4.1.28 The Council thus requested TCP to fully establish the TC Forecaster Website which is aimed at providing a readily accessible source of forecast tools and a portal of analytical data for operational forecasters. The Website has been temporarily developed within the TCP Website as a prototype. In this regard, the Council was pleased to note that Hong Kong, China accepted to host the TC Forecaster Website. Arrangements are being made for the transfer of the Website management from TCP to Hong Kong Observatory and improvements are being carried out in its structure as well as content. The new Website is expected to be inaugurated by the end of 2012. The Council marked its full approval with the support of Hong Kong, China and recommended that the requirements for improvement of TC forecasting as suggested above be fully considered in the establishment of the TC Forecaster Website.

4.1.29 The Council reaffirmed that for a more reliable and user friendly TC warning service the standardization of operational procedures and products used for Tropical Cyclone (TC) forecasting in different regions is essential. The Council requested the Secretariat to promote the implementation of CAP and the graphical TC advisories at the seventh TCM meeting (Indonesia, November 2012). It also recommended that Members adopt and implement the standardized formats for TCAC advisories as early as possible, if they have not yet done so.

4.2 Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (agenda item 4.2)

4.2.1 The Council noted that the EC-WG on SD has elaborated strategic priorities for ER 2 to provide further guidance to the expert teams and working groups carrying out related activities. These priorities were:

(a) Implementing the Disaster Risk Reduction (DRR) Programme two-tier work plan and deliverables demonstrating the benefits of a crosscutting approach;

(b) Establishing DRR User-Interface Mechanisms for development of user requirements for DRR products and services for hazard/risk analysis, Multi-Hazard Early Warning Systems, Sectoral Risk Management and Disaster Risk Financing;

(c) Further developing the governance mechanisms for the DRR Programme, based on the systematic involvement of WMO Technical Commissions and Programmes, Regional Associations and strategic partners in the implementation of the DRR two-tier work plan;

(d) Contributing to the development of the Global Framework for Climate Services (GFCS) through the implementation of the DRR Work Plan, demonstrating the value of climate services to risk-based DRR decision-making;

(e) Facilitating better alignment of a number of WMO technical programmes and Commissions activities relevant to this ER by leveraging the crosscutting DRR framework and work plan.

Disaster Risk Reduction

DRR Programme Work Plan, User-Interface Mechanisms and Governance

4.2.2 The Council was informed of the DRR Programme two-tier work plan (hereafter referred to as the DRR Work Plan) (see annex to Resolution 8 (EC-64)), including: (i) development of guidelines, standards and training modules on DRR thematic topics based on documentation and synthesis of good practices; linked to (ii) coordinated DRR and climate adaptation national/regional capacity development projects that would assist the NMHSs to deliver meteorological, hydrological and climate services within a comprehensive service delivery framework, underpinned by quality management framework principles. The Council:

(a) Supported the utilization of the DRR user-interface mechanisms, comprised of leading experts from the diverse DRR user community (public and private sectors), UN and international partner agencies, academia as well as NMHSs. It noted the establishment of Expert Advisory Groups on: (i) Climate Services for Hazard/Risk Analysis; (ii) Multi-Hazard Early Warning Systems; (iii) Climate Services for Disaster Risk Financing; as well as Inter-commission ad-hoc Task Team on Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response, established under the Commission for Basic Systems with the Commission for Climatology and the Commission for Hydrology to help guide the implementation of DRR Work Plan;

(b) Requested that the development of guidelines, standards and training modules for NMHSs for provision of products and services to support risk-based decision-making and disaster risk financing such as ex-ante and post-disaster government funding mechanisms, insurance and external development funding be pursued as a matter of priority.

4.2.3 The Council urged the presidents of technical commissions to engage actively with the DRR user-interface mechanisms and identify concrete intra- and inter-commission collaborations to support the implementation of the DRR Work Plan. It requested the Secretariat, with support from the presidents, to develop a forward plan that highlighted concrete areas and mechanisms for engagement of TCs in the DRR Work Plan.

4.2.4 The Council noted the progress with the implementation of the coordinated DRR and Climate Adaptation national/regional projects underway in the Caribbean, Southeast Europe and Southeast Asia and was informed of the new DRR Costa Rica Early Warning System Project, particularly demonstrating the benefits of cooperation of the National Meteorological Service with the Disaster Risk Management Agency, the National Hydrological Service and authorities and stakeholders in the local communities for development of early warning systems.

4.2.5 The Council requested its EC Working Group on Service Delivery (EC WG SD) to review the documentation referred to in paragraphs 4.2.3 and 4.2.4 above, provide feedback on the utilization of the DRR user-interface expert advisory groups, systematic engagement and role of WMO constituent bodies and alignment of their priorities as well as external partners, and prepare recommendations to the EC for further development the governance mechanisms of the DRR Programme within an integrated planning framework.

4.2.6 The Council was encouraged by the efforts for strengthening existing and developing new partnerships and collaborative efforts of the DRR Programme since Cg-XVI to support the implementation of the DRR Work Plan. It particularly highlighted:

(a) Partnership with the Centre for Research on the Epidemiology of Disasters (CRED) for development of an atlas and annual joint WMO/CRED reports on the impacts of meteorological-, hydrological- and climate-related hazards, with CCl and aligned with the GFCS vision;

(b) Collaboration with the Conference of the Parties to UNFCCC work programme on loss and damage through the work of DRR Programme in hazard/risk analysis;

(c) Partnerships with the work on climate services for Disaster Risk Financing;

(d) Strengthened cooperation with UNESCO-IOC through linking the tropical cyclone committees and the ICGs for Tsunami and Coastal Hazard Warning and designation of a WMO GTS/WIS focal point to the UNESCO-IOC.

4.2.7 The Council stressed that the implementation of the DRR Work Plan is a critical contribution of WMO to the development of the Global Framework for Climate Services (GFCS). The Council requested its EC WG on SD to collaborate with the Executive Council Task Team on GFCS to evaluate and apply lesson learned from the: (i) demonstrated value of climate services to

risk-based DRR decision-making; (ii) established DRR partnerships and user-interface expert advisory groups; and (iii) aligned DRR crosscutting implementation approach to further the development of GFCS.

Alignment of Technical Assistance Projects with DRR Crosscutting Framework

4.2.8 The Council stressed that a number of technical assistance projects, namely, the Severe Weather Forecasting Demonstration Project (SWFDP), Flash Flood Guidance (FFG) systems and Coastal Inundation Forecasting Demonstration Project (CIFDP), Integrated Drought Management Programme (details provided under item 4.3), WMO Flood Forecasting Initiative (details provided under item 4.3), the WMO Emergency Response Activities (ERA) as well as further development of the Global Data-processing and Forecasting System (GDPFS) (details provided under item 4.3), WMO Integrated Global Observing System (WIGOS) (details provided under item 4.4) and WMO Information System (WIS) (details provided under item 4.4) are critical in supporting disaster risk reduction in a number of regions around the world. However, it stressed the need to ensure coordination across these activities, as relevant, and development of operational requirements that are underpinned by user needs in the context of national DRR institutional frameworks for DRR and early warning systems. The Council was encouraged by efforts to integrate these technical assistance activities along with further development of the core systems in the existing coordinated DRR national/regional projects in the Caribbean, Southeast Europe and Southeast Asia. However, the Council:

(a) Requested that such technical assistance projects and technical programmes' capacity development activities, in other regions (e.g., Southern Africa, Eastern Africa, South Asia) need to be closely aligned with national DRR and early warning system institutional frameworks to ensure consistency of approach, linkage with the users from an early stage from the design of the concept to the long-term sustainability of these technical capacities;

(b) Encouraged further expansion of the coordinated DRR and adaptation national/regional capacity development projects to other regions with consideration for the governments' receptivity, resources and leveraging these technical assistance projects and requested the Secretariat in cooperation with partners and WMO constituent bodies to prepare a proposal for consideration of the EC-WG SD;

(c) Encouraged the Members to support coordinated technical assistance projects that are linked to DRR and early warning system institutional frameworks within their respective countries and regions;

(d) Stressed that lessons learned from good practices in the context of these technical assistance projects be linked to the development of the WMO Multi-Hazard Early Warning Systems (MHEWS) Operational Guidelines planed for the intersessional period 2012–2015.

Standardization of Forecasting and Warning Protocols

4.2.9 The Council noted that effective MHEWS required significant cooperation, information sharing and coordination among NMHSs and other agencies such as the Disaster Risk Management agencies at national to local levels. The Council stressed the need for the development of NMHSs communication strategies related to alerts and warning, in alignment with the national warning protocols. The Council was updated on the implementation of the Common Alerting Protocol (CAP), all hazards, all media network, in WMO as a joint collaborative effort between the PWS Programme and the WMO Information System (WIS), as well as the establishment of the WMO Register of Alerting Authorities, supporting the "authoritative single official voice" principle for issuing warnings. The Council:

(a) Stressed the importance of considering the national EWS protocols and institutional framework as the driver of this initiative, noting that increasingly as the governments are

taking ownership in the development of MHEWS, warning authority varies from nation-to-nation and in some countries is shifting from technical agencies to multi-hazard warning authorities that incorporate risk information for development of warnings (e.g., disaster risk management agencies, health authorities, etc.). In this emerging framework, NMHSs are critical service providers of "authoritative" science-based hydrometeorological hazard analysis, forecasts, alerts, warning guidance and advice;

(b) Requested Members to consider the implementation of CAP in their NMHSs as an effective tool for the dissemination of public warnings, and to register their alerting authorities in the "WMO Register of Alerting Authorities", to safeguard the authoritative sources of warnings.

4.2.10 The Council noted the importance of the Common Alerting Protocol (CAP) to DRR and the role the Public Weather Services (PWS) programme is playing in its implementation (details provided under item 4.1).

4.2.11 With reference to the TCP/JCOMM Storm Surge Watch Schemes, the Council noted the increased utilization of RSMC advisories based on improved graphical presentation of storm surge advisories first piloted by RSMC Tokyo for the Typhoon Committee Members in 2011, and subsequently developed by RSMC New Delhi with the Indian Institute of Technology Delhi and approved by the Panel on Tropical Cyclones in 2012. Efforts to promote such standardization included: (i) presentations on CAP for the members of the Typhoon Committee and the Panel on Tropical Cyclones at their annual sessions in 2012; and (ii) a survey of the change of the format of the advisories from Tropical Cyclone Advisory Centres (TCACs) for aviation from text to graphic which, following a recommendation by the International Civil Aviation Authority (ICAO), was carried out in collaboration with ICAO in 2012. With consideration for these good examples, the Council recommended other regional TC bodies to consider the graphical presentation of the regional storm surge advisories in addition to those in text format in enhancement of the regional SSWSs.

4.2.12 The Council adopted Resolution 8 (EC-64) – Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements.

4.3 Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (agenda item 4.3)

Weather Issues

4.3.1 The Council noted the active participation of WMO within the UN system to review and assess the emergency preparedness and response system to nuclear accidents, in following up to the Fukushima-Daiichi nuclear power station accident of 2011. The Council encouraged the continued close collaboration with the International Atomic Energy Agency (IAEA) to examine the lessons learned for enhancing operational meteorological support to emergency response. It also concurred with the early initiative of WMO to organize a technical team to develop meteorological analyses suitable for atmospheric transport, dispersion, and deposition modelling, to contribute to the post-accident study undertaken by the UN Scientific Committee on Effects of Atomic Radiation's (UNSCEAR) on the levels and effects of radiation released from the accident.

Further development of the Global Data-processing and Forecasting System

4.3.2 Recalling the request by Cg-XVI to the Secretary-General and CBS to develop a strategy to assist Members in the implementation of improved high-resolution regional NWP including data assimilation, the Council noted that high-resolution limited area models (LAM), notionally less than 10-km horizontal resolution at the surface, are very relevant to short-range forecasting (up to 72 hours), and recommended that these NWP systems assimilate, to the extent possible, all available real-time observational data to improve their analyses and predictions. The

Resolution 8 (EC-64)

ENHANCED CAPABILITIES OF MEMBERS TO REDUCE RISKS AND POTENTIAL IMPACTS OF HAZARDS CAUSED BY WEATHER, CLIMATE, WATER AND RELATED ENVIRONMENTAL ELEMENTS

THE EXECUTIVE COUNCIL,

Noting:

(1) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077), general summary, paragraphs 11.5.1 to 11.5.21, and Resolution 52 (Cg-XVI) – Disaster Risk Reduction Programme,

(2) The final report of the 2012 Meeting of Presidents of Technical Commissions, Geneva, 30 January–1 February 2012,

(3) The final report of the 2012 Meeting of Presidents of Regional Associations Geneva, 30–31 January 2012,

Considering:

(1) Disaster risk reduction as one of the five priority areas for consideration under voluntary resources of WMO and among the high-priority areas recommended by the High-level Taskforce on the Global Framework for Climate Services,

(2) The WMO Disaster Risk Reduction (DRR) Programme as cross-cutting and inextricably linked to other WMO Programmes, technical commissions, regional associations and the Secretariat,

(3) The importance of a user-driven approach to development and delivery of meteorological, hydrological and climate services to support policy development, risk analysis, multi-hazard early warning systems, sectoral risk management and disaster risk financing,

(4) The high value of sharing lessons learned, and opportunities for improved operational procedures among National Meteorological and Hydrological Services, the Global Data-processing and Forecasting System, and other United Nations international agencies,

Considering further:

(1) The expressed need of Members for guidelines, standards and training modules for development and delivery of meteorological, hydrological and climate services to support DRR decision-making, in alignment with principles of quality management systems,

(2) As a good example, the significant contributions of Members and WMO DRR partner agencies to the documentation of good practices in Multi-Hazard Early Warning Systems and development of respective guidelines,

(3) The importance of lessons learned from national/regional coordinated DRR and adaptation projects for further implementation of the DRR Programme and governance mechanism,

Decides to endorse:

(1) The Disaster Risk Reduction Programme two-tier work plan, as contained in the annex to the present resolution, and hereinafter referred to as the DRR Work Plan;

(2) Establishment of the DRR User-Interface Expert Advisory Groups and mechanisms to help guide the implementation of the DRR Work Plan;

Requests the Executive Council Working Group on Service Delivery:

(1) To develop recommendations to the Executive Council for further development of the governance mechanism of the DRR Programme based on assessment of lessons learned from the achievements of the Programme to date, pertaining to systematic involvement of WMO technical commissions and Programmes, regional associations and strategic partners in the implementation of the DRR Work Plan;

(2) To ensure development of guidelines, standards and training modules for National Meteorological and Hydrological Services for provision of products and services to support risk-based decision-making, in consultation with the DRR user-interface mechanisms;

(3) To collaborate with the presidents of technical commissions to ensure that a number of technical assistance projects, namely, the Severe Weather Forecasting Demonstration Project, Flash Flood Guidance systems and Coastal Inundation Forecasting Demonstration Project, Integrated Drought Management Programme, WMO Flood Forecasting Initiative, the WMO Emergency Response Activities as well as further development of the Global Data-processing and Forecasting System, WMO Integrated Global Observing System and WMO Information System, are coordinated with the DRR Programme cross-cutting framework as key contributions to the DRR Work Plan;

(4) To establish a link between the DRR Work Plan and the implementation activities of the Global Framework for Climate Services;

Urges Members to support the implementation of the DRR Work Plan.

Annex to Resolution 8 (EC-64)

DISASTER RISK REDUCTION PROGRAMME WORK PLAN

1. Disaster Risk Reduction (DRR) is a priority for WMO because protection of lives, property and livelihoods are at the core of the priorities of the WMO Members and the National Meteorological and Hydrological Services (NMHSs). Furthermore, the implementation of the Hyogo Framework for Action (HFA) by national governments is leading to changes in national DRR policies, legal and institutional frameworks, with implications on the role, responsibilities and new working arrangements for the NMHSs. These changes provide opportunities such as increased recognition of the NMHSs by their governments and stakeholders, which could result in strengthened partnerships and increased resources. However, NMHSs face increasing demand and liabilities related to the provision of products and services to larger and more diverse group of DRR stakeholders (e.g., government authorities, public and private sectors, NGOs, general public and media, etc.) whom have direct responsibilities for DRR decision-making. To meet these new challenges, as illustrated in Figure 1, the crosscutting DRR Programme two-tier work plan (hereafter referred to as the DRR Work Plan) aims to facilitate better alignment of the activities of WMO constituent bodies and global operational network as well as strategic partners to assist NMHSs to:

(a) Engage effectively in the National DRR governance and institutional frameworks;

(b) Identify, prioritize, establish partnerships and service delivery agreements with national DRR user community (users);

(c) Establish partnership agreements with other national technical agencies (e.g., hydrological services, ocean services, etc.) as well as global and regional specialized centres (e.g. Global Producing Centres (GPC), Regional Specialized Meteorological Centres (RSMCs), Regional Climate Centres (RCC), Tsunami Watch Centres, etc.), with standard operating procedures;

(d) Develop and deliver core and specialized products and services for DRR decision support (e.g., hazard/risk analysis, multi-hazard EWS, sectoral risk management and disaster risk financing and risk transfer) in a cost-effective, systematic and sustainable manner;

(e) Ensure that core operational capacities (e.g., observing networks, forecasting systems, telecommunication systems, data management systems, human resources, etc.) are built upon the principles of Quality Management Systems (QMS) to support product and service development and delivery;

(f) Engage in regional and global efforts for development of risk information for large scale and transboundary hazards, through strengthened regional and global cooperation.

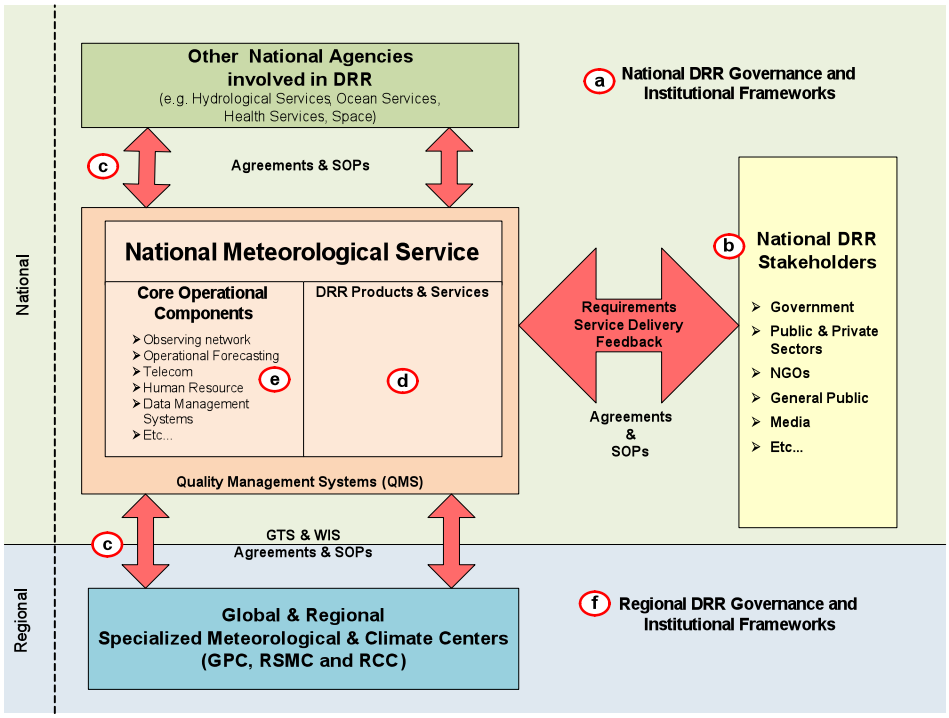

Figure 1. Schematic representation of linkages between meteorological services and DRR stakeholders

2. The DRR Work Plan (see Figure 2) includes: (i) development of guidelines, standards and training modules for DRR thematic topics based on documentation and synthesis of good practices; and (ii) coordinated DRR and climate adaptation national/regional capacity development projects to support capacity development of NMHSs as per paragraph 1 (a–f). A critical aspect of the coordinated DRR national/regional projects is strengthening of cooperation of NMHSs, RSMCs, RCCs and DRR users for development of products and services based on user needs and requirements.

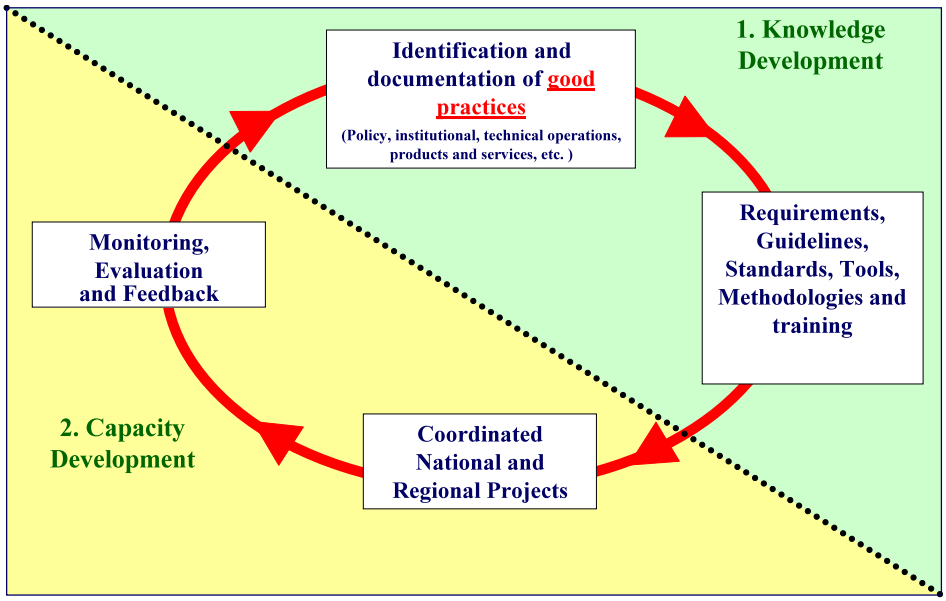

Figure 2. Two-tier schematic of the implementation approach of the DRR Programme

3. Making the implementation plan a reality would require substantial building of the operational capacities of many NMHSs in developing countries, an outcome that can only be achieved through a successful and well focused capacity development activities also engaging development partners such as the World Bank for the modernization of the NMHSs infrastructure, particularly in the developing and least developed countries. As one strategy for achieving this, significant efforts have been taken to engage Members, regional associations (RAs), technical commissions (TCs) and Programmes, to develop strategic alliances with key partners at regional and international levels to implement the DRR Work Plan.

DRR thematic guidelines, standards and related training modules

4. Thematic areas of the DRR Programme include provision of meteorological, hydrological and climate services to support: (i) Hazard/Risk Analysis; (ii) Multi-Hazard Early Warning Systems (MHEWS); (iii) sectoral risk management through improved planning in land zoning, infrastructure and urban planning, agriculture, health, transport, water resource management, and, (iv) disaster risk financing, and financial risk transfer mechanisms such as weather-indexed insurance. Efforts are underway to develop guidelines, standards, and training modules spanning institutional, technical and operational aspects, consistent with QMS principles. Risk-based decision-making and disaster risk financing are critical for the development of national DRR and climate adaptation policies, institutional and financial planning, sectoral risk management and operations, for which access to meteorological, hydrological and climate services is essential. Therefore, development of these guidelines and requirements are critical in assisting the NMHSs for providing services for these areas.

5. A number of thematic DRR user-interface expert advisory groups have been established to guide and support implementation of the DRR Work Plan and related deliverables, WMO TCs and Programmes, RAs and WMO global operational network. These user-interface expert advisory groups involve leading experts from the diverse DRR user community (public and private sectors), UN and international partner agencies, academia as well as NMHSs. These advisory groups are established to: (i) guide documentation of good practices and development of user needs and requirements for products and services to support thematic areas in DRR decision-making; (ii) support development of and provide feedback on the WMO DRR knowledge products; and, (iii) support the implementation of the DRR Work Plan. These include:

(a) Expert Advisory Group on Climate Services for Hazard/Risk Analysis (EAG-HRA) with focus on issues related to standards and guidelines for hazard definition, standardization of

hazard databases, metadata and statistical analysis and forecasting techniques of hazard analysis to support risk modelling;

(b) Expert Advisory Group on Multi-Hazard Early Warning Systems (MHEWS) with focus on the operational aspects of MHEWS, building on the principles of QMS;

(c) Expert Advisory Group on Climate Services for Disaster Risk Financing (EAG-CSDRF) with focus to develop requirements for climate services for disaster risk financing such as ex-ante and post-disaster government funding mechanisms, insurance and external development funding;

(d) Inter-commission ad hoc Task Team on Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response, established under the Commission for Basic Systems (CBS), with the Commission for Climatology (CCl), and the Commission for Hydrology (CHy), with focus on development of requirements of the humanitarian community for meteorological and climate services.

6. Following the discussions at the 2012 Meeting of the Presidents of Technical Commissions, the WMO TCs and Programmes have been actively reviewing the DRR Programme Work Plan with a view to contribute to development of standards, guidelines and training modules, through their engagement in the relevant “DRR user-interface mechanisms” to leverage and align their relevant activities.

Coordinated DRR and Adaptation national/regional capacity development projects

7. The Sixteenth World Meteorological Congress endorsed the: (i) DRR and Adaptation DRR national/regional capacity development projects in South East Europe, the Caribbean, and Southeast Asia; and (ii) the national Costa Rica Early Warning System Project funded by the World Bank. These projects are designed to demonstrate the benefits of leveraging the WMO’s Programmes, constituent bodies, global operational network and partners to address capacity development needs of NMHS to demonstrate the benefits of the DRR crosscutting framework. To date, efforts have been undertaken to strengthen coordination and cooperation among TCs and Programmes, RAs, and strategic partners at regional and international levels to support these projects.

8. These projects provide enabling environments for integrated planning, engaging the WMO TCs and Programmes with the RAs, Members and other partners for a more coordinated approach to assist Members. To this end, the project proposals and related implementation plans should ensure reflection of the specific contributions of the RAs and TCs, in particular with respect to the identification of needs and requirements, development of guidelines, norms and standards.

DRR resource mobilization

9. Resource mobilization in support of DRR is coordinated through WMO’s broader resource mobilization processes, leveraging emerging DRR funding opportunities.

Linkages to Global Framework for Climate Services (GFCS)

10. Through the aforementioned implementation approach, the DRR Programme is significantly contributing to the development of the Global Framework for Climate Services (GFCS), in particular related to the development of User Interface Mechanisms as a key contribution to the GFCS User Interface Platform (UIP), and the development climate products and services to support DRR decision-making, one of the four priority areas of GFCS. The outputs of the DRR user-interface expert advisory groups would identify the needs for Climate Services Information Systems (CSIS), research, observation and monitoring and capacity development components of the GFCS.