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Strategies in disaster risk reduction, including those related to climate change adaptation, for sustainable development

Climate information and services: the role of the Typhoon Committee and the Panel on Tropical Cyclones

Note by the secretariat**

Summary

This information note presents a brief overview of the work of the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones and their roles in climate information and services. Guided by the WMO Global Framework for Climate Services (GFCS) the two organizations have been coordinating their initiatives and activities in the development and provision of relevant science based climate information and prediction for climate risk management and adaptation to climate variability and change. Implementing the ESCAP resolution on Enhancing regional cooperation for building resilience to disasters in Asia and the Pacific, they also work towards improving the provision of assistance in developing national capacities in meteorology and hydrology. This is illustrated in a joint project entitled: "Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System" (SSOP), funded by the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries. With ESCAP serving as a regional platform, the two organizations will link more closely new scientific information to practical efforts to adapt to climate change and reduce disaster risk across the region.

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I. Background

1. Hydro-meteorological disasters are having an increasingly severe impact in the Asia-Pacific region, the most disaster prone region in the world. From 1970 to 2011, the region accounted for 75 per cent of global disaster related deaths. During the same period, economic losses from disasters in Asia and the Pacific made up around 80 per cent of global losses to disasters (accounting for US$ 294 billion of the US$ 366 billion global economic losses resulting from disasters). Such losses have been increasing in the region, as demonstrated in 2011 when annual economic losses to disasters were equivalent to 80 per cent of those attributed to the last decade combined.[1]

2. In terms of exposure, 1.2 billion people in Asia and the Pacific were exposed to hydro-meteorological hazards during at least 1,215 disaster events since 2000, in comparison to 355 million people affected by 394 events of other types of disasters over the same period. The average number of people exposed to annual flooding more than doubled from 29.5 million to 63.8 million between 1970 and 2010, and the population residing in cyclone-prone areas grew from 71.8 million to 120.7 million.

3. Hydro-meteorological being the most frequent hazard in the region includes tropical storms[2], coastal storm surges, flooding, drought, tornados, blizzards, and extreme temperatures. The intertwined dynamics between hydro-meteorology and climate render Asia Pacific more susceptible to the effects of climate variations and extreme events. It is likely that the occurrence of the Typhoon Haiyan is evidence that tropical cyclones are getting stronger, with incidence of category 1 and 2 typhoons decreasing and incidence of categories 4 and 5 increasing.

4. In 2013, the United Nations Intergovernmental Panel on Climate Change (IPCC) clearly indicated, in its "Headline Statements from the Summary for Policymakers", that (according to climate models, which have improved since the Fourth Assessment Report in 2007) it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century, which implies that the oceans will continue to warm during the 21st century. Heat will penetrate from the surface to the deep ocean and in turn affect ocean circulation.

5. In March 2012, at its 39th Session held in Nay Pyi Taw, Myanmar, the WMO/ESCAP Panel on Tropical Cyclones (PTC) decided to undertake an analysis of member States' information and research papers on the impact

[1] United Nations International Strategy for Disaster Reduction, Chapter 1 - Disaster Risks in Asia-Pacific – Key Messages, retrieved from *www.unisdr-apps.net*.

[2] Tropical storms include cyclones, hurricanes and typhoons which describe the same disaster type with the names differentiating the oceans in which the storms originate. These storms refer to large scale closed circulation systems in the atmosphere combining low pressure and strong winds that rotate counter clockwise in the northern hemisphere and clockwise in the southern hemisphere. A tropical cyclone is a non-frontal system characterized by a low pressure centre, spiral rain bands and strong winds, originating over tropical or subtropical waters and rotates clockwise in the southern hemisphere and counter-clockwise in the northern hemisphere. 'Cyclones' are storms that form in the Indian Ocean and South Pacific, 'hurricanes' form in the Western Atlantic and Eastern Pacific and 'typhoons' in the Western Pacific, and 'tropical cyclones' form in the Caribbean and China Sea region. (see: www.ifrc.org/en/what-we-do/disaster-management/about-disasters/definition-of-hazard/tropical-storms-hurricanes-typhoons-and-cyclones/).

of climate change on tropical cyclone activities in their respective countries. The preliminary report confirmed that the Bay of Bengal is one of the warmer oceans in the world. Over the period from 1948 to 2010 there was a slight decreasing trend in the frequency of tropical cyclones/depressions.

6. The slight decreasing trend, however, goes with increasing complexity. There have been more phenomena observed such as co-existing typhoons characterized by complicated interaction in terms of cyclone motion, typhoon strikes in quick succession, significant intensification ahead of landfall, and landfall impact over coastal areas at higher latitudes. All these trends present real challenges to reliable forecasting and warning of rain, wind and storm surges associated with changes in cyclone tracks, intensity and structure. With typhoon-induced heavy rain and high winds more attention is also required on the risks from flooding and landslides.

II. Roles of the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones

7. The Typhoon Committee (TC) is an intergovernmental body organized under the joint auspices of the ESCAP and the World Meteorological Organization (WMO). It was established in 1968 in order to promote and coordinate the planning and implementation of measures required for minimizing the loss of life and material damage caused by typhoons in Asia and the Pacific. The TC develops activities under three substantive components: meteorology, hydrology, and disaster risk reduction, as well as in training and research.

8. The PTC is an intergovernmental body jointly established in 1972 by the WMO and ESCAP. The main objective is to promote measures to improve tropical cyclone warning systems in the Bay of Bengal and the Arabian Sea, including dissemination of technical information on research and forecasting operations to mitigate the socio-economic impacts of tropical cyclone-related disasters. The PTC develops activities under five components: meteorology, hydrology, disaster prevention and preparedness, training and research.

III. Mandates and resolutions

9. The WMO Global Framework for Climate Services (GFCS) states as its goal ‘the development and provision of relevant science based climate information and prediction for climate risk management and adaptation to climate variability and change, throughout the world’[3]. The GFCS aims to enhance understanding of, and responses to, the climate risks and opportunities associated with climate variability and change; improve climate information for improved food security, health outcomes and disaster risk reduction; better planning of the utilization of natural resources, protection of lives; provision of user driven tailored climate information products and services at global, regional, national, and local levels that is understandable and easily accessible.

10. The GFCS’ four major components, i.e. User Interaction Platform; Climate Services Information System; Observation and Monitoring; Research

[3] The WMO GFCS also states an alternate goal as ‘the development and provision of relevant science based climate information and facilitate its use for climate risk management and adaptation to climate variability and change, throughout the world’.

Modelling and Prediction; and Capacity Development, recognize and build on the successes of existing infrastructure, including infrastructure for research, data and information products generation and dissemination and observations. Ultimately, the framework seeks to increase and improve interactions between climate service providers and users. The GFCS will facilitate enhanced development of information products and services building on advances on the weather time scales to seasonal, annual, decadal and climate change projection.

11. At its first session, the Intergovernmental Board on Climate Services (1-5 July 2013) approved the Implementation Plan of the GFCS, elected its Chair and Co-Vice Chairs, established its management committee composed of 28 members and approved a compendium of GFCS related projects to address gaps identified under the pillars or components of the GFCS and the initial priority areas (agriculture and food security; water; health and disaster risk reduction. With the approval of the implementation plan of the GFCS and the establishment of the governance structure, the GFCS has moved into the implementation phase. WMO technical and scientific programmes as well as technical commissions are to play a key role by contributing to relevant components of the implementation plan.

12. Adopted at the 2005 World Conference, the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters, calls for increased engagement of all stakeholders and communities, for building awareness to take preventive and preparedness measures for risk management. Accordingly, climate scientists must address the concerns of various groups to design relevant products to meet their needs. Tailored, timely, clear and useful climate predictions, from seasonal to decadal scales, are required to fulfil the goals and objectives of the HFA while also playing a crucial role in national development planning, for managing climate opportunities and risks, mitigation and adaptation. In Asia and the Pacific, where hydro-meteorological risk plays a prominent role and the impact of climate change is already being felt, these linkages between climate science and efforts to reduce disaster risk are particularly important.

13. The Rio +20 United Nations Conference on Sustainable Development in 2012 stipulates under the rubric of scientific and technological development five Priorities for Action: data sharing, space based earth observation, climate modelling and forecasting, early warning and the integration of disaster risk reduction strategies with climate change adaptation.[4]

14. ESCAP Resolution 69/12 on ‘Enhancing regional cooperation for building resilience to disasters in Asia and the Pacific’ requested the Executive Secretary, in collaboration with United Nations bodies and specialized agencies, international financial institutions, and donor organizations, as appropriate to support the implementation at the regional level of the WMO GFCS by, inter alia, providing assistance to member States in developing national capacities in the fields of meteorology and hydrology; and to encourage appropriate consideration of disaster risk reduction, and including as related to climate change adaptation, in discussions of the post-2015 agenda as it may pertain to disaster risk reduction.[5]

[4] Rio +20 United Nations Conference on Sustainable Development, Rio 2012 Issue Briefs: Disaster Risk Reduction and Resilience Building, retrieved from www.uncsd2012.org/content/documents/225ib8.pdf.

[5] Plan to implement resolutions adopted by the Commission at its sixty-ninth session, submitted to ACRP-348, 11 June 2013.

IV. Areas of substantive and ongoing work

15. In 2012-2013, TC members such as China; Hong Kong, China; Japan; and the Republic of Korea continued to offer resource persons and support for technology transfer and capacity-building purposes. These are efforts that are aligned with resolution 69/12 and could be further expanded to build national capacities for climate information and services.

16. In 2012, Hong Kong, China, set up two community-based weather stations in Mindanao (Philippines) and Guam to raise public awareness and community preparedness on climate change and extreme weather. Japan started providing storm surge forecast products for three selected locations in Hong Kong, China; Macao, China; and Thailand under WMO's Storm Surge Watch Scheme. Meanwhile, the Republic of Korea provides technical assistance programmes for the People's Democratic Republic of Lao to strengthen the systems for detection of severe weather events, flood control knowledge and technology for Thailand, typhoon information software for Viet Nam, and monitoring and early warning system for flood forecast for the Philippines.

17. In January 2013, the TC considered the Second Assessment Report on the Influence of Climate Change on Tropical Cyclones in the Typhoon Committee Region at its meeting in Hong Kong, China. The report summarized the results and findings from research conducted by members on the long-term trends of tropical cyclone activity in the region. The assessment report indicated considerable inter-annual and inter-decadal variations in the tropical cyclone activity in the western North Pacific basin, while also noting some regional shifts in tropical cyclone activity in the basin, such as a decreasing trend in tropical cyclone occurrence in part of the South China Sea and an increasing trend along the east coast of China during the past 40 years. The vulnerability of coastal regions to storm surge flooding is expected to increase with future sea-level rise and coastal development, although this vulnerability will also depend on future storm characteristics. The report was based on published papers as well as the analysis of the tropical cyclone activities and the survey results of impacts on member States in the region.

18. The project on Urban Flood Risk Management in the TC area was led by China as a first cross-cutting project lasting from 2008 to 2012. The project had the following objectives: (1) to exchange the experiences on management and mitigation of floods and typhoon-related disaster in urban area between TC members; (2) to share the technology of urban flood monitoring and methodology of urban flood forecasting and prediction, early warning and disaster assessment between TC members; and (3) to promote