



World Meteorological Organization
Organisation météorologique mondiale

Secrétariat

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Weather • Climate • Water
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Notre réf.: WDS/DRR/WCDRR-III

GENÈVE, le 5 novembre 2014

Annexes: 2 (disponibles en anglais seulement)

Objet: Troisième Conférence mondiale des Nations Unies sur la réduction des risques de catastrophe et participation de l'OMM à la rédaction d'un cadre de réduction des risques de catastrophe pour l'après-2015

Suite à donner: Faire parvenir vos contributions au Secrétariat de l'OMM dans les meilleurs délais

Madame, Monsieur,

Comme suite à la circulaire envoyée par l'OMM le 25 avril 2014 (référence PR-6765), j'ai le plaisir de vous faire part de la contribution qu'apporte l'OMM à la conférence mentionnée en objet, qui aura lieu à Sendai (Japon), du 14 au 18 mars 2015.

Les participants à cette conférence envisageront l'adoption d'un cadre de réduction des risques de catastrophe pour l'après-2015, un mécanisme donnant suite au Cadre d'action de Hyogo pour 2005–2015: pour des nations et des collectivités résilientes face aux catastrophes. Pour de plus amples informations sur la conférence, veuillez consulter le site Web dédié à l'adresse www.wcdrr.org.

À sa soixante-sixième session, le Conseil exécutif a noté qu'il importait, d'un point de vue stratégique, que l'OMM participe à la planification de cette conférence, et notamment à la rédaction d'un cadre de réduction des risques de catastrophe pour l'après-2015. Dans cette optique, le Secrétariat et les Membres ont pris part à des consultations et activités de planification (voir l'annexe I).

Compte tenu de ce qui précède et étant donné l'importance de la conférence, les membres de votre SMHN sont encouragés à:

- 1) Utiliser le projet de messages clés de l'OMM pour le cadre de réduction des risques de catastrophe pour l'après-2015 (annexe II) et faire parvenir, via la Plate-forme nationale pour la réduction des risques de catastrophe ou le Ministère des affaires étrangères, des avis et observations spécialisés sur les prochains projets de cadre de réduction des risques de catastrophe pour l'après-2015;

Aux: Représentants permanents (ou directeurs des Services météorologiques ou hydrométéorologiques) des Membres de l'OMM (PR-6799)

cc: Conseillers en hydrologie auprès des représentants permanents

- 2) Tout mettre en œuvre pour faire partie de la délégation de votre pays à la deuxième session du comité préparatoire de la conférence (PrepCom2) (Genève, 17–18 novembre 2014) (www.wcdrr.org/preparatory/prepcom2) et à la conférence même, et à contribuer à faire connaître le rôle important que jouent les SMHN pour la prestation de services de prévention des catastrophes;
- 3) Fournir des informations et des observations sur le projet de messages clés de l'OMM pour le cadre de réduction des risques de catastrophe pour l'après-2015 (annexe II) – la version finale servira à rédiger la déclaration de l'OMM à la conférence, et les futurs documents de référence et déclarations finales des séances de travail de la conférence s'en inspireront;
- 4) Partager des documents et des outils multimédias sur la contribution de votre SMHN et les bonnes pratiques qu'il suit en matière de prévention des catastrophes, pour information et présentation à la conférence.

Je vous saurais gré de bien vouloir envoyer dans les meilleurs délais vos contributions et renseignements sur les points ci-dessus au Secrétariat de l'OMM, à l'attention de M. Xu Tang, Directeur du Département des services météorologiques et de réduction des risques de catastrophes (courriel: wds@wmo.int).

Veuillez agréer, Madame, Monsieur, l'expression de ma considération distinguée.



(M. Jarraud)
Secrétaire général

WORLD METEOROLOGICAL ORGANIZATION
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WDS/DRR/WCDRR-III, ANNEX I

EXECUTIVE SUMMARY

WMO contribution and participation in the development of the post-2015 Framework for Disaster Risk Reduction and the Third United Nations World Conference on Disaster Risk Reduction (WCDRR-III)

WMO is actively participating in the preparatory process for the Third United Nations World Conference on Disaster Risk Reduction (WCDRR-III), 14 to 18 March 2015, Sendai, Japan, which will adopt a post-2015 framework for disaster risk reduction as a successor framework to the Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters. (For further information, please visit the conference website <http://www.wcdrr.org>)

1. Consultation process for the post-2015 framework for disaster risk reduction

In coordination with the United Nations Office for Disaster Risk Reduction (UNISDR), the WMO Secretariat Task Team on a post-2015 framework for disaster risk reduction and the WCDRR-III has been facilitating the contribution and participation to the consultative process, including the First Session of the Preparatory Committee for WCDRR-III (PrepCom1), 14-15 July 2014, Geneva, and the Open-ended Informal Consultative Meetings, with governments and major groups, between 5 September and 13 October 2014.

In particular, WMO has been providing inputs to enhance the provisions on early warning systems in the pre-zero draft of the post-2015 framework for disaster risk reduction (www.wcdrr.org/preparatory/post2015). These included WMO messages and position regarding Multi-Hazard Early Warning Systems and Services for the post-2015 framework for disaster risk reduction (Annex II) and inputs to the Joint UN Statements at the open-ended informal Consultative Meetings (www.wcdrr.org/preparatory/viewsandcomments).

Furthermore, at the regional level, WMO through its Members and Secretariat staff had participated in the Regional Platforms and Ministerial Conferences on DRR that had taken place in Africa, the Americas, Asia and the Pacific, Arab States, and Europe in 2014. In these meetings, where a number of NMHS representatives participated, WMO shared key messages and relevant documents.

2. Participation in WCDRR-III

WMO is participating in the WCDRR-III as follows:

- (a) Provision of a WMO Statement on the post-2015 framework for disaster risk reduction;
- (b) Member of the organizing team (on behalf of other UN entities) for the Working Sessions on (www.wcdrr.org/conference/programme/multistakeholder):
 - (i) Risk Identification and Early Warning;
 - (ii) Integrated Water Resources Management (IWRM);
 - (iii) Applying Science and Technology to DRR Decision-making;

- (c) Contribution to other Working Sessions on (www.wcdrr.org/conference/programme/multistakeholder):
 - (i) Disaster and Climate Risk: Accelerating National and Local Initiatives;
 - (ii) Innovation and High-technology to Reduce Risk;
 - (iii) Food Security, Disaster-Resilient Agriculture and Nutrition;
- (d) Conduct of the following Public Forum events:
 - (i) WMO Symposium on Multi-Hazard Early Warning Systems and Services immediately before WCDRR-III (with its outcome informing the Working Session on Risk Identification and Early Warning);
 - (ii) Demonstration exhibit on forecasting and early warning capabilities, jointly organized by WMO, Japan Meteorological Agency, and other NMHSs (tbc);
 - (iii) WMO contribution at the One-UN Booth.

3. Collaboration with the Government of Japan

In connection with these planned activities, WMO/WDS has initiated coordination and collaboration with government agencies concerned in Japan (i.e. JMA, MLIT, JWA, Cabinet Office, MOFA, and Science Council of Japan) and a number of academic institutions. Earlier at PrepCom1, through a bilateral talk with the Japanese delegation, WMO had elicited the support of the Government of Japan to WMO activities at the WCDRR-III.

4. Global Assessment Report on DRR 2015 (GAR15)

The Global Assessment Report (GAR) is a major collaborative initiative of United Nations agencies, international development banks, governments, civil society organizations, universities, and other experts coordinated by UNISDR. This biennial report provides a comprehensive review and analysis of the natural hazards that are affecting humanity. The GARs contribute to achieving the Hyogo Framework of Action (HFA) through monitoring risk patterns and trends and progress in DRR while providing strategic policy guidance to countries and the international community. GAR-15 will be launched at WCDRR-III.

In this regard, WMO is contributing a background paper to GAR-15 entitled "*The Status and Trends with Development of Early Warning Systems for All Major Hazards and Outreach to Communities*".

Furthermore, as requested by UNISDR, WMO/WDS is reviewing other draft background papers on hydrometeorological models for multi-hazard risk assessments at global scale, including flood, cyclone, and drought models in the following other background papers of GAR-15:

- (1) Cyclone hazard modelling from CIMNE;
 - (2) Flood hazard modelling from CIMA foundation and UNEP;
 - (3) Agricultural drought loss from FEWSNET;
 - (4) Drought modelling SPEI from ACSAD.
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**WMO Key Messages for the post-2015 Framework for
Disaster Risk Reduction**

(29 October 2014)

Compiled by WDS staff based on:

- WMO inputs to the joint UN statements at the open-ended informal consultation meetings with governments and major groups, 5 September – 13 October 2014
- Key Messages of the WMO Community for COP 20, dated 10 October
- WMO messages and position regarding MHEWS in the post-2015 framework for DRR, submitted to UNISDR on 4 September 2014 (section D, recommendations only)
- Draft WMO Key Messages circulated internally before PrepCom1 (11 July 2014)
- Draft WMO Statement on the Role and Operation of NMHSs for Decision Makers, dated 14 August 2014
- Circular Letter to PRs on Regional Consultations for the post-2015 framework for DRR and WCDRR-III, dated 25 April 2014

Merged, shortened, and restructured according to the main sections of the zero-draft of the post-2015 framework for DRR, released on 20 October 2014

Notes to the reader

The messages at hand have been prepared by the WMO Secretariat to inform directors and delegates from National Meteorological and Hydrological Services (NMHSs) attending the *Third United Nations World Conference on Disaster Risk Reduction (WCDRR-III)* and to assist them in articulating key areas and ways in which NMHSs contribute towards implementation of the *post-2015 framework for disaster risk reduction*. They contextualize the role of NMHSs according to the expected outcome, goal, guiding principles, and four priorities for action of the framework (as per the zero-draft) and considering the role of stakeholders and international cooperation.

Introduction

WMO supporting DRR

Originating from the International Meteorological Organization established in 1873, the *World Meteorological Organization (WMO)* became a specialized agency of the United Nations in 1951 and today is the United Nations system's authoritative voice on the state and behaviour of the Earth's atmosphere (weather), its interaction with the oceans, the climate it produces and the resulting distribution of water resources.

As weather, climate and the water cycle know no political boundaries, WMO promotes international cooperation in these areas by coordinating the activities of the *National Meteorological and Hydrological Services (NMHSs)* of its 191 Member states and territories (2014). It fosters the development of meteorology and operational hydrology as well as the benefits from their application.

Under WMO guidance and within the framework of its global operational network, regional associations, and technical commissions and programmes, NMHSs contribute substantially to the protection of life and property against natural hazards, to safeguarding the environment and the global climate for present and future generations, and to enhancing the economic and social well-being of all sectors of society.

WMO has made disaster risk reduction one of its highest priorities since between 2005 and 2014 alone, 83 per cent of recorded disasters, 40 per cent of recorded deaths, and 95 per cent of the recorded total affected population were linked to hydrometeorological hazards.

In collaboration with other international, regional and national organizations, WMO coordinates the efforts of NMHSs to provide and improve forecasts and early warnings services for weather-, climate-, and water-related hazards, such as tropical cyclones, storms, floods, droughts, heat waves, cold waves and wildfires. WMO also contributes to reducing the impacts of human-induced disasters, such as those associated with chemical and nuclear accidents and forest fire. In addition to public safety, such extremes affect water and food supplies, the environment, transport, health and many other socio-economic sectors. WMO thus supports the implementation of a number of environmental conventions and is instrumental in providing guidance and assessments to governments on related matters.

Achievements under the HFA

The *Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters* shifted the focus from post-disaster response to a more comprehensive approach that also includes prevention and preparedness measures. This led to changes in national disaster risk reduction policies, legal and institutional frameworks and had implications on the role, responsibilities, working arrangements, and requirements for NMHSs. NMHSs have made critical contributions to the implementation of the HFA which highlighted the integral role of early warning systems in disaster risk reduction.

Country experiences in the past decade have shown the effectiveness of early warning systems and services in dramatically reducing mortality from natural hazards related to weather, climate, and water extremes, even though economic losses continue to rise in many areas. This is attributed to scientific advances in forecasts and warnings (longer lead time) combined with proactive emergency preparedness measures. A five-day weather forecast today is as reliable as a two-day weather forecast 20 years ago. Forecasts can now be provided for a season to a year ahead with a projection of impacts in various parts of the world (e.g. El Nino).

Remaining gaps and challenges

However, despite significant progress with technologies, methods and tools for monitoring and forecasting weather, climate and hydrological hazards, in many countries development of effective early warning systems is hampered by a lack of institutional and operational capacities, human and financial resources to benefit from what could be available, and meaningful regional and international cooperation.

Disasters are still increasing in frequency and intensity, and the changing patterns of weather-, climate-, and water-related hazards caused by global climate variability and change and their environmental consequences impose new challenges for disaster resilience and consequently impede process towards sustainable development.

Furthermore, urbanization, a global phenomenon, will accelerate, especially in developing countries, resulting in a rapid increase in the number of megacities and large urban complexes, many of them along coastal areas and prone to urban flooding or water stress.

As we are approaching the end of the Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters and the adoption of a new major framework that will shape disaster risk reduction for more than a decade, the key question is how to extend the service delivery of NMHSs to the “last mile” (three ends: NMHS, disaster risk management agencies, and persons also in remote places and difficult terrains), i.e. how to apply science in disaster risk reduction services to society in order to improve the resilience of individuals, communities, nations, regions, and the globe.

Expected outcome and goal of the post-2015 framework for disaster risk reduction

The wider post-2015 development agenda will have a significant influence on the demands from NMHSs for user-oriented weather, climate, and water services to meet the evolving needs of

governments and other decision-makers and stakeholders. It includes not only WCDRR-III in March 2015 but also the adoption of the Sustainable Development Goals in September 2015 and the UNFCCC Twenty-first session of the Conference of the Parties (COP 21) in December 2015.

The successor of the HFA is expected to adopt a broader and more people-centred approach to disaster risk reduction, with enhanced work to address exposure, vulnerability, and underlying and compounding factors/drivers of risk and to ensure accountability for the creation of new risks across all levels and sectors.

The expected outcome of the post-2015 framework for disaster risk reduction remains the substantial reduction of disaster losses, in lives, and in the social, economic and environmental assets of persons, communities and countries. In order to attain this outcome, the goal of the new framework is the prevention of disaster risk creation and the reduction of the existing disaster risk through economic, social, cultural and environmental measures which address exposure and vulnerability, and thus strengthen resilience.

The new framework calls for focused actions in the following priority areas:

- 1) Understanding disaster risk;
- 2) Strengthening governance and institutions to manage disaster risk;
- 3) Investing in economic, social, cultural and environmental resilience;
- 4) Enhancing preparedness for effective response, and building back better in recovery and reconstruction.

Evolving roles and tasks of NMHSs in disaster risk reduction

To ensure that evolving needs of societies are met, it is essential that governments take advantage of the myriad of advances in science and technology provided by NMHSs and their partners, including the provision of multi-hazard early warnings and related services, around the clock all year around, and climate services through the Global Framework for Climate Services (GFCS), which when properly applied can provide societies with the underpinning information necessary to reduce and mitigate the impact of natural hazards, and capitalize on the benefits from weather-, water-, and climate-related opportunities.

Current trends of how NMHSs are adapting to the new demands are the shifting from forecasts and warnings to impact-based forecasts and risk-informed warnings, from the understanding of hydrometeorological hazards to the understanding of the risks related to these hazards, and from single-hazard early warning to multi-hazard early warning systems. Increasingly, many NMHSs provide services not only in the warning stage but also for all other stages of the disaster risk management cycle, and act upon feedback from stakeholders/users and their changing requirements.

With these considerations, and building on WMO's extensive experience in implementing the HFA together with its Members and strategic partners, the following recommendations and offerings to support the implementation of the post-2015 framework for disaster risk reduction are given:

Priority 1: Understanding disaster risk

Events of hydro-meteorological origin still trigger the large majority of disasters. Through a domino effect and because of the interdependency of economies, the hazard impact tends to broaden with indirect and lingering consequences. Thus, this understanding of disaster risk should define the development of disaster risk reduction interventions.

The gains of the HFA need to be sustained and further strengthened through a multi-hazard approach, more so in view of rising exposure and vulnerability as well as the uncertainty of natural hazard extremes exacerbated by climate change. An effective multi-hazard early warning system includes four components: (1) detection, monitoring, and forecasting of hazards, (2) risk identification, analysis, and assessment; (3) dissemination of timely and authoritative warnings, and (4) availability and activation of emergency preparedness and response plans. These components need to be coordinated across many actors at the national and community levels for

the system to work. Failure in one component, or lack of coordination, can lead to failure of the whole.

There is a need for a standardized, integrated, and holistic *multi-hazard approach* to the *identification, analysis, and assessment of risks*, using science-based, accurate, timely and extensive data sets on meteorological, climate, hydrological, geological, and environmental information. Development, improvement, and sustainability of databases, mapping, and monitoring of hazard, loss, and vulnerability are important requisites of such risk assessment. Moreover, loss and damage accounting needs to be linked to officially designated hazard events for tracking associated loss and damage. The advances in science and technology should support decision-making for *multiple and cascading hazards*, across all socio-economic sectors, levels and scales, and actors.

WMO supports this priority e.g. through the

- 1) *WMO Global Integrated Observing System (WIGOS)* that enables the collection of data from 17 satellites, hundreds of ocean buoys, thousands of aircrafts and ships and nearly 10,000 land-based stations;
- 2) WMO is building on its *WMO Global Telecommunication System (GTS)* that interconnects all NMHSs for collection and distribution of meteorological and related data, forecasts and alerts, including tsunami and seismic-related information and warnings to achieve an overarching *WMO Information System (WIS)*, enabling systematic access, retrieval, and dissemination and exchange of data and information of all WMO and related international Programmes. WIS will also be able to provide critical data to other national agencies and users dealing with many sectors including disaster risk management); and,
- 3) *WMO Global Data-Processing and Forecasting System (GDPFS)* that involves three *World Meteorological Centres* and 40 *Regional Centres*, including *Regional Specialized Meteorological Centres (RSMCs)*, *Regional Climate Centres (RCCs)* and *Regional Drought Management Centres* which process data and routinely provide countries with analysis and meteorological forecasts, supporting early warning capacities through the NMHSs.

Priority 2: Strengthening governance and institutions to manage disaster risk

The issuance of warnings is a national responsibility; thus, roles and responsibilities of various public (including NMHSs) and private sector actors and stakeholders who are implementing and benefitting from early warning systems need to be clarified and reflected in national to local regulatory frameworks, planning, budgetary, coordination/collaboration, and operational mechanisms. *Inclusion of principles of co-design, co-development and co-delivery as well as a multi-hazard approach in early warning systems will render them high efficiency and effectiveness.*

Climate change exacerbates disaster risk, especially with its significant effect of increasing intensity and frequency of extreme weather events. Thus, legislation, policies, and actions on climate change adaptation and disaster risk reduction should give considerable importance to this circumstance and be aligned.

National technical agencies such as meteorological, hydrological, geological, and marine services play a crucial role for collecting, analyzing and providing respective hazard and risk information. Their collaboration with e.g. disaster risk management agencies, natural and social scientists and the media is important for making effective use of this information and the services provided and to support risk-informed decision-making as a priority for national and local development planning. Thus, *NMHSs need to be fully integrated into national disaster risk management systems, with horizontal and vertical partnerships across the various sectors, stakeholders, and levels.*

Strengthening a multi-hazard early warning system through partnership and coordination among stakeholders across all sectors and at all levels is important in pursuing a holistic and integrated approach to disaster risk reduction and management. Moreover, since hazards do not respect national boundaries and may overwhelm a country's coping capacity, multi-hazard early warning systems need to be complimented by regional cooperation frameworks. *Regional and international cooperation among nations will ensure harmonization and interoperability of the national early*

warning systems and leverages resources for managing the risks associated with trans-boundary and large scale hazards.

WMO supports this priority through standard procedures through national and regional capacity development projects for demonstrating knowledge products such as thematic guidelines, standards and training modules; and by engaging NMHSs in the negotiations for the new UNFCCC agreements and the Sustainable Development Goals and by continuing to engage in disaster risk reduction platforms and hazard-focused disaster risk reduction forums (Associated Programme on Flood Management, Integrated Drought Management Programme, Tropical Cyclone Programme, etc.).

Priority 3: Investing in economic, social, cultural, and environmental resilience

Raising community awareness of the impacts of weather-, water-, climate- and environment-related hazards and implementing preparedness measures are critical to building resilience. For the safety of people and their livelihoods and property, improving community resilience with the help of multi-hazard early warning systems and tailored hazard information for weather- and climate-sensitive sectors as well as for risk financing/transfer (e.g. weather index insurance) should be considered as the highest priority.

Multi-hazard early warning systems are an essential cost-effective component of a holistic and integrated national disaster risk reduction approach. They leverage capacities often spread across different systems and provide more comprehensive services than single-hazard approaches. Resources put into multi-hazard early warning systems are not expenditures, but rather investments with very significant returns. For every dollar invested in multi-hazard early warning systems, at least seven dollars of losses are offset, with averted environmental and ecological losses excluded.

Sustained investments in the infrastructure of organizations and entities collecting, storing, and archiving hazard and vulnerability data sets are fundamental to the prevention of losses and damages due to disasters. For NMHSs this applies to the maintenance, modernization, integration, and further development of their core capacities, i.e.:

- 1) operational weather, climate, and hydrological observations, information and services to inform risk reduction measures and medium- and long-term strategic planning for community resilience in a changing climate; and,
- 2) high-impact weather and climate research, including modelling.

These investments in science and operational capacities will help to predict the characteristics of weather, climate, water and environmental hazards and their interactions with socio-economic systems, therefore contributing greatly to risk-based decision-making.

In order to make effective multi-hazard early warning systems a reality, it is equally important to ensure that investments are materialized in Information and Communication Technologies (ICT). ICT facilitate monitoring the environment, retrieving and processing vital data, and disseminate and receive information before, during and after disasters strike. This is important particularly for early warning where timely evacuation can save thousands of lives. These investments should move beyond hardware requirements and ensure that the human capital of the country is capacitated to develop, operate and maintain such systems.

WMO is strongly committed to coordinating the implementation and use of ICTs that will improve the global, regional, and national production, exchange and distribution of information and warnings on weather, climate, and water. WMO will develop the WIS in a way that enables it to support the post-2015 development agenda. The availability of ICTs has, therefore, a key role to play in enabling and fostering access to weather, climate and water information and services. These services are a crucial input to risk modelling and risk financing and serve as decision support for public investments into disaster risk reduction measures.

Priority 4: Enhancing preparedness for effective response, and building back better in recovery and reconstruction

It is essential that societies be prepared to act appropriately in response to warnings. Education and training is paramount for improvement of preparedness for response, recovery, and reconstruction. Early warning systems for natural hazards work only if governments have appropriate systems and their stakeholders and public knows how to respond. Ensuring access to timely environmental hazards information and communicating (issuing and disseminating) impact-based forecasts and risk-informed warnings of hazards to end-users in a manner that is efficient, timely, understandable, and actionable are therefore crucial in decision-making for disaster risk reduction and thus for saving life and property. Such an approach would require a framework for standardized and interactive operations and partnerships for preparedness and response as well as indicators to monitor these processes, performance, and expected outcomes.

Further to the call in the zero-draft on “strengthening early warning systems and tailoring them to users’ needs, including social and cultural requirements”, it is critical to recognize multi-hazard early warning systems as a life-saving tool and an integral part of disaster risk reduction. Multi-hazard early warning systems provide integrated and seamless services for all components of disaster risk reduction in relation to various hazard types and lead times, from the national level to local communities.

In this regard, multi-hazard early warning systems should consider the vulnerability and full engagement of women, children and youth, persons with disabilities, indigenous peoples, and older persons. These efforts need to focus on cities and communities highly exposed to the varying intensity and impact of natural hazards. WMO supports the availability of data to better understand exposure and tolerances of vulnerable groups, infrastructure and other assets.

Through its work with the Inter-Agency Standing Committee (IASC) for inter-agency coordination of humanitarian assistance, WMO is linking authoritative weather and climate services to international humanitarian agencies to improve humanitarian contingency planning, preparedness and response.

Role of stakeholders and international cooperation and global partnership

The outcomes of WCDRR-III will have the potential to act as an important momentum to reinforce the critical role of NMHSs in disaster risk management, in particular, in providing authoritative high quality warnings in sufficient lead time to mitigate the risks of disaster.

Partnerships between NMHSs and academia, government departments, international and non-governmental organizations, the media and, where appropriate and possible, the private sector and civil society, help society make better decisions based on more complete and accurate weather, water, and climate information. These partnerships provide better data coverage and information processing, higher resolution models, and more precise and useful specialized products for societal benefits, including opportunities to better support government and other decision-makers regarding safety, economy, and security. NMHSs are encouraging these partnerships by adopting open and unrestricted data policies, which make their information easy to access in real time, in useful forms, and at low cost.

International cooperation and partnerships at global, regional, and national levels is necessary to ensure harmonization and interoperability of the national multi-hazard early warning systems, the development and transfer of technologies, knowledge and data exchange. Effective coordination and leveraging of government investments and risk financing strategies with international development and climate-related funding in areas such as institutional and infrastructure capacities, hazard/risk analysis, and climate information systems are critical for maximizing the use of resources, avoiding duplication, managing risks associated with trans-boundary and larger scale hazards and for promoting and ensuring sustainability.

Finally, WMO will contribute to the implementation to the post-2015 framework for disaster risk reduction by engaging in a new science and technology advisory mechanism and committing to the United Nations Plan of Action on Disaster Risk Reduction for Resilience.