

Expected Result: 2

ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS

Strategic Thrust: Science and Technology Development and Implementation

SUMMARY

ISSUES TO BE DISCUSSED:

1. Expansion of the scope of atmospheric reanalysis
2. CCI/CLIVAR/JCOMM Joint Expert Team workplan: development and use of indices
3. Research strategies to support studies of impacts, vulnerability and adaptation
4. WCRP/WWRP/IGBP Earth System Modeling Strategy to serve the predictive needs of WMO Members
5. Implementation of results of WCRP 2007 Barcelona workshop on seasonal prediction
6. Development of Regional Downscaling Techniques and capacity to use Regional Climate Models
7. CCI CLPA/WCRP mechanism for improving climate prediction and its application for adaptation
8. Implementation of Climate Watches
9. Joint IOC/WMO/CPPS Working Group on El Niño new Terms of Reference, with resolution
10. Endorsement of the CCI-CBS mechanism and timeframe for completion of the amendments to the *Manual on the GDPFS*, regarding WMO designation of Regional Climate Centres
11. Endorsement the outcomes of the WCC-3: WIOC-1
12. Endorsement of the outcomes of the ECWG-CWE-1
13. Publication and translation of the Guide to Climatological Practices
14. Improving Member's capacity for improved climate prediction and assessments through CLIPS training and networking
15. Inclusion of adaptation to climate variability and change as a key focus under Expected Result 2

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) Adoption of draft Resolution 3.2/1 (EC-LX) on the Terms of Reference (ToRs) of the joint IOC/WMO/CPPS working group on El Niño, given in Appendix B;
- (b) Adoption of the draft text for inclusion in the general summary of EC-LX contained in Appendix A.

REFERENCES:

1. "Future climate change research and observations" GCOS, WCRP and IGBP learning from the IPCC Fourth Assessment Report, WMO/TD-No. 1418
2. WCRP Position paper on Seasonal Prediction, WCRP Informal Report No. 3/2008, February 2008
3. Report of the 28th Session of the WCRP Joint Scientific Committee (Zanzibar, 26-30 March 2007)
4. Report of the meeting of the CCI Implementation Coordination Team (ICT) (Geneva, 9-11 October 2007)
5. WCDMP-No. 58, WMO/TD-No. 1269
6. WCDMP-No. 64, WMO/TD-No. 1042
7. Final report of the ETCCDI workshop (Hanoi, 3-7 December 2007)
8. Abridged Final Report with Resolutions and Recommendations of the Fourteenth Session of the Commission for Climatology (Beijing, 3-10 November 2005), WMO-No. 996
9. Abridged Final Report with Resolutions of the Fifty-eighth Session of Executive Council (Geneva, 20-30 June 2006), WMO-No. 1007
10. Abridged Final Report with Resolutions of the Fourteenth World Meteorological Congress (Geneva, 5-24 May 2003), WMO-No. 960
11. Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress (Geneva, 7-25 May 2007), WMO-No. 1026
12. Final report of the CCI-CBS Intercommission Technical Meeting (Geneva, 21-22 January 2008)
13. Final report of the first meeting of the International Organizing Committee on a WCC-3 (WIOC-1) (Geneva, 4-6 February 2008)
14. Abridged Final Report with Resolutions of Fourteenth Session of Regional Association III (South America) (Lima, 7-13 September 2006), WMO-No. 1011
15. Final report of the eleventh session of the joint IOC/WMO/Permanent Commission for the South Pacific (CPPS) Working Group on the Investigations of El Niño (Lima, 4-8 June 2007)

CONTENT OF DOCUMENT:

Appendices for inclusion in the final report:

- A. Draft text for inclusion in the general summary of EC-LX
- B. Draft Resolution 3.2/1 (EC-LX) – The Joint IOC/WMO/CPPS Working Group on the Investigation of El Niño

Appendix for information:

EC-LX/Rep. 3.2, REV. 1: Progress/Activity Report

DRAFT TEXT FOR INCLUSION IN THE GENERAL SUMMARY OF EC-LX

3.2 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS (*agenda item 3.2*)

3.2.0.1 The Council recognized that WMO's climate initiatives include the observations that sustain the models and underpin assessments, the research that develops the 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 Council noted that WMO climate activities are duly presented with respect to Expected Results 2 (Doc. 3.2), 5 (Doc. 3.5), 6 (Doc. 4.1), 7 (Doc. 4.2), 8 (Doc. 5.1) and 9 (Doc. 6.1).

3.2.1 Climate Monitoring and Assessment

3.2.1.1 The Council noted the critical need for high-resolution, high quality, homogeneous real-time and historical atmospheric and ocean datasets as input for downscaling, for statistical analyses, assessments and prediction/projection of the climate on all time scales, thus ensuring high resolution and timely climate products. It urged Members to undertake collaborative approach at regional and subregional level to develop such data sets. [*Cross reference Doc. 3.5 on data initiatives including MEDARE and marine data rescue.*]

3.2.1.2 The Executive Council noted the climate system monitoring activities undertaken under the WCDMP and the close interactions between the CCI (OPAG on Monitoring and Analysis of Climate Variability and Change) and other relevant WMO Programmes in particular WCRP/CLIVAR and JCOMM. This collaboration led to excellent and sustained work on climate change indices with direct benefits to the Members' efforts in assessing and monitoring climate extremes, regionally and locally, as well as to the IPCC work. Consequently the Council endorsed the CCI/Clivar/JCOMM Joint Expert Team (ETCCDI) workplan for the current CCI intersessional period and requested Members and the Secretary-General to continue their efforts in assisting NMHSs in developing and least developed countries in using the knowledge developed through this workplan.

3.2.1.3 The Executive Council reconfirmed its support to continuation of the atmospheric reanalysis as primary means to monitor climate variability and endorsed the need of expanding the scope of reanalysis activities to include key trace constituents, the ocean, and the cryosphere. It recognized that reanalyses require substantial infrastructure and intellectual resources, and thanked all sponsors of reanalysis activities for their efforts. The Council called on WCRP and GCOS to continue providing coordination of data reprocessing and reanalysis efforts, and urged them and sponsors to continue their support for efforts spanning the full record of instrumental observation and for the climate system as a whole.

3.2.2 Climate Prediction and Modelling Research

3.2.2.1 Based on the outcomes of the successful GCOS, WCRP and IGBP Workshop on Learning from the IPCC Fourth Assessment Report (Sydney, 4-6 October 2007), the Executive Council recognized an increasing demand by decision-makers for climate change information required for adaptation and the assessment of impacts and vulnerability, and that significant gaps still exist in our ability to observe, understand and predict climate with the required level of detail. It called on WCRP and its projects to develop strategies for future climate research that would be aimed at continuous substantiation of climate predictions and projections and at meeting identified

requirements of communities studying impacts, vulnerability and means of adaptation to climate change. It recognized the long-term climate record as a key foundation for adaptation and reinforced the high importance of adequate support to existing GCOS networks for effective use of both research-based and operational observations in climate monitoring.

3.2.2.2 The Council noted with great interest the outcomes of the WCRP/WWRP/IGBP Modelling Summit for Climate Prediction (ECMWF, Reading, 6-9 May 2008) and WCRP regional modeling workshop and endorsed WCRP's leading efforts in climate modeling, collaborating where necessary with IGBP projects, especially on biogeochemical aspects and carbon cycle. The Council urged WCRP to focus special effort on development of regional downscaling techniques, in consideration of the capacity of Members and regional entities to use regional models and observations for regional climate change assessment and adaptation.

3.2.2.3 The Council reaffirmed the high importance of the WCRP efforts aimed at the development of greater skill in seasonal and inter-annual prediction. It endorsed the results of the WCRP Seasonal Prediction Workshop (Barcelona, June 2007) and urged Members to make use of the WCRP Position Paper on Seasonal Prediction in their practices of seasonal forecasting.

3.2.3 Operational climate prediction (monthly to seasonal, interannual and decadal scales)

3.2.3.1 The Executive Council recognized a need for Members to develop or improve their national capabilities in climate prediction on the appropriate time and space scales, and consequently to improve their ability to support applications of climate information to key socio-economic sectors for adaptation to climate variability and change, and for studies of impacts and vulnerability. The Council further recognized a need to foster the transition of results from climate research to the operational practices of NMHSs. The Council therefore urged the Secretary-General, CCI and the WCRP JSC to establish a mechanism to identify the requirements of Members for, and to facilitate development and operational implementation by Members of, appropriate climate prediction techniques.

3.2.3.2 The Council noted the urgent need for NMHSs and regional climate institutions to make use of best practices in delivery, provision and evaluation of climate watches, and in managing efficiently and seamlessly the interaction among the three involved parties: Regional Institutions, NMHSs and end users. The Council urged all Members to assist in providing technical assistance to help developing and least developed countries to implement climate watches. The Council recognized the benefits of regional workshops to implement climate watches and noted the limited availability of funds for these activities. The Council therefore requested the Secretary-General promote mobilization of extrabudgetary resources to carry this activity in all regions in need.

3.2.3.3 The Council reiterated the importance of the Regional Study of the El Niño Phenomenon (ERFEN: Estudio Regional del Fenomeno El Niño) and renewed its support for the work of the joint IOC/WMO/Permanent Commission for the South Pacific (CPPS) Working Group on the Investigations of El Niño. Following the recommendation by Regional Association III, the Council adopted Resolution 3.2/1 (EC-LX) on the proposed new Terms of Reference of the joint working group (which replaces Resolution 3, EC-XLVIII), keeping in mind that the executive bodies of IOC and the CPPS would also be taking decisions on those recommendations at their forthcoming sessions.

3.2.3.4 The Council recognized the importance of Regional Climate Outlook Forums (RCOFs) in fostering networking amongst climate scientists, in development of consensus-based forecasts for regions and subregions, and in development of effective two-way relationships with users of climate information in those regions. The Council, noting the proposed expansion of RCOFs to northeastern Africa and southeastern Europe; a general interest in RCOFs globally to expand the

process to include assessments of climate change for the regions; and recent application of information from climate outlooks to the UN interagency development of information on hazards and risks for the Humanitarian Aid community, urged all Members to support these initiatives, and requested the Secretary-General to promote such activities.

3.2.4 Regional Climate Centres (RCCs)

3.2.4.1 The Executive Council noted that the Commission for Climatology Implementation Coordination Team had met (Geneva, 9-11 October 2007), and had identified CCI and CBS experts and a work plan for development of the amendments to the CBS *Manual on the Global Data Processing and Forecasting System* (GDPFS) (Vol. 1, Global Aspects) that would allow WMO designation of Regional Climate Centres by EC-LXI in June 2009. Recognizing the importance of RCC designation to Members in this timeframe, the Council endorsed the CCI/CBS inter-commission mechanism and the deadline for the completion of the amendment of the *Manual on the GDPFS*. The Council urged GPCs and regional associations to support the climate activities of pilot RCCs and RCC-Networks.

3.2.5 World Climate Conference-3 (WCC-3)

3.2.5.1 Noting that the International Organizing Committee for the World Climate Conference-3 (WCC-3) (WIOC) has been established and held its first meeting (Geneva, 4-6 February 2008), and that the science segment of WCC-3 has many implications for future climate prediction and assessments by Members and RCCs, the Council endorsed the outcomes of WIOC-1; and requested the Secretary-General to promote resource mobilization for the conference and further partnership with other UN agencies and international organizations, NGOs and the private sector. EC-LX took note of the proposed change in the date of WCC-3, and confirmed the new dates: 31 August-4 September 2009. The Council expressed its appreciation to the governments of Switzerland and the USA for their generous financial and in-kind support for WCC-3, and urged all Members to contribute to the conference, particularly through the WCC-3 Trust Fund.

3.2.6 EC Working Group on Climate and Related Water and Environmental Matters (ECWG-CWE)

3.2.6.1 The Executive Council noted that the Working Group on Climate and Related Water and Environmental Matters (ECWG-CWE) held its first session in Geneva, from 26-28 March 2008. It noted that the Group had, as requested by EC-LIX, finalized its revised Terms of Reference and had proposed revising the Group's title as follows: 'Working Group on Climate and Related Weather, Water and Environmental Matters'. The Council approved the report of the meeting, including the final ECWG-CWE Terms of Reference.

3.2.6.2 The Council noted that the Group had held a wide-ranging discussion on the future of the World Climate Programme and the Climate Agenda as a framework for WMO-sponsored and co-sponsored work on climate. It recalled that Resolution 8 of Cg-XV entitled: World Climate Programme and its Coordination provides a strong basis for moving forward on climate-related issues within the UN system and other international agencies to contribute to science, monitoring and services. The Council further recognized that the Climate Agenda continues to be a feasible step in a process for more effective and efficient integration and management of the international climate-related programmes in order to meet stakeholders' requirements. It emphasized that the legacy of the first and second World Climate Conferences such as WCP, GCOS and IPCC were still valid and need to be reinvigorated.

3.2.6.3 The Council took note that the ECWG-CWE had considered a range of options and concluded that WMO should retain "The World Climate Programme" as the overarching framework for all its activities in support of climate relevant Expected Results in the Strategic Plan. The

Council reaffirmed this notion and believed, however, that it is time for a major refocusing of activities carried out under the WCP broadly in line with the major thrusts of the Climate Agenda.

3.2.6.4 The Council considered that the redefinition of the role of the component systems of GCOS in serving the totality of user needs for climate observations should ensure that both:

- (a) GCOS, as an integrated cross-domain system broader than WIGOS, would contribute effectively to the achievement of Expected Results 2, 4, 5, 6, 7, 8 and 9 of the WMO Strategic Plan; and
- (b) GCOS (including its WIGOS components) will optimally support the broader set of needs currently represented by the four components of the World Climate Programme, the Climate Agenda, the IPCC, the UNFCCC and the full set of GEOSS SBAs.

3.2.6.5 The Council noted the benefits of the existing partnerships between WMO and agencies within the UN System on climate issues, and further noted that there are a number of other organizations active in climate that are currently not under the UN umbrella. To this effect, the Council encouraged WMO to strengthen its partnership with both UN and non-UN agencies relevant to its climate-related activities.

3.2.6.6 The Executive Council noted that its advisory bodies and working groups provide important input to the work of the Council and sufficient funding should be available in the WMO Regular Budget to ensure annual meetings of such Groups.

3.2.7 Guide to Climatological Practices

3.2.7.1 The Council noted the need by Members for advanced, up-to-date information on all aspects of climatological services, and urged the Secretary-General to expedite publication of the Guide to Climatological Practices. The Council further urged Members to facilitate translation of this important publication.

3.2.8 Capacity Building for Improved Climate Prediction and Assessments

3.2.8.1 Underpinning the goal of enhancing capabilities of Members to provide better climate predictions and assessments are urgent requirements for technical training for climate professionals, modelers, analysts, statisticians, etc.; for reference materials on best practices; and for networking and collaboration. The Council therefore urged the Secretary-General to provide all possible support, and Members to provide in-kind and extrabudgetary resources for development of a CLIPS permanent training curriculum, enhancement of the CLIPS Focal Point Network, and for the development of an Implementation Plan for future evolution of CLIPS as recommended by Cg-XV.

3.2.9 Adaptation to Climate Variability and Change

3.2.9.1 The Council agreed that all the activities noted in 3.2.0.1 above 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 change; the climatic sensitivity of the system or region in question; and the capacity to adapt to the projected changes. The Council therefore urged Members to consider, in due course, specific inclusion of the concept of adaptation in WMO's Strategic Plan, and, when appropriate in that evolution, to revise the wording of Expected Result 2 as follows: ***'Enhanced capabilities of Members to provide better climate predictions and assessments and to develop effective strategies for adaptation to climate variability and change'***.

3.2.9.2 In this regard, the Council urged CCI and relevant WMO Programmes including co-sponsored WCRP and GCOS, to identify current activities relevant to adaptation and gaps to be addressed for provision for the needs of key socio-economic sectors for climate information for climate-risk management, and to take steps to incorporate these in future priority setting and planning. This effort must address, amongst other things, 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.).

3.2.9.3 The Council noted the recommendations of the EC Working Group on Climate and Related Water and Environmental Matters (EC WG-CWE) to undertake a major refocusing of activities carried out under the WCP; the pledges made by WMO to the Nairobi Work Programme following the UNFCCC COP-13 (Bali, 2007); and the current lead role assigned to WMO and UNESCO jointly to provide the knowledge base for adaptation in accordance with the UN system wide coordination of climate activities. The Council appreciated that the Secretariat has developed a proposal on the 'WMO Initiative to support Climate Change Adaptation (WISCCA), which takes into account recent realization and enhancement of global and regional mechanisms for climate (e.g. GPCs, RCCs, RCOFs), in consultation with climate experts from the Commission for Climatology (CCI) and the ECWG-CWE. It noted that the Initiative complements the proposal for "Enhanced Climate, Weather, Water and Environmental Prediction Framework" presented in EC-LX/Doc. 3.2(3).

3.2.9.4 The Executive Council endorsed the new Initiative and urged the Secretary-General to develop, as a matter of priority, a new programme to support adaptation to climate change, in consultation with the relevant technical commissions and the ECWG-CWE. The Council recognized that this initiative, realigning and focusing existing programmes and activities, would be initially launched within existing human and financial resources. The Council 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.

[For background information, see the Progress/Activity report EC-LX/Rep. 3.2, paragraphs 3.2.9.4 and 3.2.9.5, and its Annex.]

3.2.9.5 The Executive Council noted that the UNFCCC (Mexico City, 4-7 March 2008) identified RCOFs as successful methods for adaptation, and noted that NMHSs play a vital role in the data and observations required for adaptation. The Council noted the concern raised at the meeting regarding the need for smoother mechanisms for 'free exchange of data and information' for adaptation purposes, and requested the Secretary-General to take measures to enhance partnerships with the user communities and to facilitate exchange of data and information for the use of adaptation practitioners.

DRAFT RESOLUTION

Res. 3.2/1 (EC-LX) - THE JOINT IOC/WMO/CPPS WORKING GROUP ON THE INVESTIGATIONS OF *EL NIÑO*

THE EXECUTIVE COUNCIL,

Noting:

- (1) Its approval in 1978 for WMO's participation in the joint IOC/WMO/CPPS Working Group on the Investigations of *El Niño* (EC-XXX, general summary, paragraph 3.2.11),
- (2) Paragraph 3.4.4.22 of the general summary of the *Abridged Final Report with Resolutions of Twelfth Congress* (WMO-No. 827), noting with satisfaction the close and continued collaboration of WMO with the other organizations concerned,
- (3) Paragraphs 7.4.13 and 7.4.14 of the general summary of the *Abridged Final Report with Resolutions of Fourteenth Session of the Regional Association III (South America)* (WMO-No. 1011), endorsing the need to review the terms of reference for the working group, in order to adjust to the new coordination scheme in the framework of the JCOMM, CCI, as well as the interaction with the International Research Centre on El Niño (CIIFEN),
- (4) That membership of the joint working group is open to all Members of WMO,

Decides to approve the new terms of reference of the joint IOC/WMO/CPPS Working Group on the Investigations of *El Niño* as given in the Annex to this resolution, subject to a similar decision being taken by other co-sponsoring organizations;

Requests the Secretary-General to continue providing the necessary assistance and Secretariat support for the joint working group, within the available budgetary resources.

Annex: 1

Note: This resolution replaces Resolution 3 (EC-XLVIII), which is no longer in force.

Annex to draft Resolution 3.2/1 (EC-LX)

TERMS OF REFERENCE OF THE JOINT IOC/WMO/CPPS WORKING GROUP ON THE INVESTIGATIONS OF EL NIÑO

Date and IOC resolution of initial establishment: November 1977; Resolution X-2

The Joint IOC/WMO/CPPS Working Group on the Investigations of El Niño, henceforth known as the IOC/WMO/CPPS Working Group on El Niño and its Regional Impacts, shall:

Overall objective

Promote activities and research aimed at reinforcing the coordination of projects related to the El Niño Southern Oscillation (ENSO), including those activities undertaken in support of the Regional Study on the El Niño Phenomenon (ERFEN), its Strategic Action Plan, and the Global Ocean Observing System's Regional Alliance for the Southeast Pacific (GRASP) with a view to sustainable development in the long term as well as capacity-building at both national and international levels.

Specific objectives

1. Promote projects for the better understanding of how to use climate information to obtain the greatest socio-economic benefit in the fishing, energy and agricultural sectors and water resources management, amongst others, to help governments with decision-making and preparation for, and adaptation to disasters;
2. Work with CLIVAR and other related programmes to improve regional forecast models through intercomparison, to help promote regional and global capacities for physical and impact modelling;
3. Promote the generation, management and exchange of data in standardized formats to help improve climate prediction models (initial conditions and validation);
4. Improve public information about ENSO and the effects of climate variability in the region, including the creation of a representative definition for the region, as well as communication with governments about the importance of investment in the training of scientists and the acquisition of forecasting and observation capacity;
5. Promote the exchange of experts between Member countries and with other regions.

Work methodology

1. Hold workshops and develop short-term projects;
2. Mobilize resources to finance regional projects and activities;
3. Coordinate activities with relevant centres and agencies in the region;
4. Prepare exchange agreements on information and technical cooperation;
5. Promote the inclusion of regional scientists in global and regional programmes relevant to the region.

Participants and coordination relationship

The IOC/WMO/CPPS Working Group on El Niño and its Regional Impacts shall be open to the Member States of the three co-sponsoring organizations. Other public, private and academic organizations and bodies that are interested in participating for research purposes may be considered by the working group, if they apply to, and are accepted by the National Focal Points and subject to approval by IOC, WMO and CPPS.

The following cooperative relationships are also hereby established:

- Through CPPS, with ERFEN, GRASP and CIIFEN in areas of common interest;
- Through WMO and IOC with programmes that are of more global concern, in particular WCRP's CLIVAR Project, WCP, CCI, IODE, GCOS/GOOS, and the Joint WMO-/IOC Technical Commission for Oceanography and Marine Meteorology;
- With IOC's Capabilities Development Programme and WMO's Education and Training Programme;
- With IOCARIBE and the relevant WMO regional associations.

Membership and chairmanship

Members shall be scientists and experts in the fields of oceanography, meteorology, biology, fisheries and socio-economic matters, nominated by the countries' governments.

The chairmanship shall be assigned for two years to a group member designated by one of the Member States by rotation in alphabetical order, starting with Ecuador. Likewise, a deputy shall be chosen by whichever country is to designate the chair for the following period, who will replace the chair in the event of any absence, whether temporary or permanent, in the latter case while the chair's country designates an appropriate replacement.

The chair is responsible for implementation of the two-year plan, which shall form part of the present terms of reference, agreed at every meeting of the group, in close coordination with the Secretariat. He shall also prepare and submit a progress report relating to his term of office.

Meetings

The group shall hold ordinary meetings every two years and extraordinary ones when any of the Parties request them and the other Parties agree. The venue may be the same as for the meetings of the ERFEN Scientific Committee.

Secretariat

It shall be the responsibility of CPPS, with the support of the secretariats of IOC and WMO.

Evaluation and continuation

The new terms of reference of the IOC/WMO/CPPS Working Group on El Niño and its Regional Impacts shall cover four years from the date of their approval by the relevant authorities of the three founding organizations, whereafter the IOC, WMO and CPPS, as the group's founders, shall evaluate them and decide on their continuation.

World Meteorological Organization

EC-LX/Rep. 3.2, REV. 1

EXECUTIVE COUNCIL

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**ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER
CLIMATE PREDICTIONS AND ASSESSMENTS**

**Strategic Thrust: Science and Technology
Development and Implementation**

PROGRESS/ACTIVITY REPORT

SUMMARY

Reference: EC-LX/Doc. 3.2, REV. 1

CONTENT OF DOCUMENT:

Appendix:

- Progress/Activity Report since EC-LIX

PROGRESS/ACTIVITY REPORT SINCE EC-LIX

3.2.1 Climate Monitoring and Assessment

3.2.1.1 Publication and dissemination of the WMO statements on the status of the global climate and the annual climate review based on the “State of the Climate” BAMS article continued in collaboration with Members, CCI experts and various data and monitoring centres including in particular the strong contribution from UK, NOAA/NCDC, DWD, CMA, Australia, Japan and others. However the annual climate review could not be translated on regular basis to all WMO languages due to lack of resources.

3.2.1.2 In November 2006, an action plan was established by the CCI, WCRP/CLIVAR, JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI). The work plan includes new recommended indices such as Arctic and Antarctic sea-ice extent, ocean and surface marine indices, heat stress index and a greenhouse gases climate response index. The work plan involves interactions with several international groups and projects such as: the Asian Pacific Network (APN); the European Climate Assessment and Dataset (ECA&D) Project; the IPCC Task Group on Data and Scenario; Support for Impact and Climate Analysis (TGICA); the WCRP JSC/CLIVAR Working Group on Coupled Modeling (WGCM); the GEWEX/WISE group; and the US CLIVAR WG on droughts. The outcome of the work plan will contribute to the IPCC AR5 as well as to the UNFCCC Nairobi Work program (NWP). See:

www.wmo.int/pages/prog/wcp/wcdmp/wcdmp_series/documents/ETCCDI64.pdf

3.2.1.3 A seminar on climate extremes and climate change indices was organized for the East Asian Countries (Hanoi, 3-7 December 2007). See:

www.wmo.int/pages/prog/wcp/wcdmp/documents/ETCCDI_Vietnam_workshop_report_final.pdf

3.2.1.4 A successful third WCRP International Conference on Reanalysis was held from 28 January–1 February 2007, in Tokyo, Japan. It concluded that atmospheric reanalyses have greatly improved our ability to diagnose climate variability. The scope of reanalyses is expanding to include key trace constituents, the ocean and the cryosphere. Regional reanalyses are conducted. The Conference underlined the need for substantial infrastructure and intellectual resources and stronger coordination of data reprocessing and reanalysis efforts. It urged the sponsors of reanalysis to continue their support for efforts spanning the full record of instrumental observation and for the climate system as a whole.

3.2.1.5 WMO established the Marine Climatological Summary Scheme (MCSS) in 1963 (Resolution 35, Cg-IV). The JCOMM Data Management Coordination Group (DMCG), which met in October 2006 (Geneva, Switzerland), agreed on the need for modernization of the management of the two separate functions of the MCSS: (i) delayed-mode VOS data handling; and (ii) the preparation of the Marine Climatological Summaries (MCS). This issue was further discussed by the JCOMM Expert Team on Marine Climatology (ETMC), which met in March 2007 (Geneva, Switzerland), that established: (i) a JCOMM cross-cutting task team on Marine and Oceanography Climatological Summaries (TT-MOCS), with CCI representation; and (ii) a task team on Delayed-mode VOS data (TT-DMVOS). Both TT-MOCS and TT-DMVOS met in May 2008 during the Third JCOMM Workshop on Advances in Marine Climatology (CLIMAR-III, Gdynia, Poland) in order to, respectively: (i) prepare a work plan to modernize the production and dissemination of user relevant marine climatological summary products and to develop the amendments required for the Manual on and the Guide to Marine Meteorological Services to reflect the proposed changes in the MCSS; and (ii) address the management and quality control of the delayed-mode VOS data and to explore possible connections with real-time VOS and other ship-based data.

3.2.1.6 Following the request by JCOMM (JCOMM-II, Halifax, Canada, September 2005), and its endorsement by Congress (Cg-XV, May 2007), the Third JCOMM Workshop on Advances in Marine Climatology (CLIMAR-III) was held in Gdynia, Poland, from 6 to 9 May 2008. CLIMAR-III aimed to build on the outcomes of the two previous CLIMAR workshops (2003 and 1999) and on the outcomes of the alternating and closely related Advances in the Use of Historical Marine Climate Data (MARCDAT) workshops (2005 and 2002). All these workshops have brought together a wide spectrum of marine data users and managers of marine data and products, and had included an underlying focus on the continuing evaluation, utilization, and improvement of ICOADS (<http://icoads.noaa.gov/>). CLIMAR-III goals were to: (i) review ongoing developments in the flow and standardization of marine data and metadata; (ii) foster and coordinate the development of marine climate data and products, including ICOADS; and (iii) encourage appropriate contributions for the Dynamic Part of the WMO Guide to the Applications of marine Climatology.

3.2.1.7 The Joint IOC/WMO/Permanent Commission for the South Pacific (CPPS) Working Group on the Investigations of El Niño is a result of a long-standing cooperation between the three organizations. The terms of reference for the working group did not reflect recent developments on El Niño activities. At the fourteenth session of Regional Association III (South America) (Lima, Peru, September 2006), the Association endorsed the need to review the terms of reference for the working group, in order to adjust to the new coordination scheme in the framework of JCOMM, CCI, as well as the interaction with the International Centre on Research Studies for El Niño (CIIFEN). New Terms of Reference were adopted during the eleventh session of the working group (Lima, Peru, June 2007). By virtue of its capabilities, CPPS currently implements the Regional Study of the Phenomenon El Niño (ERFEN) and the Programme of Annual Regional Oceanographic Observation Cruises in the Southeast Pacific, and issues a Climate Alert Bulletin for the region.

3.2.1.8 There is a great deal of interest among operational climate services, users and the media for information on the regional impacts of ENSO. The available information on such impacts is scattered, and globally consolidated syntheses are outdated. Acting on the recommendation of CCI-XIV, the CCI Expert Team on El Niño and La Niña is working on the zero-order version of an atlas of regional impacts of ENSO. At the meeting of the ET (12-15 August 2007, Cola, Calverton, USA) the team decided that the atlas would initially be web-based, and can gradually evolve and stabilize into a hard copy version. The team also agreed that the ENSO should be represented as a continuous phenomenon in modulating the impacts, not confined to the depiction of typical El Niño and La Niña events. WMO is exploring potential hosts for the web-based atlas.

3.2.2 Climate Prediction and Modelling Research

3.2.2.1 Having substantially contributed to the success of the IPCC AR4 and 2006 Scientific Assessment of Ozone Depletion, the WCRP was focusing efforts of its projects and working groups in 2007 on developing new directions of climate research that would significantly advance climate understanding and improve climate prediction skill from extended medium-range through inter-annual and decadal scales to centennial scales.

3.2.2.2 The GCOS-WCRP-IGBP Workshop on Learning from the IPCC Fourth Assessment Report (4-6 October 2007, Sydney, Australia) recognized an increasing demand by decision-makers for climate change information for adaptation and the assessment of impacts and vulnerability. Guidance for decisions on adaptation is often demanded with greater detail than current research can currently deliver. The workshop identified a number of significant gaps that still exist in our ability to observe, understand and predict climate with the required level of detail and agreed that research and observation communities and those studying impacts, vulnerability and means of adaptation needed to develop linked strategies. The workshop report proposed several major principles for guiding the future research and observations by global programmes.

3.2.2.3 The 28th Session of the WCRP Joint Scientific Committee (26-30 March 2007, Zanzibar, Tanzania) reviewed progress in climate modeling and recognized a need to organize a high level meeting on the strategy for its further development. The WCRP Modelling Panel was in charge of organizing a WCRP/WWRP/IGBP Modelling Summit for Climate Prediction (ECMWF, Reading, 6-9 May 2008) and was able to attract many sponsors for this event enabling participation of experts from developing countries. Recommendations from the Summit are expected to contribute to formation of a scientific consensus on how to advance climate modelling in collaboration with WWRP/THORPEX and IGBP, spanning the range of time scales from days to centuries, and extending the scope of processes represented closer to the full Earth System.

3.2.2.4 GCOS, WCRP and WCP have proposed to the World Bank to hold a series of workshops in several African countries focusing on assessment of skill in regional downscaling of climate predictions and development of capacity to use regional models and observations for regional climate change assessment and adaptation. Outcomes of the Regional Climate Modelling workshop in Trieste, Italy, March 2008 and other planned for the future will be communicated to Members.

3.2.2.5 The WCRP continues its Seasonal Prediction Experiment aimed at determining the possible sources of predictability associated with various domains of the physical climate system. The state-of-the-art in these activities and directions for future work were the main themes of the very successful and well attended Seasonal Prediction Workshop (4-7 June 2007, Barcelona, Spain). The report from the Workshop contains a WCRP Position Paper on Seasonal Prediction that represents a consensus of a large number of active seasonal prediction scientists on principles for objective assessment of seasonal forecasts based on WMO practices and the strategy for achieving maximum predictive skill and efficiency, and raising the seasonal forecast value for national economies.

3.2.2.6 Activities of WCRP core projects in 2007 resulted in several major initiatives and achievements of global and regional character including: approval of the IGOS Theme on Cryosphere and the proposal for study of feasibility of a WMO Global Cryosphere Watch; advances in the development of science-based observing systems in the World Ocean; online and hard copy publication of a WOCE Pacific Atlas; coordinated acquisition of satellite observations for the IPY 2007-2008 that will lead to an unprecedented snapshot of the polar regions; regional initiatives in the La Plata Basin; several continental scale initiatives such as Year of Organized Tropical Convection, Asia CliC, Asian Monsoon Year, West African Monsoon Modelling and Evaluation, and many others. They all involve a broad network of scientists and users and these developments were extensively communicated through the WCRP updated Website and a significant number of published and electronic reports and Newsletters.

3.2.3 Operational climate prediction

3.2.3.1 The Secretariat, in collaboration with CCI/ICT (Geneva, Switzerland, 9-11 October 2007), noted the benefits of regional workshops on the implementation of climate watches. These workshops would be based on the WMO technical document on "Climate Watches" (see <http://www.wmo.int/pages/prog/wcp/wcdmp/documents/GuidelinesonClimateWatches.pdf>) and the clarified definition provided by CCI-XIV (Beijing China, 3-10 November 2005) (item 5.4.2) which was subsequently endorsed by EC-LVIII (item 3.2.2.13). The ICT agreed that the first workshop would be held in Region III, in collaboration with WCDMP, WCASP and WWW, to focus on the following objectives:

1. Assess the need for climate watches in the Regions;
2. Review the status of climate monitoring and long range forecasting capabilities at regional and national level;

3. Review and discuss climate watch showcases from the Region and from abroad;
4. Work on tailoring the WMO guidelines on climate watches to the Region needs;
5. Recommend best practices for the Region in issuing climate watches;
6. Recommend best strategies towards users of climate watches.

3.2.3.2 WMO continued to develop consensus-based updates of El Niño and La Niña, in collaboration with the International Research Institute for Climate and Society (IRI). WMO El Niño/La Niña Updates are being issued on a quasi-regular basis once in every three months (Updates were released in July and October 2007 and in February 2008). Global Producing Centres, regional institutions, NMHSs as well as some applications and communications experts actively participate in the development of these consensus products.

3.2.3.3 Regional Climate Outlook Forums (RCOFs) have sustained their operations in Africa, South America, Asia and South Pacific Islands. RCOFs have completed 10 years of their existence in Africa, and are increasingly being recognized as effective mechanisms for generating and disseminating regionally consistent climate outlooks in a user-targeted manner. WMO also has been actively promoting the concept, and a new initiative to start an RCOF in Southeastern Europe has been taken up by the concerned members in RA VI. Efforts have been initiated to reactivate RCOFs for Northern Africa and Central Africa. RCOFs have been included in the UNFCCC Compendium of Methods and Tools in support of adaptation to climate change. WMO is also taking steps include regional climate change issues into the portfolio of RCOF activities. The CCI Expert Team on CLIPS Operations, Verification and User Liaison is developing a Guide to Best Operational Practices focusing on the RCOFs.

3.2.3.4 The nine Global Producing Centres (GPCs) of Long-Range Forecasts (LRF), recognized by CBS-Ext. in 2006 and approved by EC-LIX include: Beijing, Exeter, Melbourne, Montreal, Seoul, Tokyo, Toulouse, Washington and ECMWF, have pursued their regular production of LRF and fed the joint Lead Centre for the Standard Verification System for LRF (LC_SVSLRF) (Melbourne and Montreal). Information and forecast data are available for all NMHSs through GPCs' Web sites (see: <http://www.wmo.int/pages/prog/www/DPS/Seasonal/List-URL-LRF.doc>) or by request by contacting the GPCs directly. Information on scores and hindcasts are available in the LC-SVSLRF Web site: <http://www.bom.gov.au/wmo/lrfvs/>. The Russian Federation has indicated its intention to have Moscow recognized as GPC at the next CBS session (CBS-XIV).

3.2.3.5 Given the advantage of Multi-Model Ensemble techniques, a Workshop of GPC representatives was held, at the kind invitation and support of the Republic of Korea, in Busan from 18 to 20 September 2007 to consider the establishment of a Lead Centre for Long-Range Forecast Multi-Model Ensemble prediction (LC-LRFMME). With a view to further discussions by the CBS Expert Team on Extended and Long-Range Forecasting and CBS-XIV, the workshop refined the needs and functions of the LC-LRFMME and made recommendations for a phased approach to the development of these activities.

3.2.4 Regional Climate Centres

3.2.4.1 WMO has formally sought to define and establish Regional Climate Centres (RCCs) since the Thirteenth World Meteorological Congress (Cg-XIII, May 1999). The Commission for Climatology Implementation Coordination Team (CCI ICT) which met from 9-11 October 2007 (Geneva, Switzerland) with representation from the regional Working Groups on Climate-related Matters and of the WMO World Weather Watch and CBS, agreed on definitions of RCCs and RCC-Networks, and that the terms 'RCC' and 'RCC-Network' would be exclusively used for

centres designated by WMO under the *Manual on the Global Data-processing and Forecasting System* (Volume 1, Global Aspects) (the 'GDPFS Manual'). Roles and responsibilities of RCCs and RCC-Networks were identified in two categories: mandatory functions that would be common to all designated RCCs or RCC-Networks, and highly desirable functions. It was decided that RCCs and RCC-Networks will be considered, in the GDPFS Manual, as a type of Regional Specialized Meteorological Centre (RSMC), and will be 'centres in a cooperative effort', a concept already defined in the GDPFS Manual. These decisions underpin the concept that RCCs and RCC-Networks will be centres of excellence, with uniformity of service around the globe in their mandatory functions. The CCI ICT established a technical expert group, with CCI and CBS representation, to address and resolve remaining issues, and to develop the amendments required for the GDPFS Manual to support formal WMO designation of RCCs or RCC-Networks, and established a work plan for this activity.

3.2.4.2 The CCI-CBS Intercommission Technical Meeting was held in Geneva, Switzerland on 21-22 January 2008. A comprehensive set of amendments was developed for the GDPFS Manual, including criteria for the set of mandatory functions for RCCs and RCC-Networks. Following finalization of the report for the session, implying agreement by both CCI and CBS representatives on the content, style and format of the amendment, the proposed amendment will be submitted to the CBS Expert Team on LRF and then the CBS ICT on the Data Processing and Forecasting System. Any suggested CBS modifications will be reviewed and undertaken by the Intercommission Expert Group, and approved by the CCI Management Group. The president of CCI will submit the proposed amendment to the upcoming session of CBS (November 2008) for endorsement. CBS will submit the proposed amendment to WMO Executive Council in 2009 (EC-LXI) for approval. CCI and CBS recognize the importance of adherence to the timeframe identified by the CCI ICT, in order to support the wishes of the members to have the first RCCs designated at EC-LXI in 2009.

3.2.5 World Climate Conference-3

3.2.5.1 In the follow-up to the decision of Cg-XV, WMO established an International Organizing Committee (WIOC) for WCC-3 to support continuation of the work. The WMO Congress has agreed that any costs for organizing and holding a WCC-3 must be funded from extrabudgetary resources and emphasized implementing efficient mechanisms for resource mobilization. WMO has established a Trust Fund for WCC-3 to receive contributions. The Government of Switzerland stands as the first major contributor to the WCC-3 Trust Fund. The Government of the USA also provided logistical support through a professional staff for the Conference Secretariat to organize the first meeting of the International Organizing Committee. A Conference Secretariat (WCC-3-CS), which will run with secondment of staff from contributing countries and extrabudgetary resources, was established to organize the meetings of WIOC and manage other requirements for the WCC-3. The WCC-3-CS will make quarterly progress reports to the WMO President and Secretary-General and submit annual written reports to the Executive Council. These reports will be disseminated to WMO Permanent Representatives and their Missions in Geneva.

3.2.5.2 WMO organized the first meeting of the International Organizing Committee on a WCC-3 (WIOC-1) (Geneva, 4-6 February 2008). The most significant issues that concerned the meeting were related to the title of the conference, putting more attention at WCC-3 on the needs of users, in contrast to the capabilities of users; and secondly the scope of the science agenda with primary focus on seasonal to interannual predictions as compared to long-term climate projections, though prediction out to multi-decades is within the scope of the WCC-3 where appropriate. The meeting by and large agreed that multi-decadal prediction should be an important part of the conference programme.

3.2.5.3 The meeting expressed concern over the short time available to organize the WCC-3, especially to obtain the needed resources. An aggressive process will be needed over the next

few months to get all aspects of the Conference moving forward. WIOC-1 emphasized the need for an implementation plan and timeline with milestones.

3.2.5.4 WIOC-1 established four sub-committees to further the planning and implementing the WCC-3. These sub-committees are:

- Sub-committee on Programme Segment – Chair: Martin Visbeck (Germany);
- Sub-committee on Interactions – Chair: Alexia Massacand (GEO);
- Sub-committee on High-level Segment – Chair: Jose Romero (Switzerland);
- Sub-committee on Resource Mobilization – Chair: Mary Power (WMO).

3.2.6 EC Working Group on Climate and Related Water and Environmental Matters (ECWG-CWE)

3.2.6.1 The Executive Council Working Group on Climate and Related Water and Environmental Matters (ECWG-CWE) takes over from the EC Advisory Group on Climate and Environment which served from 1999-2007. The new working group now includes water issues as well and will advise on all matters related to the WMO's climate, water and environment activities in order to promote better coordination among WMO bodies and sponsored programmes and to strengthen WMO's partnership with other UN and scientific organizations concerned with climate. The ECWG-CWE will also seek to promote the valuable contribution of NMHSs to the strategies of Members for adaptation to the impacts of climate variability and change. The Group now enjoys wider expertise through ex-officio members who come from technical commissions and WMO's joint bodies. The Group held its first session in Geneva from 26-28 March 2008.

3.2.7 Guide to Climatological Practices

3.2.7.1 A full draft of key chapters of the third edition of the Guide to Climatological Practices was provided to members during the Fifteenth World Meteorological Congress in May 2007, and their input was requested. In the third quarter of 2007, the draft Guide was circulated to relevant Secretariat Programmes for their review and comment. The CCI Expert Team (ET) on the Guide continues the work to incorporate Members and Secretariat comments, to finalize the annexes, graphics and references. Upon receipt of the complete draft, the Secretariat will conduct a peer review, following which the ET will make a final editing and submit the manuscript to WMO for publication.

3.2.8 Capacity building for Improved Climate Prediction and Assessments

3.2.8.1 Capacity building is one of the core elements of the CLIPS project. Under the CLIPS project, a number of training sessions have been held worldwide, covering different Regions in a cyclical fashion. As part of this activity, a CLIPS Focal Point training session was held in RA I with special focus on the Mediterranean Region (Tunis, 29 October-9 November 2007). CLIPS Training Workshops are also proposed under the relevant thematic areas including applications, such as ENSO, Polar Regions, Human Health, Tourism and Energy. Due to limited resources, revisiting of Regions for updated training sessions has not been possible. However, considering that CLIPS training is an essential element in the development of climate services, CLIPS Training Curriculum is under constant development and updating, and the modules are made available on WMO Web site.

3.2.8.2 Cg-XV urged the Secretary-General to work with CCI to revisit the goals and objectives of CLIPS and to draft an Implementation Plan for future evolution of CLIPS activities that would propose options for a guidance mechanism for CLIPS, to include the WCRP, ETR, DPM, LDCs and other relevant programmes. The CCI ICT considered the Cg-XV recommendations on CLIPS and agreed that the new CLIPS-IP may consider and incorporate some of the following:

- Defining clear deliverables and milestones;
- Establishment of a Scientific Steering Group (including participation of CCI OPAGs 3 and 4, WCRP/CLIVAR, international organizations such as IRI, partner agencies such as WHO, UNWTO, etc.);
- Establishment of joint CCI/WCRP Expert Teams for more efficient operationalization of research advances in climate prediction;
- Resource mobilization;
- Development of strategies for user-targeted CLIPS product generation and dissemination;
- Expansion and enhancement of RCOF processes;
- Showcase projects;
- Development of training material for sustained capacity building activities both for the climate providers and application sectors;
- Revitalization of CLIPS Focal Point (FP) networking, including standardization of their reporting process, and a close interaction of the CLIPS FPs with the Regional Working Groups on Climate-Related Matters;
- Setting a sunset date for CLIPS project with a wrap-up conference and a publication highlighting CLIPS contributions; defining CLIPS legacy and the way forward.

3.2.8.3 The ICT endorsed the idea of setting a sunset date for CLIPS as a project, and agreed that the year 2015 coinciding with Cg-XVII might be a reasonable sunset date. However, the ICT agreed that while CLIPS may be concluded as a project, the concept will need to continue as an ongoing programme, the nature of which may be determined as part of the CLIPS-IP.

3.2.8.4 Showcase projects demonstrating the benefits of climate services in different sectors are very important in promoting the CLIPS concept. However, implementation of such showcase projects is highly resource-intensive and cannot be taken up under the regular budget. In a welcome development, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), and the Satellite Application Facility on Climate Monitoring (CM-SAF), with the assistance of Deutscher Wetterdienst (DWD) offered to support proposals for a showcase on the use of CM-SAF data for operational climate applications. This showcase is also acknowledged as an important contribution to the WMO CLIPS project. The goal of this initiative is to demonstrate the use of CM-SAF data for operational climate applications. NMHSs of WMO's RA VI have been invited to propose a tailored application of CM-SAF data in an operational climate activity.

3.2.9 Adaptation to Climate Variability and Change

3.2.9.1 Following the recommendations of the expert meeting on the "Climate information needs of the water planning and management community", held at the WMO Headquarters from 18-20 December 2006, two national pilot projects have been initiated in Mexico and Egypt to assess the climate change impacts on water resources and developing appropriate adaptation strategies for the water sector in the two countries. A National Workshop, to start the project in Mexico, was organized from 5-7 December 2007, and was hosted by CONAGUA, the national water agency of Mexico. Experts from water and climate sectors from the USA also participated in the workshop. An action plan for the next four year period has been formulated, which will be largely funded from the national resources. The National Kick-off Workshop for starting the project in Egypt was organized in Cairo from 13-15 April 2008. Experts from Canada and South Africa also participated. A national action plan to carry out the activities is presently being developed based on which a project proposal for funding is proposed to be submitted to CIDA. Based on the experience gained thus far from these projects, it is clear that WMO, working as it does with both the climate and hydrological scientific communities, is in a unique position to provide the much needed support to facilitate this multi-stakeholder activity in the countries under the overall guidance of CHy with support from CCI. Both Commissions are in a prominent position to

contribute with expert advice, in view of their memberships formed by experts from WMO's Member countries.

3.2.9.2 Activities of CCI OPAGs on Climate Information and Prediction Services and on Climate Applications and Services towards building partnerships with UN agencies and other international organizations representing key socio-economic sectors, scoping the climate-related needs of these sectors, and development of information and products to serve specific sectors are pertinent to development of effective strategies for adaptation to climate variability and change. (Cross reference Doc. 4.2.)

3.2.9.3 In the follow-up to the implementation of Nairobi Work Programme on impacts, vulnerability and adaptation to climate change, WMO participated in the UNFCCC organized expert meeting on Methods and Tools as well as Data and Observations, Mexico City, Mexico, 4-7 March 2008. RCOFs have been identified in this forum as successful methods for adaptation. With respect to data and observations, the user community gives a central role to NMHSs and is much concerned about smoother mechanisms for 'free exchange of data and information' for adaptation purposes.

3.2.9.4 The Bali Action Plan adopted at the COP-13 (2007) has recognized the need for enhanced action on adaptation through international cooperation, risk management, risk reduction strategies and building resilience. It also calls upon multilateral bodies, the public and private sectors and civil society, to support adaptation in a coherent and integrated manner. The UN-wide climate initiative has accordingly identified four pillars of action to combat climate change: adaptation, mitigation, technology and finance. In April 2008, WMO submitted two action pledges to the UNFCCC Nairobi Work Programme on 'Climate information, products and services for adaptation', and on 'Regional Frameworks for Adaptation of Agriculture to Climate Change' (see <http://unfccc.int/3996.php> or go directly to <http://unfccc.int/4367.php>).

3.2.9.5 Effective management of climate variability and potential climate change within Member countries requires that climate information (e.g. data, climate monitoring products, statistical and GIS analyses, assessments, predictions, projections, policy-relevant products, etc.) be used effectively in planning and that climate related risks be incorporated into development decisions. Promoting the broader use of climate information and key services as tools in the development and implementation of effective adaptation strategies is one of WMO's major goals. The research, data collection, prediction and client services of National Meteorological and Hydrological Services (NMHSs) play a significant role in providing climate information in support of development of adaptation strategies. In order to help NMHSs in supporting various development sectors to make informed decisions on practical adaptation actions and measures, WMO has developed an Initiative on Support for Climate Change Adaptation (WISCCA). The Initiative, described in the Annex to this Appendix, appropriately addresses the needs of developing countries and least developed countries (LDCs).

ANNEX

WMO INITIATIVE TO SUPPORT CLIMATE CHANGE ADAPTATION (WISCCA)

1. Introduction

Enhanced action on adaptation through international cooperation, risk management, risk reduction strategies and building resilience has been recognized by The Bali Action Plan adopted at the COP-13 (2007) as essential to meet the growing challenge of climate change. Adaptive management approaches for sustainable development and achieving Millennium Development Goals (MDGs), not only require a coherent policy framework from governments but also high-quality climate information and tools for risk management through better and systematic monitoring, assessments and predictions at the regional, national and local scales.

Promoting the broader use of climate information and products as tools in the development and implementation of effective adaptation strategies is one of WMO's major goals. In an effort to help NMHSs in playing their assigned role in supporting various development sectors to make informed decisions on practical adaptation measures, WMO proposes to launch a new Initiative to support Climate Change Adaptation (WISCCA). The proposal addresses Expected Result 2 and Expected Result 7. This initiative is a WMO contribution towards the Nairobi Work Programme for adaptation as a response promoted by the UNFCCC.

2. WMO Initiative to support Climate Change Adaptation

Under the overarching framework of World Climate Programme (WCP) and in pursuance of the discussions during the EC-WG-CWE (March 2008), this Initiative, with a focus on provision of services including climate prediction and related capacity building, has been developed. The Initiative is based on the main pillars representing WMO's climate activities, namely observations; monitoring; research; and applications and services; and on the capacity building required for each. The Initiative complements another initiative on "Enhanced Climate, Weather, Water and Environmental Prediction Framework", which focuses on strengthening prediction research, being developed separately.

The Initiative is an effort to pool together WMO's existing strengths to provide climate information that is vital to support adaptation to climate variability and climate change, particularly for the most vulnerable sectors and regions. The Initiative will therefore support WMO and relevant partner's efforts to enhance capacity at international, regional, national, sectoral and local levels to identify and understand impacts, vulnerability and adaptation responses, and to select and implement adaptation actions. The Initiative also addresses the special needs of developing countries and least developed countries (LDCs).

2.1 Mission

To integrate, coordinate and enhance the provision of user-oriented climate information, products, advisories and services to support national and regional climate risk assessment, climate adaptation planning and implementation practices for sustainable development.

2.2 Objectives

The main objectives of the initiative are to:

- Support the scientific foundation for climate adaptation strategies;

- Make available adequate data products and other relevant climate information for developing adaptation strategies in different sectors at regional and national levels and help integrating them into national development agenda;
- Facilitate use of climate information for mainstreaming climate risk management into decision-making;
- Enhance the national capacities in the provision of user-oriented climate information, products, advisories and services for climate adaptation planning and implementation; and
- Help develop regional capacities for operational implementation of the above.

2.3 Components

The Initiative will make use of the outputs from observations and research activities – as inputs to this Initiative and form the foundation of the Initiative. On this foundation a framework consisting of a network of regional institutions would be built on the existing institutional capacities that would provide the data and services and build capacities at the regional and national level. The Initiative consists of the following components:

- A. Climate information for adaptation;
- B. Climate monitoring;
- C. User-specific sectoral advisory services; and
- D. Capacity building.

Adaptation in different socio-economic sectors takes place at the local level. For this purpose, regional climate change scenarios at local scales (~50x50 km² or below), for different parts of the world, particularly in developing and least developed countries, would be provided. Regional climate change scenarios along with information on the associated uncertainty will be made available to the user communities through the mechanism described subsequently and would be made available in user-friendly formats (e.g., Geographic Information Systems (GIS)).

“Climate Watches”, which are launched when evolving and/or foreseen climate anomalies may result in impacts from extreme weather and climate events, can serve as a mechanism to heighten awareness in the user community and initiate preparedness measures. Based on the outputs of these climate watches, NMHSs will prepare and issue improved advisories and warnings to their public and other users.

WMO, through its mandate, has established networks such as CHy, CAgM, CAeM, JCOMM etc. that have outreach into the user groups and the decision makers in certain sectors. Therefore for the purpose of this initiative, the sectors are grouped in two categories:

- Category A: Agriculture, Water, Transportation and Disaster Risk Management; and
- Category B: Health, Energy, Tourism, Urban Development etc.

The **sectoral advisory services** for adaptation would be developed for Category A sectors through the technical expert groups associated with the existing programmes. However, for wider outreach, collaboration with other UN partners would also be required. For Category B sectors, WMO, through WCASP, has established expert groups under the Commission of Climatology. However it will have to largely work with its partners in the UN System and other international organizations to reach out to the user communities. The experiences gained from the Espoo Conference and the Madrid Conference would be used appropriately while developing these products and services.

In order to facilitate use of climate information in developing national adaptation strategies it is essential to **build capacity** of:

- Regional partners to develop user-specific products;
- NMHSs to develop and deliver products and information;
- Professionals from development sectors to understand and appreciate the importance of climate information;
- User groups to understand the climate information and products;
- Policy makers and general public to recognize climate as a resource; and
- NMHSs to interact with users and help in the above.

Mechanisms would be established to further develop capacity of NMHSs on a continuous basis to make use of the climate information developed at the regional levels and provide products at the national level to sectoral users. Development of skills of the staff of NMHSs to interact with professionals from other sectors and communicate the uncertainties in climate information will be facilitated. Methods and tools developed for socio-economic valuation of climate services, being developed as part of the Madrid Action Plan, will be incorporated into this Initiative when available. Skill in their application will be developed as part of the Initiative. The capacities of the regional partners involved in delivery mechanism, particularly those in the developing countries, would be enhanced to produce, use and evaluate the regionalized products.

3. Outputs and delivery mechanism

3.1 Outputs

The inputs from observation and research would be adapted to user needs. They would be regionalized and delivered in user friendly formats. The Initiative's outputs can be grouped under:

- Better climate information for impact analysis and adaptation;
- Sector specific predictions based on climate outlooks;
- Early warnings of extreme hydro-meteorological events; and
- Climate risk assessments.

A well-synchronized global, regional and national institutional network would be established to deliver these products.

3.2 Delivery Mechanism

WMO through the WCP (WCASP, WCDMP) and other Programmes such as AgMP, HWRP, DRRP and others has been providing climate related services over the years through various activities. Some of these activities have progressed well while others have lagged. In some of the activities like Regional Climate Outlooks, for example, there is need to bring coherence in presentations of information to users among various centers. The Initiative will attempt to streamline and realign these activities to form a comprehensive delivery mechanism which will consist of:

- National Meteorological and Hydrological Services;
- Regional Climate Centers and Global Producing Centers;
- Regional Climate Outlook Forums; and
- User Forums.

WMO, through the existing collaboration of CCI and CBS, will encourage standardization of Global Producing Centres' (GPCs) long-range forecasts, regional and sub-regional tailored products, developed by appropriate downscaling strategies, from Regional Climate Centres (RCCs); and seasonal outlooks through RCOFs. WMO, through this Initiative will help accelerate the process of implementation of RCCs. The present RCOF activities would be strengthened and streamlined. Based on the regional priorities, extension of RCOFs into sector-specific forums would be

encouraged. User Forums would be facilitated in form of national and regional workshops or seminars for identification of user requirements on a continuous basis and development of clear specifications for products and services.

4. Partnerships

Many agencies have an interest in adaptation to climate variability and change. This Initiative will complement and integrate contributions of WMO with those of other agencies and therefore will establish partnerships with other relevant international and regional agencies, both UN and non-UN, for:

- Providing access to various user sectors;
- Implementing the initiative; and
- Financing various activities.

Climate change adaptation has a multi-disciplinary facet where different sectors have to work closely together to meet the sustainable development objectives. For effective applications, climate information and prediction products need to be clear, understandable, reliable, timely, and useful for short-term operational response to climate variability and for developing longer-term adaptation strategies for climate change. They should have consistent, user-friendly formats, and be transmitted by multiple methods for maximum distribution, recognizing the special requirements of developing and least developed countries. In order to address the adaptation needs of developing countries and LDCs, regional partnerships with countries/institutions would have to be developed.
