

Expected Result: 6

**ENHANCED CAPABILITIES OF MEMBERS IN MULTI-HAZARD EARLY
WARNING SYSTEMS AND DISASTER PREVENTION AND
PREPAREDNESS**

Report to Plenary on item 4.1

REFERENCE:

EC-LXII/B/WP 4.1

APPENDICES:

- A. Draft text for inclusion in the general summary on item 4.1
- B. Draft Resolution 4.1/1 (EC-LXII) – Use of standardized precipitation index (SPI) for characterizing meteorological droughts by all NHMSs

APPROVED

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

4.1 ENHANCED CAPABILITIES OF MEMBERS IN MULTI-HAZARD EARLY WARNING SYSTEMS AND DISASTER PREVENTION AND PREPAREDNESS (*agenda item 4.1*)

Disaster Risk Reduction Programme Strategy and Implementation Framework

4.1.1 With reference to the decision of the Fifteenth Congress of WMO (Cg-XV) regarding WMO strategic priorities and implementation approach in disaster risk reduction (DRR), the Council noted with satisfaction the DRR Programme's progress with the development of a systematic approach engaging WMO Programmes, constituent bodies, Members and external partners to implement WMO DRR strategic priorities through national projects with a strong regional cooperation framework. It noted that a clear DRR Project Management Framework with criteria for initiation of projects was established, a resource mobilization strategy developed and based on outcomes of the WMO Regional and National DRR Surveys in 2006, as well as surveys of other agencies, two types of DRR model projects had been initiated in several WMO Regions and sub-regions, with strong connection to the regional association (RA) DRR structures. Through a systematic approach based on "good practices", multi-stakeholder mechanisms and training workshops were developed to ensure systematic interface of National Meteorological and Hydrological Services (NMHSs) with various disaster risk management (DRM) stakeholders to identify jointly needs, gaps and requirements for DRM capacity development at national and regional levels. The Council was informed of a number of relevant activities and initiatives of WMO technical programmes and technical commissions (TCs) in supporting DRM capacity development in a more integrated manner. The Council was informed that in light of the linkages between DRR and Climate Risk Management, development of climate services for DRR is taking front stage, driven by legislative requirements and policy developments in a number of countries.

4.1.2 The Council stressed that effective implementation of the WMO DRR strategies through national and regional projects would require:

- (a) Strategic positioning of the NMHS within the national and regional DRM governance and institutional frameworks;
- (b) Integrated approach to deliver multi-hazard technical capacity development of the NMHS and facilitation of multi-sectoral partnerships and service delivery to a wide range of DRM stakeholders to support:
 - (i) Risk assessment;
 - (ii) Reduction of mortality risks through early warning systems (EWS);
 - (iii) Reduction of economic risks through medium- to long-term sectoral risk management and planning (e.g., land zoning, infrastructure and urban development, agricultural management, health, etc.);
 - (iv) Risk transfer through catastrophe and weather-indexed insurance and other financial tools;
 - (v) Information/knowledge sharing and educational programmes at various levels.

4.1.3 The Council stressed a number of emerging opportunities for the NMHS, linked to the implementation of the Hyogo Framework for Action (2005-2015) and climate adaptation strategies at the national level, including:

- (a) Increasing receptivity and need for meteorological, hydrological and climate services for informed decision making;

- (b) Increasing recognition of NMHSs by governments and DRM stakeholders as a key component within the national DRR structure;
- (c) More funding opportunities for NMHSs as part of national disaster and climate risk management frameworks.

4.1.4 The Council acknowledged that the implementation of the DRR Programme requires not only a better understanding of capacity development needs of the NMHSs, but also identification of various DRM stakeholders, their institutional capacities and opportunities for partnerships with the NMHSs. In this regard, the Council recalled the results of the WMO National DRR Survey of the Members (of which 139 responded) in 2006 that: (i) nearly 70% of countries need amendments or restructuring of their national policies, legislation and planning to shift towards preparedness and prevention; (ii) over 65% of NMHSs need some level of modernization and sustainability of their observation and telecommunication infrastructure and operational 24/7 forecasting systems; (iii) over 80% of NMHSs require various technical tools, guidelines and training for meteorological-, hydrological- and climate-related hazard analysis, mapping and forecasting; and (iv) over 80% of NMHSs need developing and/or strengthening of their institutional and operational partnerships with various DRM stakeholders. The Council requested the Secretary-General to leverage partnerships with agencies such as UN-International Strategy for Disaster Risk Reduction (UN-ISDR), United Nations Development Programme (UNDP), the World Bank, working with national DRM mechanisms, to analyse national DRM capacities and coordination mechanisms and identify opportunities for furthering national policy level engagement and partnerships with NMHSs. The Council recommended exploring opportunities to be realized through the climate adaptation funds.

4.1.5 The Council also acknowledged that many NMHSs suffer from inadequate or no legislation to underpin their areas of activity; hence, a great ambiguity exists as to their role, their relations with other stakeholders and ultimately the extent of their ambit. As a result, a mechanism that will assist NMHSs in this situation to achieve the legal framework required for optimal operations and engagement of relevant stakeholders, especially in an era of increased focus on DRR, needs to be developed.

WMO DRR Project Management Framework and national and regional DRR projects

4.1.6 In reference to the request of Cg-XV related to the implementation of the DRR Programme through regional and national projects, the Council:

- (a) Noted and endorsed the six-phased result-based WMO DRR Project Management Framework including project identification, planning, implementation, reporting and evaluation, sustainability and expansion and a number of criteria considered for initiation of projects;
- (b) Endorsed DRR Programme's Resource Mobilization Strategy which involves: (i) identification of strategic donors and understanding of their priorities and interests in investing in DRR projects in different regions; (ii) engagement of the donors in the projects from early stages of assessments and project identification in different regions, sub-regions and country-groupings; and (iii) building a track-record with strategic donors. It stressed that different donors may have different requirements for project management, monitoring and reporting and that these issues should be considered within the overall project management framework for each project. It also noted the opportunities for raising funds for strengthening and/or reconstructing the NMHSs through post-disaster funding mechanisms including the UN-driven Humanitarian Flash Appeal and the UN/World Bank driven Post Disaster Needs Assessment and Reconstruction Planning, and was informed that such opportunities are being explored

for the reconstruction of the Haiti Meteorological Service. The Council requested the Secretary-General to document the lessons learnt from this experience. The documentation should be developed in consultation with all partners, including the Government of Haiti, and be presented to Sixteenth Congress. This documentation should include recommendations that would assist in developing appropriate mechanisms within WMO for an effective response to similar disastrous events in the future;

- (c) Was informed that in different regions, drivers of DRR projects were different and that countries were at different stages of DRM development. It noted that two types of DRR national/regional cooperation projects are underway in a number of WMO Regions to demonstrate the benefits of DRR Project management Framework. These include:
- (i) First type: National and regional disaster risk management and adaptation projects with the World Bank, UN–International Strategy for Disaster Reduction (UN-ISDR), and UNDP which focus on development of national capacities and regional cooperation along three components, including:
 - (i) disaster risk management institutional capacities across various economic sectors (e.g., health, infrastructure and urban planning, agriculture, energy, civil protection and emergency planning, etc.) (Lead: UN-ISDR, UNDP);
 - (ii) NMHSs and their partnership with disaster risk management stakeholders (Lead: WMO); and
 - (iii) financial risk transfer and insurance markets (Lead: the World Bank).The Council was informed that these programmes are initiated by UN-ISDR and the World Bank to which WMO is invited as a key partner for addressing capacity developments of the NMHSs and their partnerships. This type of project has been initiated in eight countries in Southeast Europe, eight countries in Central Asia and Caucuses, and five countries in southeast Asia, The Council was informed that the first step for initiating these projects was a detailed institutional capacity assessment and identification of national needs and priorities as well as development of a regional cooperation framework;
 - (ii) Second type: Comprehensive end-to-end multi-hazard early warning system (MH-EWS) projects building upon capacity development activities of WMO technical programmes and UNESCO-IOC tsunami early warning programmes, when relevant, in countries that have some institutional capacities for emergency preparedness and planning. The Council was informed that the first step in initiating these projects involves a “MH-EWS Training Workshop with Focus on Institutional Partnerships and Coordination,” held under the umbrella of the RAs, bringing together directors and senior-executives from NMHSs and DRM agencies, regional and international organizations as well as the development and funding agencies to identify the needs and priorities for the development of regional/sub-regional cooperation programmes complemented with national MH-EWS development projects;
- (d) Strongly endorsed utilization of an integrated approach for project development, leveraging WMO technical programmes, TC, Members and external partners through well defined projects, based on the DRR project management framework and requested documentation of lessons learnt from these projects, upon completion of each phase. The Council welcomed the collaboration within the Secretariat on this matter and requested the Secretary-General to develop a schematic diagram that illustrates how the work of WMO Programmes that is directed towards achieving DRR-

related results will be aligned with the work of technical commissions and regional associations;

- (e) Noted that the DRR projects are linked to training programmes utilizing relevant training materials and guidelines developed (or being developed) by various technical programmes and TCs, DRR Programme and partners engaged in DRM.

4.1.7 With respect to the implementation of MH-EWS DRR Projects, the Council was informed of the outcomes of the first MH-EWS Training Workshop with Focus on Institutional Partnerships and Coordination, in RA IV held in San José, Costa Rica on 22–26 March 2010, appreciating the support of the United States of America (USA) National Weather Service through its VCP funds. It noted that this multi-stakeholder regional meeting identified the needs for strengthening/development of core observing and telecommunication capacities, national/regional forecasting centres, harmonization of the watch and warning services in the region, service delivery, training programmes for NMHSs and DRM agencies, as well as public awareness campaigns. The Council noted that these needs and requirements were built upon a joint national MH-EWS questionnaire completed by the NMHSs and DRM Agencies prior to the workshop. The Council was informed that as the next step (in collaboration with the RA IV DRR Task Team, Members, WMO technical programmes and TCs as well as regional and international partners) concrete sub-regional cooperation programmes and national development components will be developed in 2010 and presented to the donors and national and regional stakeholders by the end of 2010. The Council endorsed the approach, and stressed that success in implementation of these projects would be critical for scaling up to other WMO Regions.

4.1.8 The Council stressed the critical role of the RAs in the implementation of the DRR Programme at national and regional levels by providing input on the needs and priorities of the Members and the Region and encouraged the presidents of the RAs to facilitate collaboration with the regional inter-governmental DRM organizations. The Council urged the participation of NMHSs and RAs as well as regional DRM platforms in order to strengthen partnerships and cooperation for the implementation of the DRR priority projects that meet identified needs. The Council stressed the importance of engaging the RAs through their various DRR task teams or working groups in the DRR projects to provide advice and expertise on the implementation aspects, review and evaluation of the outcomes and provide recommendations for improvements, sustainability and scaling up of the projects. The Council also requested the Secretary-General to:

- (a) Facilitate participation of the NMHSs and RAs in the DRM coordination processes at the national and regional levels, respectively;
- (b) Further strengthen WMO partnerships with the UN-ISDR system partners for the implementation of national and regional DRR projects.

Research, Technical Capacity Development and training activities of Technical Programmes and TCs to support DRR projects

4.1.9 The Council stressed the need for utilizing relevant training materials and workshops, guidelines and capacity building activities developed (or being developed) by various technical programmes, TCs, DRR Programme and partners for implementation of the DRR projects. It requested the technical programmes and Commissions to further develop such capacities and materials, especially in relation to the needs and requirements identified through the DRR multi-stakeholder processes, engaging not only the NMHSs but also their stakeholders in DRM. The Council requested that DRR training be incorporated in the capacity development and training programmes in WMO.

4.1.10 The Council noted that the foundation for past successes in reducing fatalities and protecting property losses from hydrometeorological, climate, and environmental disasters included the successes in advancing predictive skill. The Council recognized that additional benefits will arise from research resulting in future improvements in predictive skill for weather, water, climate and environmental disasters including the efforts of WWRP (such as THORPEX) and WCRP, as outlined under items 3.1 and 3.2. The Council urged that the design of the WMO DRR Programme and its deliverables should reflect the research contributions associated with advancing both predictive skill and the utilization of forecast information for disasters, such as outlined in the EC-RTT Report: Challenges and Opportunities in Research on Climate, Weather, Water and Environment (WMO/TD-No. 1496).

Hazard information and analysis for risk assessment and planning

4.1.11 Recalling its suggestion that “best possible practice” approaches be followed for the development of standard methodologies on hazard data, metadata and mapping, by the TCs, the Council:

- (a) Encouraged the presidents of TCs to address needs for further development of guidelines on the meteorological-, hydrological- and climate-related hazards as identified in the WMO National DRR Survey in 2006 that were not already being addressed by TCs, and that these guidelines be developed as a matter of priority for Sixteenth Congress and be tested and operationalized through the DRR projects as appropriate;
- (b) Encouraged Members to ensure that their NMHSs establish mechanisms and methodologies for the provision of meteorological, hydrological, climate hazard data and metadata, analyses, value-added information and technical expertise to support national risk assessment projects across various sectors;
- (c) Recognizing the European Council’s conclusions relating to a Community Framework on Disaster Prevention within the EU (2979 Justice and Home Affairs Council meeting), the Council encouraged NMHSs of EU Member States to become active participants in this process so as to ensure cohesion with WMO actions.

4.1.12 The Council noted that the Secretariat, together with TCs, is working on establishing standard methodologies for maintenance of hazard data, metadata and mapping of meteorological-, hydrological- and climate-related hazards, as requested in Resolution 25 (Cg-XV), using “best possible practice” approaches (EC-LXI) and that these emerging standards would be implemented through Regional/National DRR projects within NMHSs. The Council expressed concern that since Cg-XV, annual global statistical reports on the observed hazards and their impact on the economy had not been supplied to the specialized agencies of the United Nations. In this regard, the Council requested the Secretary-General to report on possible approaches to compile and produce statistical reports, with the possibility of a trial publication for severe weather phenomena in Europe and North America within a realistic timeframe, in agreement with the concerned Members.

4.1.13 The Council noted that droughts were among one of the highest impacts hazards, leading to food insecurity, loss of life and economic impacts and stressed the importance of an integrated drought risk management approach to addressing these impacts.

4.1.14 In reference to the ANADIA (Assessment of the Natural Disaster Impacts on Agriculture) project and the outcomes of the International Workshop on Drought and Extreme Temperatures: Preparedness and Management for Sustainable Agriculture, Rangelands, Forestry & Fisheries, the Council noted the urgency for the development of best methodologies for assessing impacts of

natural hazards on agriculture and methods for the development of standards for agricultural drought indices in a timely manner to support agricultural risk management practices.

4.1.15 The Council noted that different drought indices are useful in various regions and applications, but that some expert guidance is needed to help Members in the evaluation of proven indices that could be useful in their Service. The Council supported the “Lincoln Declaration on Drought Indices” from the Regional Workshop on Indices and EWS for Drought which was held at the University of Nebraska-Lincoln in December, 2009. Experts made a significant step through a consensus agreement that the Standardized Precipitation Index (SPI) should be used to characterize meteorological droughts by all NMHSs around the world. In this regard, the Council urged all Members to start using SPI to characterize meteorological droughts, in addition to other drought indices that are already in use in their Service, and adopted Resolution 4.1/1 (EC-LXII).

4.1.16 The Council was informed that in response to the significant impacts droughts have on the national economies of the Caribbean countries in RA IV, the Caribbean Institute for Meteorology and Hydrology (CIMH) has developed two operational products (the Caribbean Drought and Precipitation Monitoring Network, and the Caribbean Water Monitor) to assist NMHS in the Region with forecasting the onset, duration and intensity of droughts across the Region. Both products utilize the Standardized Precipitation Index (SPI) as well as other indices. These products will support DRR activities in the region and represents part of the Region’s adaptation strategy to extreme climate variability and climate change. The Council further noted the Environment Agency of the Republic of Slovenia has taken responsibility for the operation of the Drought Management Centre for southeastern Europe.

4.1.17 The Council expressed gratitude for the offer to develop a user manual on SPI and recommended that this work be accomplished before Cg-XVI. It also welcomed the development of indices for monitoring agricultural and hydrological droughts. It also acknowledged with satisfaction the collaborative work of WMO with UN-ISDR for contributing a chapter on meteorological, hydrological and agricultural drought risks for the 2011 UN Global Assessment Report on Disaster Risk Reduction (GAR11).

4.1.18 The Council noted that there are many mitigation strategies to combat drought, including increasing water storage capability, but also noted that some of these strategies, such as building large mountain reservoirs, could actually increase the threat of drought and that an international and independent ecological examination of these strategies must be considered.

Multi-Hazard Early Warning Systems (MH-EWS) and Emergency Response Operations

4.1.19 The Council strongly endorsed the WMO DRR systematic approach engaging a multi-stakeholder process to document good practices in MH-EWS and develop the MH-EWS Training Workshop, which serves as a platform for: (i) sharing of these good practices; and (ii) providing a multi-stakeholder coordinated approach for regional/national EWS project development, engaging not only the NMHS but also DRM stakeholders at national and regional levels. It noted with satisfaction the completion of documentation of seven good practices in MH-EWS and a “Guideline on Institutional Partnerships and Coordination in Multi-Hazard EWS,” based on lessons learnt from these cases, and was informed that these are being published in 2010. The Council extended its appreciation to Members who have supported this process and requested that as a next step, the documentation of good practices extend to include issues related to concept of operations among agencies and service delivery aspects of MH-EWS. In this regard, it stressed the importance of holding the Third International Experts’ Symposium on MH-EWS,” in the 2011-2012 timeframe.

4.1.20 With reference to its pertinent decisions linked to Expected Results 1, 2, 3, and 7 under agenda items 3.1, 3.2, 3.3 and 4.2, the Council re-emphasized the continuing need to improve NMHSs technical capacities and methodologies for the generation of warnings related to

severe weather, vector-borne diseases and heat-related hazards, riverine and flash floods, sand and dust storm, marine meteorological and environmental hazards, droughts and increasing hazards in urban areas, noting the importance of linking technical capacity development activities systematically to DRR national/regional projects for benefit of more Members. The Council stressed that it is critical to delineate the time and impact differences from short-term hazards (hours to days), such as severe weather, flooding, tsunamis, tropical cyclones, extreme heat, etc., from the appropriate multi-hazard approaches for longer term (weeks to years) events, such as vector-borne diseases and droughts (weeks and months). In this regard, the Council:

- (a) Noted that the Global Data-processing and Forecasting System (GDPFS) represents the continuing investment of WMO in enhancing Members' capabilities to produce better weather forecasts including warnings for meteorological hazards, i.e., Expected Result 1 [see EC-LXII/Doc. 3.1]. The Council further noted that the Severe Weather Forecasting Demonstration Project (SWFDP) is an activity of the GDPFS, in collaboration with PWS that contributes significantly to MH-EWS systems in particular for capacity building in developing countries. The Council encouraged relevant programmes and TCs to collaborate in the SWFDP, to meet regional requirements being identified through the DRR project development process, while at the same time facilitating and underpinning improved national and regional institutional relationships for DRR;
- (b) Noted that WMO in collaboration with the USAID/OFDA have initiated a Flash Flood Guidance project in Southern Africa, using the products developed through the Severe Weather Forecast Demonstration Project (SWFDP). The Council further noted that making use of synergies generated through these projects, WMO was now in collaboration with USAID/OFDA in developing a Strategy for Flood Forecasting and Early Warning in the Zambezi Basin. The Council highlighted the importance of realizing synergies such as those demonstrated between SWFDP and FFG for the planning and implementation of the DRR national/regional projects;
- (c) Noted the ongoing collaborative activities and projects of the Public Weather Service Programme (PWSP) with the WMO Climate Applications and Services Programme (CASP) related to application of weather and climate data in combating vector-borne and heat-related hazards undertaken in partnership with other organizations including the State Agency for Meteorology of Spain (AEMET), WHO, IRI, Pasteur Institute, the Anti-Malaria Association and the Korea International Cooperation Agency (KOICA), in Madagascar, Panama, Chile, Peru, Ethiopia, Burkina Faso, Mali, Mauritania, Niger and Nigeria. The Council urged the continuation of these projects, documentation of lessons learnt and scaling up of these activities through the coordinated DRR regional/national projects [see agenda item 4.2]. The Council also stressed the importance of accelerating the implementation of heat-health warnings through the MH-EWS DRR regional/national projects, such as the one in South East Europe;
- (d) Emphasized the importance of a comprehensive and integrated approach for marine multi-hazard forecasting and warning system, for improved coastal risk management, and:
 - (i) Noted that development of Storm Surge Watch System (SSWS) would be a first step, noting with satisfaction activities of the Tropical Cyclone Programme (TCP) regional bodies for their respective regions such as preparation of distribution maps and time-series charts of storm surges to be provided by RSMC Tokyo for the Typhoon Committee Members and recommended strengthening of the capacity building in the operational storm surge forecasting through training courses and workshops;

- (ii) Stressed the importance of the implementation of the Coastal Inundation Forecast Demonstration Project (CIFDP), noting the importance of coupling between meteorological, oceanographic, hydrological and tropical cyclone forecasting models to result in an end-to-end comprehensive coastal inundation forecast and warning systems, in reference to existing guidelines such as the UNESCO/IOC on Hazard Awareness and Mitigation in Integrated Coastal Area Management (ICAM). It reinforced the necessity for development of software with multi-disciplinary components for improved coastal inundation forecasting products and services in basins and delta regions;
- (iii) Noted the important role of the TCP regional bodies as platforms for developing regional cooperation in multi-hazard EWS through providing guidance for dissemination and exchange of information and warnings as well as a useful forum for the Members and relevant regional and international agencies to explore links among tsunami, tropical cyclone, storm surge and coastal inundation matters. Examples include the RA IV Hurricane Committee and the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS) and the WMO/ESCAP Panel on Tropical Cyclones and the Pacific and Indian Ocean Tsunami Warning and Mitigation Systems (ICG/PTWS and ICG/IOTWS).

4.1.21 The Council recommended that under environmental Emergency Response Activities (ERA), operational arrangements for nuclear emergency response should continue to be well maintained through regular planned exercises and review, which should involve RSMCs and relevant NMCs, collaborating with the Incident and Emergency Centre of the International Atomic Energy Agency (IAEA) for nuclear accidents and radiological emergencies. Similarly the Council recommended that operational arrangements with the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) should be maintained through CTBTO-led tests of the joint response system, involving all designated RSMC with this activity specialization.

4.1.22 The Council recalled the Shanghai MH-EWS project, which provides a coordinated framework for technical capacity development in nowcasting and forecasting of various hazards, involving all relevant WMO technical programmes and noted that WMO Regional Training Centre Nanjing has already organised two training workshops in MH-EWS. The Council stressed the importance of this demonstration project requiring technical capacity development with a multi-hazard approach and requested the Secretary-General, upon completion of this project, to document the lessons learned with the goal to determine opportunities for applying this model to other countries and mega cities.

4.1.23 The Council urged Members to consider providing assistance to the broad range of needs in relation to both urgent measures and longer-term re-building of the Haitian Service, and requested the Secretary-General to provide the necessary coordination of Members' offers of assistance, to meet the identified needs as well as the coordination with UN programmes for planning and implementing of assistance (e.g. Post Disaster Needs Assessment – PDNA and subsequent reconstruction planning, and the humanitarian Flash Appeal).

Catastrophe insurance and weather risk management within financial risk transfer markets

4.1.24 In reference to the request at its sixtieth session, the Council endorsed the Secretary-General's efforts to prepare a document on experiences of several NMHSs, currently serving these markets, and lessons learnt from these experiences to be published in 2010. It noted that these efforts will be linked to emerging opportunities for climate services for (re)insurance sectors.

Emerging Opportunities for Development of Climate Services for Disaster Risk Management

4.1.25 The Council recalled the outcomes of the Third World Climate Conference (WCC-3) that climate information is critical for the analysis of hazard patterns and trends, which must be augmented with socio-economic data for quantification of risks. Changing patterns of climate hazards pose challenges with longer-term disaster risk management and investments. In light of climate variability and change, analysis of hazard patterns from historical data is necessary but not sufficient for risk assessment and management. The Council stressed the need for research as well as development of seamless operational forecasting and analysis tools for analysing changes in severity, frequency, and occurrences of hydrometeorological hazards from weather to climate timeframes (i.e., hourly, daily, weekly, seasonal, inter-annual, decadal, and longer climate change time lines). In this regard, it requested the Secretary-General to explore opportunities for coordinated approach for the development of such capacities through the various WMO sponsored and co-sponsored weather and climate programmes, TCs, and other research initiatives. The Council also stressed the importance of linking the strategic framework and implementation of the DRR Programme with the development of the Global Framework for Climate Services (GFCS).

4.1.26 The Council appreciated the research and analysis being carried out by the World Climate Research Programme (WCRP) and the Commission for Climatology (CCI) on Climate Extremes to assess model representation of extremes and projections of climate and also noted that the project funded by the World Bank's Global Facility for Disaster Risk Reduction and Recovery being implemented jointly by WCRP and CASP was a good vehicle for hands-on training for development of climate information to support risk management decision-making in 10 countries in the Greater Horn of Africa (GHA). The Council noted the importance of these projects being identified and developed based on understanding of needs and requirements for disaster and climate risk management and applications of most relevant technologies.

4.1.27 The Council noted the emerging opportunities for climate services for DRR and the insurance sector driven by legislative requirements in an increasing number of countries, with governments requesting the insurance sector to report on and manage their climate risk. In this regard, the Council highlighted a number of activities engaging the NMHSs, leading climate centres and the industry for development of climate services to support this sector. The Council requested the Secretary-General to ensure active involvement of the DRR Programme and relevant climate programmes in the implementation of the GFCS and identification of the user needs and requirements for climate services for these sectors as they are highly receptive to the utilization of climate information.

4.1.28 The Council was informed that a number of international development agencies such as the UNDP were initiating national disaster and climate risk management and adaptation programmes, and requested the Secretary-General to explore opportunities for the development of national climate services within the framework of the GFCS through these national programmes.

DRAFT RESOLUTION

Res. 4.1/1 (EC-LXII) – USE OF STANDARDIZED PRECIPITATION INDEX (SPI) FOR CHARACTERIZING METEOROLOGICAL DROUGHTS BY ALL NMHSs

THE EXECUTIVE COUNCIL,

Noting:

- (1) That the International Workshop on Drought and Extreme Temperatures: Preparedness and Management for Sustainable Agriculture, Rangelands, Forestry & Fisheries was organized by WMO and the China Meteorological Administration (CMA) in Beijing, China in February 2009,
- (2) The recommendation from the Beijing workshop that WMO makes appropriate arrangements to identify the methods and to marshal resources for the development of standards for agricultural drought indices in a timely manner,
- (3) The deliberations of the Regional Workshop on Indices and Early Warning Systems for Drought was held in December 2009 in Lincoln, USA,
- (4) That the “Lincoln Declaration on Drought Indices” from this regional workshop recommended that the NMHSs around the world are encouraged to use the Standardized Precipitation Index (SPI) to characterize meteorological droughts and provide this information on their websites, in addition to indices currently in use,
- (5) That as a next step, WMO will develop a comprehensive user manual on SPI that will provide a description of the index, the computation methods, specific examples of where it is currently being used, the strengths and limitations, mapping capabilities and how it can be used,
- (6) That two working groups with representatives from different regions around the world and observers from UN Agencies and Research Institutions (and water resource management agencies for hydrological droughts) will be established to further discuss and recommend, by the end of 2010, the most comprehensive indices to characterize the agricultural and hydrological droughts,

Considering that drought is a protracted period of deficient precipitation, and that effective monitoring and early warning systems for the three types of droughts, meteorological, agricultural and hydrological droughts, require standardized indices;

Decides:

- (1) To recommend that the Standardized Precipitation Index (SPI) be used to characterize meteorological droughts by all NMHSs around the world, in addition to other drought indices that are already in use in their Service;
 - (2) To submit this recommendation to Sixteenth Congress for approval.
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