WORLD METEOROLOGICAL ORGANIZATION

MEETING OF THE EXECUTIVE COUNCIL WORKING GROUP ON SERVICE DELIVERY (ECWG-SD)

GENEVA, SWITZERLAND, 25-27 MARCH 2014

FINAL REPORT

INTRODUCTION

The "Meeting of the Executive Council Working Group on Service Delivery (ECWG-SD)" was held at the WMO headquarters, in Geneva, Switzerland, from 25 to 27 March 2014. The Meeting was chaired by Mr Abdalah Mokssit, the Chairperson of the ECWG-SD, who is also the Third Vice-President of WMO and the Permanent Representative of Morocco with WMO. The list of the participants at the meeting is attached as Appendix I to this report.

The main outcome of the Meeting was a set of five overarching recommendations for consideration by the sixty-sixth session of the WMO Executive Council (EC-66, Geneva, Switzerland, 16-27 June 2014). The recommendations are included in Appendix II to this report. Table 1 of Appendix III shows the mapping of the recommendations aligned to the six strategy elements as defined in the Implementation Plan (IP) of "The WMO Strategy for Service Delivery".

The five overarching recommendations are based on a set of detailed recommendations formulated by the Working Group for each agenda item. The detailed recommendations are contained in Appendix IV to this report.

1. OPENING OF THE SESSION

1.1 Mr Jeremiah Lengoasa, Deputy Secretary-General of WMO, opened the meeting on behalf of the Secretary-General. Mr Lengoasa welcomed the Members of the Working Group and thanked them for attending the meeting. He expressed the timeliness of the meeting, which was arranged just prior to the last Executive Council in the 16th Financial Period, and hence provided the Group a perfect opportunity to convey to the Executive Council its input and views on the crucial topic of service delivery. Mr Lengoasa emphasized the importance of the meeting and pointed out that the 16th World Meteorological Congress (Cg-16, Geneva, Switzerland, May-June 2011) had acknowledged service delivery as one of the Strategic Thrusts of WMO in the Strategic Plan 2012-2015. Cg-16 had also approved "The WMO Strategy for Service Delivery" (herein referred to as "the Strategy") and requested the Secretary-General to arrange for the development of an implementation plan for the Strategy. The Implementation Plan was developed and approved by sixty-fifth session of the WMO Executive Council (EC-65, Geneva, Switzerland, May 2013). He stated that the aim of the meeting was to discuss and agree on recommendations to EC on how the Strategy could be best implemented and how it could be applied to provide a coherent approach to service delivery across all of the programmes and constituent bodies of WMO. Mr Lengoasa reiterated the overall responsibility of the Working Group in providing oversight of the implementation of the Strategy and advice and guidance to the work of the WMO constituent bodies.

1.2 In his remarks, Mr Abdulah Mokssit reiterated the importance of service delivery in the National Meteorological and Hydrological Services (NMHSs) as one of their primary functions. Mr Mokssit emphasized that this area needed improvement in most NMHSs. The meeting was therefore crucial in formulating recommendations to EC, for helping Members improve their service delivery. He pointed out the necessity to map out the status of service delivery in all NMHSs and to use this information to monitor progress as the Strategy was implemented in the coming years.

2. ADOPTION OF THE AGENDA

The provisional agenda was adopted without changes. The final meeting agenda for this event is attached as Appendix V to this report.

3. SERVICE DELIVERY

3.1 Concept paper on a harmonized approach for Service Delivery across WMO Programmes and Projects

3.1.1 The Working Group noted that a more uniform approach for service development and delivery had been initiated through the Strategy. The Strategy and its Implementation Plan provide an adaptable tool and comprise an initial step for Members and WMO constituent bodies to move towards a more structured approach to service delivery.

3.1.2 Noting further the definition of service as "a product or activity that meets the needs of a user or can be applied by a user" and related attributes, as defined in the Strategy, the Working Group considered it useful to also define some generic principles applicable to all types of services provided by Members and guided by various WMO Programmes. Such principles would imply that services should be: (a) science-based; (b) quality-assured; (c) user-oriented; (d) adding value to users; and (e) harmonized and standardized to the extent possible.

3.1.3 The Working Group discussed the report presented by the Secretariat on a harmonized approach to service delivery across WMO Programmes and Projects. It agreed that the issue at the centre of service delivery at present could be formulated as: developing an integrated approach to service delivery within WMO, throughout various programmes that have service delivery elements, and at the level of national service providers (recognizing by default NMHSs as the major service providers), based on agreed sets of attributes and general principles of services and delivery methodology.

3.1.4 The Working Group further agreed that this approach needed to be complemented with a products and service development and delivery process that would incorporate: (i) identification and prioritization of the target users; (ii) establishment of working arrangements; (iii) understanding the target users' needs and requirements; (iv) development of products and technical support to meet the needs and requirements; (v) development of the proper service delivery model appropriate for this target user group; (vi) delivery of the service; (vii) establishment of feedback mechanisms for improving products and/or identifying new product opportunities with the target user. The expected benefits of such a holistic approach for NMHSs are: (i) increased effectiveness and efficiency; (ii) increased competitiveness; and (iii) sustained and expanded market position. The benefits for the end-users will be: receiving more quality and value; and focus on their primary needs, efficiency and affordability in their operations.

3.1.5 The Working Group regarded two primary drivers for moving towards an enhanced service culture. External drivers include: the increasing competition in the field of service provision between NMHSs and private service providers; the current economic stress on NMHSs to maximize their efficiency in the overall discharge of their mandates; the technology development, in particular in the information technology (IT) sector, that have brought enormous new opportunities in accessing data and products and in communicating between providers and users; and the evolving national policies, legislation and legal frameworks in areas such as disaster risk reduction with implications on the role, responsibilities and new working arrangements for NMHSs in the provision of products and services. The internal drivers are related to the evolution of WMO priorities such as WMO Integrated Global Observing System (WIGOS), WMO Information System (WIS) and the Global Framework for Climate Services (GFCS) which have a strong user interface elements. The Meeting felt that special efforts were necessary to create a common concept and initiate work on setting up flexible service standards to cover different types of services.

3.1.6 In order to progress towards a coherent service delivery approach across WMO Programmes, based on the Strategy, the Working Group proposed to consider the following:

(a) The necessity to require from all programmes involved in delivery of weather, climate, water, and environment-related services to develop further their ability and mechanisms for interaction with users and identifying user requirements as the first step; and to encourage Members to develop their services in a coherent way to optimize the use of limited resources;

(b) Most of the generic principles and attributes of effective service delivery are inherent in the Quality Management System (QMS); therefore, based on the positive experience of the Aeronautical Meteorology (AeM) Programme (AeMP), a strong recommendation could be to encourage Members to implement QMS in the entire range of activities and programme areas that involve delivery of services to users;

(c) The WMO Technical Regulations should be expanded to cover generic aspects of service delivery based on good practices and experience in specific service (e.g., aviation, marine); the overall culture of compliance with the WMO's and other relevant standards and regulations should be enhanced and regarded as an important performance indicator of a successful service provider;

(d) Improving services and service delivery, as well as efficient arrangements for effective application through fast uptake of science and technology developments should be regarded as a main factor for success; the application programmes should work closely with science and technology community to identify opportunities and promote effective and affordable solutions in this regard;

(e) Cross-cutting demonstration projects with coherent actions should be initiated on regional basis in an integrated fashion to help implement the current WMO strategies, Programmes and Projects focusing on the Strategy;

(f) Priorities should be set for the delivery of integrated weather, climate, water, and environment- related services to meet the rapidly changing needs of society, including new applications to address the needs of different sectors, such as: integrated multimodal transportation (aviation, marine and land); health; energy; agriculture and food security; and urban service delivery;

(g) Training and capacity development should be implemented primarily for the forecasters and managers of NMHSs, and also be offered for the users, on the principles of service delivery and QMS. The Regional Training Centres (RTCs) may provide a basic framework to extend and expand relevant training by all WMO Programmes to include topics related to service delivery to Members;

(h) Competency requirements currently exist for Aviation Meteorology, while PWS and Marine Meteorology and Oceanography (MMO) Programmes are in the process of developing and finalizing competency requirements in their respective areas of responsibilities. The competencies should cover not only basic sets of knowledge/skills/behaviour in producing and delivering forecasts and warnings, but also should outline requirements for delivering services for specified user groups and partners;

(i) A few key service areas may be considered to initiate such an exercise and demonstrate feasibilities for such a holistic approach in the provision of weather, climate and hydrological services (e.g., transport, health and possibly energy sectors); and

(j) Impact-based forecasting and risk-based warnings should be recognized by all WMO Programmes involved in the delivery of weather, climate, water and environment-related services, as supporting social resilience through behaviour modification in society. Issues surrounding the move towards impact-based forecasting and risk-based warning should be integrated into a common framework across all WMO Programmes dealing with applications of meteorology.

3.2 The Implementation Plan for "The WMO Strategy for Service Delivery"

3.2.1 The Working Group noted with appreciation the report presented by the Secretariat on the successful progress in the preparation of the IP of the Strategy, following its approval by EC-65. It noted that the Strategy and its IP, which are WMO-wide, had been developed in response to requests by Members who had indicated the need for a more structured approach to service delivery. It further noted that the PWS Programme had coordinated the process of consultation with presidents of TCs, RAs and WMO Programmes, and had supported the Working Group (which has the overall responsibility for guiding, monitoring and reporting on the implementation of the Strategy) in the preparation of the Strategy and the IP, as requested by Cg-16.

3.2.2 The Working Group was pleased that the Strategy had been published in English for distribution to Members (WMO-No.1129), with other languages to be disseminated in due course. The Working group noted with appreciation that this document can now be freely accessed through the WMO Website at the following link: http://www.wmo.int/pages/prog/amp/pwsp/documents/WMO-SSD-1129_en.pdf. The Working Group also noted with interest that the Strategy and its IP were published as a recommended practice and would be referenced in the Technical Regulations (WMO-No.49).

3.2.3 The Working Group noted that the IP laid out a path forward to guide WMO Members and constituent bodies in realizing the goal of the Strategy which is to help NMHSs raise the standards of service delivery in the provision of products and services to their users. It emphasized that the IP needed to be applied in a practical manner, and that all elements of service delivery needed to be identified in WMO Programmes. This would include all basic requirements for observation, data processing and forecasting, and, at the same time, would help identify sectoral requirements and various users.

3.2.4 The Working Group acknowledged that the IP provided guidance to Members through a three-level approach to the implementation of the Strategy: Global; Regional; and National. The role of various constituent bodies at each of these levels is laid out. At the Global Level, the responsibilities for the Strategy fall within the mandates of Congress, the Executive Council, the TCs and the WMO Secretariat, while on behalf of the Executive Council Working Group on Service Delivery (ECWG-SD) had been assigned the responsibility for the implementation of the Strategy. At the Regional Level, the responsibility for the Strategy is focused on RAs. At the national level, the IP is designed to be adapted and applied by Members and their NMHSs, regardless of their structure and operating model, to guide them in improving their levels of service delivery. A three-step process is proposed in the Service Delivery Progress Model (SDPM), which is the key tool in the implementation of the Strategy to provide step-by-step guidance to: (i) determine a Member's current levels of service delivery; (ii) target where they wish to be in the future; and (iii) develop a plan to get there.

3.2.5 The Working Group noted that close linkages with the WMO Strategic and Operational Plan, as well as other WMO priority areas and initiatives such as the Global Framework for Climate Services (GFCS), Capacity Development, and Quality Management Framework (QMF), had been maintained in the development of the IP.

3.2.6 The Working Group picked up on the vital connection between the Strategy and improvement of delivery of warning services. It agreed that the activities of NMHSs for reducing the impact of severe weather hazards and increased social resilience needed to be embedded in their overall role of delivery of services on a day-to-day basis. It further recognized the importance of the application of service delivery principles to climate services.

3.2.7 The Working Group agreed that all WMO constituent bodies and programmes that have a service delivery role need to consider using the IP as a tool to improve a service culture in their areas of responsibilities.

3.2.8 The Working Group noted that in order to quantify progress against the high-level objective of the IP a number of targets had been proposed based on short-term (2 years), medium-term (6 years) and long-term (10 years) milestones, which aim at arriving at a point where all Members have either developed or strengthened a total service culture in their NMHSs.

3.2.9 The Working Group was in full agreement that for the Strategy IP to be successful, the exchange of knowledge and information among NMHSs and WMO constituent bodies was crucial. Timely and accurate reports to the Working Group would help to ensure that relevant knowledge and information could be communicated to other NMHSs and constituent bodies. Twinning and mentoring would help achieve progress, and RAs, in particular, would have a major role in facilitating these activities.

3.3 Public Weather Services

3.3.1 The Working Group was briefed by the Secretariat on a number of important new initiatives related to the PWS Programme in the context of service delivery related to the:

(a) implementation of “The WMO Strategy for Service Delivery”;

(b) move towards impact-based forecasting and risk-based warning services;

(c) service provision for megacities;

(d) service provision for surface transportation; and

(e) service provision for the health and energy sectors.

3.3.2 In addition to the report provided under item 3.2 above (The Implementation Plan for “the WMO Strategy for Service Delivery”), the Working Group was informed that, as requested by EC-65, the PWS Programme had started to take steps to assist NMHSs in the application of the Strategy in a realistic, pragmatic and concrete manner in the provision of services to the public and other users. To this end, it had organized three regional seminars in order to familiarize Members with the IP. These seminars had been held in Curaçao, for the English-speaking Caribbean Members (December 2013); South Africa, for the Southern African Development Community (SADC) region (November 2013); and Brunei Darussalam, for the Association of South-East Asian Nations (ASEAN) Members (October 2013). Senior management and technical staff of 38 Member NMHSs participated in these seminars. The seminars were well received by the participants who indicated the benefits of further detailed and country-specific training to NMHSs in the implementation of the Strategy.

3.3.3 The Secretariat provided the Working Group with the rationale for moving towards impact-based forecasting and risk-based warnings in the provision of more effective public warning services in building social resilience. The Working Group fully agreed that addressing this issue was a challenge to developing and developed economies alike, but acknowledged that governments and the

public needed to know the impact of severe weather hazards on their lives, livelihoods, property and economy and were increasingly demanding more than just statements of expected weather conditions from their NMHSs. This point was illustrated with the example of Typhoon Haiyan, where in spite of very good track and intensity forecasts, around 6,000 people lost their lives, and many more were and are still unaccounted for.

3.3.4 The concept of risk-based warnings was introduced to the Working Group. The Risk Matrix, developed by the United Kingdom Met Office and a prototype of risk-based warning for hurricanes developed by the National Weather Service/National Oceanic and Atmospheric Administration (NWS/NOAA) were used as examples to illustrate the combination of likelihood and impact related to vulnerability and exposure to a severe weather event. It was noted that some other Members were also engaged in developing warnings based on risk knowledge. The Working Group acknowledged the complexity of issues related to impact-based forecasting and risk-based warnings which require planning and forging of partnerships at many levels and with many other government agencies and stakeholders. Lack of access to many types of data required for this type of warning was seen as another major impediment. These complexities, in addition to fear of false alarms, often lead to reluctance of meteorologists to forecast impacts since extensive knowledge of vulnerability and exposure are required and can only be addressed through data sharing among different agencies and departments.

3.3.5 The Working Group noted that issues surrounding implementation of the Strategy, in particular, impact-based forecasting and risk-based warnings, needed to be pulled together into a common planning framework to maximize benefits and allow for efficient implementation of prediction services of Members in support of social resilience and mitigation of impacts, ranging from daily operations to dealing with various hazard occurrences. The importance and effectiveness of a multi-hazard approach to reducing impacts should be highlighted through understanding how a hydrometeorological hazard can produce a series of social consequences, which are also public hazards. Some of the proposed next steps in assisting NMHSs to move towards impact based forecasting are provided below:

(a) Expanding service delivery in NMHSs' modernization programmes to include impact-based forecasting. This requires investment in other sectors, as well as new skills in NMHSs, and the development of effective partnerships among a diverse group of stakeholders providing demographic information, Geographical Information Systems (GIS), behavioural information, etc.;

(b) Assisting NMHSs and their partners to develop impact-based scenarios based on hazard information (available at NMHSs) and assessments of vulnerability and exposure to particular hazards (to be obtained through partnerships with organizations that have this information);

(c) Training in all aspects of impact-based forecasting for staff of NMHSs and emergency responders; and

(d) Developing operational pilots, most effectively through choosing suitable candidates from among countries participating in the Severe Weather Forecasting and Demonstration Project (SWFDP), in response to the need to transition from weather warnings to weather impact warnings.

3.3.6 The Working Group was informed that the PWS Programme had taken the lead within the Commission for Basic Systems (CBS) to focus on impact-based forecasting and risk-based warnings. As a response to the request of CBS, the CBS Open Programme Area Group (OPAG) on PWS was in the process of preparing a set of WMO guidelines for NMHSs on multi-hazard impact-based

information and warning services, which upon approval by the Extraordinary Session of CBS (CBS-Ext.(14), Asuncion, Paraguay, September 2014) would be published and distributed to Members. The guidelines address issues indicated in the preceding paragraph.

3.3.7 In relation to megacities, the Working Group acknowledged the need for climate, weather and environmental services in order to be resilient in withstanding environmental hazards. It emphasized that improving the capacity of NMHSs in megacities to develop partnerships and collaboration with the city government authorities responsible for provision of services to the population, was crucial for the delivery of user-relevant services with targeted improvements in communication and client relations. The Working Group stressed that providing forecasts, information and advice to all partners and the public on flash floods, heat wave and cold spells, ultraviolet (UV) radiation, ozone concentrations, haze, smog and pollen levels, through robust PWS multi-channel systems of dissemination and communication in megacities was a vital and challenging task for NMHSs.

3.3.8 The Working Group agreed that effective and efficient operation of the transport sector was highly dependent on the production, dissemination, and application of accurate, timely weather and climate data and information. While each transportation sub-sector has taken independent steps to address this situation, a well-integrated approach to maximize the benefits of the mitigation strategies employed in multimodal (aviation, marine, road and rail) transport was required. In this regard, a new initiative needed to be taken on an approach to aviation, marine and land transportation (ref.: agenda item 3.4 – Service delivery related to aeronautical, marine and surface transport (see below)) with the involvement of the Aeronautical Meteorology (AeM), MMO and PWS Programmes for a seamless integration of weather and climate impact information and services for the transport sector.

3.3.9 The Working Group noted that the PWS Programme had successfully implemented several projects to demonstrate the application of weather and climate information in the health sector, leading to the creation of “Weather, Climate and Health Working Groups” in a number of countries. Such initiatives had highlighted the value that NMHSs could add in the provision of services to the health sector, developed in a cross-cutting manner involving relevant WMO programmes and activities, including GFCS. The Working Group agreed that this should be a priority focus for service delivery.

3.3.10 The Working Group observed that for most NMHSs the energy sector represented a relatively new market. The requirements of this sector, including those engaged in the production of renewable energy, were wide and varied and NMHSs could meet much of these needs through provision of tailored services built on the basis of their public weather services. The Working Group considered energy as an important sector to be added to the more traditional sectors such as agriculture for the provision of services.

3.4 Service delivery related to aeronautical, marine and surface transport

3.4.1 The Working Group agreed that in view of the different approaches taken by aviation, marine and surface (including inland waterways) transport sub-sectors in response to requirements for safety, efficiency and continuity of operations in the face of adverse weather, an integrated approach to service delivery for the transport sector (aviation, marine, surface) was required in order to maximize the benefits of the weather and climate impact mitigation strategies. Safe, effective and efficient operation of the global and regional transportation network is highly dependent on the production, dissemination, and application of accurate and timely weather information. The interconnectivity of all modes of transport which had resulted in an intermodal[1] network of various

[1] Intermodal passenger transport, also called mixed-mode commuting, involves using two or more modes of transportation in a journey. The goal of mixed-mode commuting is often to combine the strengths (and offset the weaknesses) of various transportation options.

transportation systems meant that any disruption in the operations of one of the elements of this network due to adverse weather would have a negative impact on the other elements.

3.4.2 The Working Group noted that in terms of standards for robust weather- and climate-related observing systems, dissemination methods and added value services, such as alerts and forecasts, some level of guidance for surface transportation does exist. However, to date, there are no international and few national standards for this sector (albeit some national and state/provincial guidelines and established practices). Therefore, key stakeholders have far more difficulty accessing and employing the right weather data and information, even though the majority of the population travels by surface transport. The Working Group noted the rich experience in service provision in the aviation and marine sectors according to international standards and regulations. The implementation of QMS in aviation sector provided a best practice example in achieving safety and efficiency. In this regard, the Working Group agreed that the case of land transport was in contrast with these two sectors.

3.4.3 The Working Group agreed that the above mentioned sector differences, necessitate that work be done to provide comparable standards across all transport modes, with the goal of enabling a seamless transportation network in order to facilitate safer, more effective operations in all transport modes. It welcomed the intention of WMO to study this issue in order to identify current multi-modal synergies and gaps with respect to weather impacts, leading to the provision of suitable global guidance on the seamless integration of weather information services across all transport sub-sectors. Benefits of such integrated approach are expected to be: maximization of weather and climate information to all transport sub-sectors; making use of good practices from developed sub-sectors, (e.g., aviation and marine); enabling optimal decision making for all users; and harmonization and cost-effectiveness for service providers. The AeM, MMO and PWS Programmes were expected to be involved in this initiative.

3.5 Disaster Risk Reduction within the framework of service delivery

3.5.1 The Working Group reviewed the progress with further development and implementation of the cross-cutting Disaster Risk Reduction (DRR) Programme, particularly, in relation to:

(a) The DRR Work Plan (2012-2015) and related deliverables driven by user requirements, to support risk-informed decision-making in DRR thematic priority areas (ref.: Abridged final report with resolutions of the Sixty-fourth session of the Executive Council (EC-64, Geneva, June-July 2012, WMO-No. 1092), agenda item 4.2 and 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 and the Annex to Resolution 8 (EC-64) – Disaster Risk Reduction Programme Work Plan);

(b) Establishment of the four DRR User-Interface Expert Advisory Groups (DRR UI-EAGs) and mechanisms for the DRR thematic priority areas, including: (i) Hazard/Risk Analysis; (ii) Multi-Hazard Early Warning Systems (MHEWS); (iii) Disaster Risk Financing and Insurance; and, (iv) Humanitarian Planning and Preparedness. These UI-EAGs, as coordinated user platforms, are to provide input on user requirements and facilitate the engagement of user community with the implementation of the DRR Work Plan (EC-64 and EC-65, under agenda item 4.2);

(c) Progress with the implementation of deliverables of the DRR Work Plan, including:

    (i) DRR documented good practices and guidelines on user requirements in areas of risk analysis, MHEWS, and disaster risk financing and insurance;

(ii) DRR holistic and integrated national capacity development projects with regional cooperation in Southeast Europe (SEE), Central America and the Caribbean; and

(iii) Progress with the development of DRR Training on service delivery to scale up the benefits of DRR Programme to all Members.

3.5.2 The Working Group also considered lessons learned through the implementation of the different deliverables of the DRR Work Plan, including:

(a) Governance, and other implementation mechanisms that have facilitated more systematic engagement of the user community, WMO constituent bodies, WMO coordinated operational network, Members, and strategic partners; and

(b) Project approach, management and oversight mechanisms at the national, regional and secretariat levels for implementation of DRR Projects that had enabled engagement of various stakeholders.

3.5.3 The Working Group noted that:

(a) Significant and systematic progress had been made on governance and coordination mechanisms, as well as implementing the deliverables of the DRR Work Plan;

(b) Implementation of DRR Work Plan, within the service delivery framework, could benefit from development of indicators that would allow for measuring benefits to the Members in alignment with the principles of the Strategy;

(c) There were opportunities for better aligning and leveraging the TCs' contributions to the implementation of DRR guidance material and demonstration projects, particularly in linkage with guidelines on hazard/risk analysis and technical assistance projects;

(d) DRR training modules developed by the Members, RTCs, WMO Secretariat, UI-EAGs of DRR and partners such as the World Bank, United Nations Development Programme (UNDP), United Nations Institute for Training and Research (UNITAR), and United Nations Office for Disaster Risk Reduction (UN-ISDR) could be leveraged to enable scaling up of the benefits of DRR Programme to all Members.

3.5.4 The Working Group embraced two recommendations of the DRR Focal Points of the TCs and Technical Programmes (TPs) (DRR FP TC-TP), which were endorsed by the meeting of the presidents of TCs (PTC-2014, Geneva, January 2014) including: (i) the development of technical guidelines and recommended practices, underpinned by DRR user requirements; (ii) leveraging a number of existing WMO technical assistance projects and activities within the user-driven holistic and integrated DRR project in South-East Asia. The Working Group appreciated that these recommendations were the result of analysis of intra- and inter- TCs and TPs activities and mechanisms, in relation to the DRR Work Plan.

3.5.5 The Working Group concluded the consideration of this item by agreeing that delivery of services takes on an emergency assistance role during extreme conditions to reduce disaster risk in weather, climate, water and environment-related events.

3.6 Tropical Cyclone Programme and related service delivery issues

3.6.1 The Working Group noted that the primary objective of the Tropical Cyclone Programme (TCP) was to help establish nationally and regionally coordinated systems in order to ensure that the risks of disasters, in particular, loss of life and damage caused by tropical cyclones were minimized;

3.6.2 The Working Group recognized that service delivery in tropical cyclones involved improvement in all aspects in the chain from observations, model development, forecast techniques, forecasts and warnings, dissemination of the warnings, hazard mapping, and response strategies;

3.6.3 The Working Group discussed the service delivery aspects related to TCP, in particular, experience and lessons learnt from the WMO Emergency Response to Typhoon Haiyan. The Working Group agreed and recommended that major efforts were needed to establish mechanisms to respond to requests from Members for emergency assistance in cases of extreme conditions related to tropical cyclones.

3.7 Data Processing and Forecasting Systems related to Service Delivery

3.7.1 The Working Group recalled the successful formula of the SWFDP and the significant benefits that had been realized so far in its three regional projects in RA I (Africa) and RA V (South-West Pacific); and two others under in development in RA II (Asia). From its inception, as an idea in 2004, the Project has had two key goals: (1) improving the forecasting of severe weather; and (2) improving the delivery of warning services. The Project implemented the concept of Cascading Forecasting Process, which involved global numerical weather prediction (NWP) centres, regional centres that integrated and synthesized all forecasting guidance, and the national meteorological centres that provided a wide range of services to meet national needs in relation to meteorological hazards.

3.7.2 The Working Group agreed that the Data Processing and Forecasting Systems (DPFS) of Members were the production “engine rooms” for forecasts and warning products, and provided the essential basis for the delivery of services. A clear lesson from the SWFDP was that strengthening and sustaining WMO operational centres through the Cascading Forecasting Process, particularly those for centres with regional or sub-regional operational responsibilities (e.g., Regional Specialized Meteorological Centres (RSMCs), satellite product centres, technical training centres) would increase and sustain the benefits in the delivery of services by the NMHSs. The SWFDP had successfully developed much needed severe weather forecasting and warning services capabilities at many NMHSs of developing and least developed countries.

3.7.3 The Working Group agreed that a broader implementation of the Cascading Forecasting Process could contribute to strengthening many service delivery functions of NMHSs and strengthen their links with other national organizations with hydro-meteorologically relevant activities, especially those with potentially high societal or economic impacts. Furthermore, the Cascading Forecasting Process, if implemented across meteorology and hydrology disciplines, could help create an integrated MHEWS approach in collaboration with Disaster Management and Civil Protection Authorities (DMCPA), for both meteorological hazards, as well as other hazards that depend on hydro-meteorological factors (e.g., environmental emergencies).

3.7.4 The Working Group noted similarities in the implementation of the TC P and the SWFDP, in particular, the reliance on an essential operational role played by designated regional centres. It suggested that in the evolution of the SWFDP Project(s), and learning from best practices of TCP, an operational framework should be developed, to include designated operational regional centres with specialization in severe weather Standard Operating Procedures (SOPs) to define and assure

operational processes should also be developed. The relevant RAs should lead in such developments, with the Secretariat playing a facilitating role.

3.7.5 The Working Group agreed that the development of high-impact and risk-based forecast services should take a probabilistic approach, to benefit from NWP/ Ensemble Prediction System (EPS) outputs as a source of strong objective guidance for decision-making. At the same time, there is a continuing need to improve the understanding of the limitations of the forecasts, especially for meteorological hazards. The limitations should be expressed in terms of uncertainties in the forecasts, and as well carried forward in the estimation of risks and impacts

3.8 Service delivery link to climate including agriculture, water, environment, and the Global Framework for Climate Services (GFCS)

3.8.1 The Secretariat informed the Working Group about the variety of documentation that was available to support a service delivery approach for the delivery of agricultural, water and climate services and GFCS. This included a range of subject orientated guides such as “The Guide to Hydrological Practices (WMO-No. 168)” and “The Guide to Climatological Practices (WMO-No. 100)”. Other documentation provided guidance on the application of a quality management framework and on the role, operation and management of national services which incorporated service delivery elements.

3.8.2 The Secretariat also informed the Working Group about the two key pillars of the GFCS which related directly to service delivery (the User Interface Platform (UIP) and the Climate Services Information System (CSIS)) noting that all of the pillars contribute to the improved delivery of climate services. The UIP component of the GFCS provides the basis for effective service delivery while the CSIS provides guidance on how to produce and distribute climate data and information according to the needs of users and to agreed standards.

3.8.3 It was noted that service delivery is one component of the overall QMS which supports the timely delivery of robust and scientifically sound services to the user community. The Working Group raised a number of issues during discussions, including the need to:

(a) Get a services delivery culture up front as the driving force for the development and distribution of services;

(b) Recognize that the GFCS UIP is not just a single platform, but consisted of many mechanisms operating at local, national, regional and international levels, with linkages to service delivery component of WMO Programmes and Projects related to the GFCS priority areas such as food security, water resources management and health;

(c) In the delivery of the GFCS, NMHSs may not be the sole providers of climate and climate-related services in a country. In this regard, the definition of roles and responsibilities of providers, agreement on standards and minimum requirements for the production of services and the identification of quality control procedures to facilitate the interface with users need special attention;

(d) Ensure that there are appropriate connections between user interface mechanisms and the services that are developed. That is, the user requirements feed into the development of the services to make them appropriate and demand driven;

(e) Accept that, sometimes, how the service is delivered is as important as the quality of the service itself;

(f) Recognize that users' expectations will most likely exceed current capabilities and that feedback therefore needs to be a two-way process, so that robust and sound services are delivered in a user friendly manner; and

(g) Provide guidance on how to undertake realistic socio-economic cost benefit analyses is necessary to ensure that service delivery is cost-effective and efficient and that services that are no longer required can be ceased.

3.9 Contribution of Research to service delivery

3.9.1 The Working Group was informed of the contributions by the Commission for Atmospheric Sciences (CAS) and its two Programmes, namely the World Weather Research Programme (WWRP) and the Global Atmosphere Watch (GAW) Programme. It noted that the Sixteenth Session of CAS (CAS-16, Antalya, Turkey, November 2013) had highlighted six priority areas as the focus of research and enhanced service delivery over the next decade. The following four priority areas were considered in detail:

(a) High-impact weather and its socio-economic effects in the context of global change;

(b) Water: modeling and predicting the water cycle for improved disaster risk reduction and water resource management;

(c) Aerosols: impacts on air quality, weather and climate; and

(d) Urbanization: research and services for megacities and large urban complexes.

3.9.2 The Working Group learnt of the growing importance and vulnerability of the urban environment and the complex needs for new and enhanced services tailored for cities. It agreed that the city was the new frontier for high resolution service delivery and the needs would be best addressed through cross-cutting initiatives within WMO.

3.9.3 The Working Group was informed of the Sub-seasonal to Seasonal Prediction Research Project and the Polar Prediction Research Project, both of which were undertaken in partnership or close collaboration with the World Climate Research Programme (WCRP) to enhance service delivery in the context of the GFCS. It was informed that both these Projects, developed from THORPEX, would continue when this Project is concluded at the end of 2014.

3.9.4 The Working Group supported the following as priority areas of particular relevance to Members:

(a) The importance to link research initiatives to operations from an early stage, as well as the value to be derived by including demonstration projects in the research efforts. By doing so research would be better aligned to user needs and a pathway would be established for mature research results to be implemented operationally; and

(b) The World Weather Open Science Conference (WWOSC), planned for August 2014 in Montreal, Canada, would be an ideal platform to further discuss how to strengthen the links between research and service delivery in the areas identified.

APPENDIX I

FINAL LIST OF PARTICIPANTS

COUNTRY:	NAME AND TITLE(S):	ADDRESS:
Morocco	***Mr Abdalah MOKSSIT*** ***Chairperson of the ECWG-SD, Permanent Representative of Morocco with WMO***	Direction de la météorologie nationale National Centre of Climate and Meteorological Research BP 8106 Casa-Oasis 20103 CASABLANCA, Morocco Tel.: +212 522 913 803 Fax: +212 522 913 797 E-mail: mokssit.abdalah@yahoo.fr
Argentina	***Dr Héctor Horacio CIAPPESONI*** ***Member of the ECWG-SD, Permanent Representative of Argentina with WMO***	Servicio Meteorológico Nacional 25 de Mayo 658, Capital Federal CP1002 ABN 1002 BUENOS AIRES, Argentina Tel.: +54 11 5167 6712 Fax: +54 11 5167 6711 E-mail: hectorciappesoni@smn.gov.ar
China	***Dr CHEN Zhenlin*** ***Representing the Permanent Representative of China with WMO***	Department of Emergency Responses, Disaster Mitigation and Public Services China Meteorological Administration 46 Zhongguancun Nandajie Haidian District 100081 BEIJING, China Tel.: +86 10 6840 6531 Fax: +86 10 6217 4239 E-mail: cdccc@cma.gov.cn
Republic of Korea	***Dr LEE Woojin*** ***Representing the Permanent Representative of the Republic of Korea with WMO***	Korea Meteorological Administration (KMA) 61, 16-gil, Yeouidaebang-ro, Dongjak-gu SEOUL 156-720, Republic of Korea Tel.: +82 2 2181 0491 Fax: +82 2 2181 0499 E-mail: wjlee@kma.go.kr

United States of America	***Ms Laura K. FURGIONE*** ***Member of the ECWG-SD, Permanent Representative of the United States of America with WMO***	National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) 1325 East-West Highway SILVER SPRING, MD 20910-3283 United States of America Tel.: +1 301 713 0711 Fax: +1 301 587 4524 E-mail: laura.furgione@noaa.gov
United States of America	***Mr James PERONTO*** ***Meteorologist/Program Analyst***	International Activities Office (IAO) National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) 1325 East West Highway SILVER SPRING, MD 20910 United States of America Tel.: +1 301 427 9051 E-mail: james.peronto@noaa.gov
Zambia	***Mr Jacob NKOMOKI*** ***Member of the ECWG-SD, Permanent Representative of Zambia with WMO***	Meteorological Department P.O. Box 30200 10101 LUSAKA, Zambia Tel.: +260 977 883 189 Fax: +260 211 252 728 E-mail: jnkomoki@yahoo.com
WMO SECRETARIAT 7 bis, avenue de la Paix, Case Postale No. 2300 CH-1211 GENEVA 2, Switzerland **Website:** http://ecwg-sd-2014.wmo.int		
WMO HQ, Geneva, Switzerland	***Mr Bruce STEWART (D/CLW)*** ***Director, Climate and Water Department***	Tel.: +41 22 730 8355 Fax: +41 22 730 8043 E-mail: BStewart@wmo.int
WMO HQ, Geneva, Switzerland	***Mr Robert O. MASTERS (D/DRA)*** ***Director, Development and Regional Activities***	Tel.: +41 22 730 8325 Fax: +41 22 730 8047 E-mail: RMasters@wmo.int

WMO HQ, Geneva, Switzerland	***Dr Wenjian ZHANG (D/OBS)*** ***Director, Observing and Information Systems Department***	Tel.: +41 22 730 8567 Fax: +41 22 730 8021 E-mail: WZhang@wmo.int
WMO HQ, Geneva, Switzerland	***Dr Deon E. TERBLANCHE (D/ARE)*** ***Director, Atmospheric Research and Environment (ARE) Branch, Research Department***	Tel.: +41 22 730 8240 Fax: +41 22 730 8049 E-mail: DTerblanche@wmo.int
WMO HQ, Geneva, Switzerland	***Mr Filipe Domingos Freires LÚCIO (D/GFCS)*** ***Global Framework for Climate Services (GFCS) Office***	Tel.: +41 22 730 8579 Fax: +41 22 730 8037 E-mail: FLucio@wmo.int
WMO HQ, Geneva, Switzerland	***Dr Xu TANG (D/WDS)*** ***Director, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8264 Fax: +41 22 730 8128 E-mail: XTang@wmo.int
WMO HQ, Geneva, Switzerland	***Dr Rupa Kumar KOLLI (OiC/CLPA)*** ***Officer-in-Charge, Climate Prediction and Adaptation Branch, Climate and Water Department***	Tel.: +41 22 730 8377 Fax: +41 22 730 8042 E-mail: RKolli@wmo.int
WMO HQ, Geneva, Switzerland	***Mr Dimitar IVANOV (C/AEM)*** ***Chief, Aeronautical Meteorology Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8283 Fax: +41 22 730 8128 E-mail: DIvanov@wmo.int
WMO HQ, Geneva, Switzerland	***Mr Peter CHEN (C/DPFS)*** ***Chief, Data Processing and Forecasting System Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8231 Fax: +41 22 730 8128 E-mail: PChen@wmo.int
WMO HQ, Geneva, Switzerland	***Dr Maryam GOLNARAGHI (C/DRR)*** ***Chief, Disaster Risk Reduction Programme, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8006 Fax: +41 22 730 8128 E-mail: MGolnaraghi@wmo.int

WMO HQ, Geneva, Switzerland	***Mr Edgard CABRERA (C/MMO)*** ***Chief, Marine Meteorology and Ocean Affairs Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8237 Fax: +41 22 730 8128 E-mail: ECabrera@wmo.int
WMO HQ, Geneva, Switzerland	***Ms Haleh KOOTVAL (C/PWS)*** ***Chief, Public Weather Services Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8333 Fax: +41 22 730 8128 E-mail: HKootval@wmo.int
WMO HQ, Geneva, Switzerland	***Dr Taoyong PENG (C/TCP)*** ***Chief, Tropical Cyclone Programme Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8145 Fax: +41 22 730 8128 E-mail: TPeng@wmo.int
WMO HQ, Geneva, Switzerland	***Mr Samuel MUCHEMI (SO/PWS)*** ***Scientific Officer, Public Weather Services Division, Weather and Disaster Risk Reduction Services Department***	Tel.: +41 22 730 8137 Fax: +41 22 730 8128 E-mail: SMuchemi@wmo.int

OVERARCHING RECOMMENDATIONS FOR CONSIDERATION BY EC-66

(1) Following the acknowledgement by sixteenth Session of the World Meteorological Congress (Cg-16, Geneva, May-June 2011) of service delivery as one of the Strategic Thrusts of WMO, adoption by Congress of the WMO Strategy for Service Delivery (SSD); and the subsequent approval of the Implementation Plan (IP) of the Strategy by the sixty-fifth Session of the WMO Executive Council (EC-65, Geneva, May 2013) service delivery should be integrated in a harmonized and holistic approach, based on the attributes and principles of effective service delivery as contained in the Strategy and its IP, into all WMO programmes that have a service delivery role, and through design and implementation of demonstration projects;

(2) Relevant technical commissions (TCs), with the support of the Secretariat, should take action to raise the level of the existing and future service delivery guidance materials within a regulatory framework for assisting Members in fulfilling their national service delivery mandates;

(3) The Secretariat should take concrete steps to promote quality management in areas beyond Aeronautical Meteorology (AeM);

(4) In order to sustain improved, efficient and effective service delivery, the Secretariat and relevant TCs are encouraged to put in place mechanisms to ensure the flow of science and technology into operations and service delivery; and

(5) Members, with assistance from regional associations (RAs), are encouraged to pay special attention to performance measurement and continuous improvement, as a critical element in building a service-driven culture.

APPENDIX III

MAPPING OF THE OVERARCHING RECOMMENDATIONS AGAINST THE STRATEGY ELEMENTS OF THE IMPLEMENTATION PLAN (IP)

	The six (6) Strategy Elements as defined in the WMO Strategy for Service Delivery Implementation Plan:	**Overarching recommendations:**
1.	Evaluate user needs and decisions	3
2.	Link service development and delivery to user needs	3
3.	Evaluate and monitor service performance and outcomes	3, 5
4.	Sustain improved service delivery	3, 4
5.	Develop skills needed to sustain service delivery	2, 3
6.	Share best practices and knowledge	3, 4

Table 1: Mapping of the overarching recommendations by the Executive Council Working Group on Service Delivery (ECWG-SD) aligned to the six (6) Strategy Elements as defined in the IP

DETAILED RECOMMENDATIONS BY MEETING OF THE ECWG-SD (GENEVA, 25–27 MARCH 2014)

ITEM NO.:	ITEM(S):	RECOMMENDATION(S):
3.1	Concept paper on a harmonized approach for Service Delivery across WMO Programmes and Projects	3.1.1 A holistic approach focusing on attributes and principles of Service Delivery to be applied by all Programmes: o Sharing best practices among Programmes; o Strengthening service delivery elements in all Programmes; and o Engagement of RAs and TCs; 3.1.2 Establish an adequate system of regulation and guidance, based on existing and future service delivery materials, to reflect the positioning of service delivery as a WMO priority through harmonization and standardization; 3.1.3 Engage WIGOS, WIS, GDPFS as major enablers in service delivery; 3.1.4 Ensure a harmonized approach to service delivery based on the following key elements: o User focus; o Quality management; o Partnership development with relevant stakeholders; o Science and technology uptake; o Priorities of application (e.g., health, transport, megacities, food security, energy, etc.) as agreed by Members; o Performance measurement; o Continuous improvement; and o Demonstrated social economic benefits; 3.1.5 Effect a paradigm shift of service delivery model toward integrated service delivery systems (e.g., integrated transportation) at national and regional levels; 3.1.6 Policy issues including governance, legislation and data sharing policy so as to adequately support the Strategy; 3.1.7 In Capacity Development for service delivery, competency and training should be emphasized; and 3.1.8 Consider establishing integrated service delivery infrastructure or platform related to weather, climate, water and environment-related services.

3.2	The Implementation Plan (IP) for "The WMO Strategy for Service Delivery"	3.2.1 The Secretariat should assist Members to implement service delivery in a practical manner, recognizing sectoral requirements and users through training, developing guidance, sharing best practices; 3.2.2 It is necessary to put in place an effective tool to monitor Members' progress in SD, such as a global map to monitor progress: o The Secretariat should foster the establishment of a baseline of service delivery status among Members through the IP approach (categorization) and encourage Members to establish their targets and respective action plans; 3.2.3 Action should be taken to raise the level of existing service delivery guidance material, a regulatory mechanism, to reflect the positioning of service delivery as a WMO priority; 3.2.4 As service delivery is a WMO priority, all TCs are requested to include service delivery in their agenda during their sessions; and 3.2.5 To develop closer alignment between "The Strategy on Capacity Development" and "The WMO Strategy on Service Delivery".
3.3	Public Weather Services	3.3.1 The PWS Programme to focus on impact-based forecasting and risk-based warning, services for megacities, services for surface transportation, adopting innovations in IT into forecasting and service delivery; 3.3.2 Assist NMHSs address issues related to competition from private service providers; 3.3.3 Provide NMHSs with concrete best practice examples of impact-based forecasting practices, in order to assist them to effectively deal with issues of the collaborative decision-making process; 3.3.4 Take steps to standardize colour coding in warning services as exemplified by the Meteoalarm colour coding standardization; and 3.3.5 Take the necessary steps to assist Members adopt the Common Alerting Protocol (CAP) standard.

3.4	Service delivery related to aeronautical, marine and surface transport	3.4.1 To promote good service delivery practices from aviation and marine sectors for application to surface transport; and 3.4.2 To undertake study to identify weather-related current multi-modal synergies and gaps leading to global guidance on seamless integration of weather information services across all transport sectors.
3.5	Disaster Risk Reduction in the framework of service delivery	3.5.1 Launch and accelerate implementation of the integrated DRR capacity development project in risk analysis and MHEWS in South-East Asia, as per recommendations from the PTC-2014, drawing on the expertise of T Cs and leveraging technical assistance projects in the region; 3.5.2 Scale up the benefits of the DRR Work Plan outcomes by development and delivery of DRR training modules with other partners; 3.5.6 Align the future work of DRR with the Strategy and its IP through development of indicators; and 3.5.7 Facilitate the NMHSs access to loss-damage and exposure/vulnerability databases for development of risk-based products with support from the DRR UI-EAG on hazard/risk analysis.

3.6	Tropical Cyclone Programme and related service delivery issues	3.6.1 The service delivery element should be a priority within TCP 3.6.2 The TCP Programme to lead developing a Standard Operating Procedure (SOP) or Manual within the Secretariat in cooperation with TCs and RSMCs/Tropical Cyclone Warning Centres (TCWCs) and Members for urgent international assistance to Members upon request in severe TC cases; 3.6.3 Develop WMO competency requirements for TCP (including English language for the contact network); 3.6.4 Take steps to enable Members include the impact-based and risk-mapped forecasts and warning service information into the TC advisories and provide training; 3.6.5 To develop a clear, concise checklist of a technical guide to be included in the WMO Strategic and Operational Plan (SOP), as recommendations to Members for urgent action. This Guide should link hazard information to actions to be taken by the public; 3.6.6 To establish a network of emergency contacts, including Members and partner organizations; 3.6.7 To develop and include impacts-based and risk-mapped tropical cyclone forecasting and warning information into the tropical cyclone advisories provided by Regional Specialized Meteorological Centres (RSMCs) with activity specialization in tropical cyclones, and provide training accordingly; and 3.6.8 To develop guidance and technical tools to support Members' activities in disaster risk assessment and post-disaster analysis.

3.7	Data Processing and Forecasting Systems related to service delivery	3.7.1 Continue to provide guidance on how to convey uncertainty through the use of EPS products, for use by Members; 3.7.2 DPFS of Members to continue to be strengthened, focused on meteorological hazard and other high-impact areas, as a basis for service delivery; 3.7.3 Operational centres, through the Cascading Forecasting Process, particularly those centres with regional or sub-regional operational responsibilities, be strengthened to increase and sustain the benefits in the delivery of services by the NMHSs, in all regions of developing and least developed countries; 3.7.4 Strengthen efforts to develop guidance on seamless data processing for forecasting on all timescales; and 3.7.5 Extend efforts to develop guidance on environment-related forecasting under ERA.
3.8	Service delivery link to climate including agriculture, water, environment and Global Framework for Climate services (GFCS)	3.8.1 To further develop regulatory framework and guidance to cover service delivery aspects; 3.8.2 Encourage implementation of Quality Management Systems (QMS); 3.8.3 Clarify practical realization of User Interface Platform (UIP) of GFCS; and 3.8.4 Work on better definition of “products” in relation to the Climate services Information System (CSIS).
3.9	Contribution of Research to service delivery	3.9.1 Take necessary action to strengthen transition from research to operation in order to expedite the flow of new research findings to benefit operations, including in polar forecasting, seasonal and sub-seasonal forecasting, hydrological forecasting, and environment-related prediction; and 3.9.2 Develop demonstration projects engaging research and operational components to address new operational service delivery needs such as for megacities.

APPENDIX V

FINAL MEETING AGENDA

1. OPENING OF THE SESSION

1.1 Opening

1.2 Adoption of the agenda

1.3 Working arrangements

2. THE TERMS OF REFERENCE OF THE ECWG-SD

3. SERVICE DELIVERY

3.1 Concept paper on a harmonized approach for Service Delivery across WMO Programmes and Projects

3.2 The Implementation Plan for "The WMO Strategy for Service Delivery"

3.3 Public Weather Services

3.4 Service delivery related to aeronautical, marine and surface transport

3.5 Disaster Risk Reduction in the framework of service delivery

3.6 Tropical Cyclone Programme and related service delivery issues

3.7 Data Processing and Forecasting Systems related to service delivery

3.8 Service delivery link to climate including agriculture, water, environment, and the Global Framework for Climate Services (GFCS)

3.9 Contributions of Research to service delivery

4. CLOSURE OF THE SESSION