STATEMENT OF THE
5TH INTERNATIONAL CONFERENCE ON FLOOD MANAGEMENT (ICFM5)
"FLOODS: FROM RISK TO OPPORTUNITY"
27-29 SEPTEMBER 2011, TOKYO JAPAN

On 27-29 September 2011, the 5th International Conference on Flood Management (ICFM5) was held in Tokyo, Japan with more than 450 participants gathered from 41 different nations throughout the world. The participants applaud the local organizers for their great efforts to ensure the success of ICFM5 in the face of the extreme difficulties that Japan experienced as a result of the Great East Japan Earthquake and Tsunami in March of this year.

Following three days of extensive discussions on the important issues that communities, nations and regions face in flood management, the participants of ICFM5 declare the following as their own commitment, and appeal to all of the professionals, managers and decision makers in this important field as well as the public to carry out such statements for life security, social welfare, and enhancement of land and water related environmental management:

1. ACKNOWLEDGE:

- **Events beyond Expectation.** The Great East Japan Earthquake and Tsunami of 11 March 2011 revealed that events beyond expectation (Soteigai in Japanese), or beyond the realm of assumptions used in disaster management planning do occur. It is a violation of the law of living with nature to establish limits related to extreme events and, thus, neglect the potential occurrence of events that might exceed those limits.
- **Increasing Complexity of Socio-Economic Systems.** It is recognized that the components of socio-economic activities are increasingly dependent upon each other and the impact of local disasters may quickly extend to national, regional and global scales through the market network (e.g., supply chains). There is a critical need to evaluate, comprehend and address the complexity of existing and future socio-economic systems. As societal vulnerability to disasters increases through economic development and globalization, Asia is a "hot spot" of increasing global disaster risk while local disasters have disrupting consequences anywhere in the world.
- **Increasing Floods.** Floods are the most extensive and frequently occurring disaster in the world, resulting in the largest socio-economic impacts to most nations in comparison to all other natural disasters. Flood frequency and severity continue to rise at many places, along with the accompanying socio-economic impacts. It is further recognized that the flood risk is becoming

increasingly important in those urban areas that are experiencing expansion and higher densities of population throughout the world.

- **Increasing Flood Risk.** Climate change is a serious factor that acts to increase the flood risk. The intensity and frequency of torrential rains have markedly increased, as evidenced in Taiwan in 2009 and in Japan in 2011. The flood risk is further heightened as a consequence of unprecedented urban growth, human encroachment in disaster prone areas, continued poverty rates, poor governance, environmental degradation, water illiteracy, corruption and other related human practices.

2. DECLARE:

- **From Risk to Opportunity.** The scientific knowledge of risk, as a combination of hazard and vulnerability, provides an opportunity to improve societies and their ways of life. This era of increased risk presents new opportunities for societies to shift from high risk, unsustainable cycles to low risk, sustainable cycles. Particularly when the scientific basis of a risk becomes known, it serves as an indispensable occasion to make critical societal adjustments. We now have the opportunity to balance desired life styles with enriched ecological environments. We have a unique opportunity to advance science and make wise use of our scientific knowledge. Reducing the disaster risk reduces damages that might otherwise impede continued economic development and environmental sustainability.

- **Management of Flood Disasters under High Levels of Uncertainty.** As a result of increased complexities, shifting populations and climate change the concept of flood management under uncertainty is no longer an abstract concept. The total elimination of the flood risk is impossible and new risk-based tools and techniques are necessary to advance flood management policy, engineering design and operations, along with the disaster management process.

- **Flood Management as Part of IWRM.** Flood management is a critical part of Integrated Water Resources Management (IWRM). More efforts to integrate land and water development with basin-level management are necessary, including the involvement of the industrial, agricultural, environmental and administrative sectors. Integrative practices continue to lag in many nations. In this respect, the UNESCO publication on IWRM guidelines (2009) and the Concept Paper on Integrated Flood Management (2009) by the Associated Program on Flood Management are major contributions and their recommendations should be more fully promoted.

- **Balance of Structural and Non-Structural Infrastructure.** There is an increased emphasis in

modern flood management thinking on non-structural methods, such as land use planning, insurance, education, early warning and evacuation protecting high valued and/or important real estate. While these options are all very important, it cannot be understated that in many nations, many people have no choice but to live in flood prone areas where structural measures are critical for their settlement. Especially for high economic activities, such exercises as evacuation, business discontinuity with or without insurance and strong limitation in land use are not compatible. Continued economic development, therefore, requires a rational balance of structural and non-structural infrastructure.

- **Preparedness beyond Expectation.** It is now necessary to prepare for potential events that exceed expectations. The theoretical maxim of combined multi-hazard effects must be considered in community, national and regional risk management. Extreme floods and landslides beyond expectation that may result from typhoons, earthquakes, tsunamis, storm surges and other extreme events should be fully incorporated into the field of flood management.
- **Methods of Assessing "unexpected, extreme event" and Cascading Effects.** The assessment methodology on the impacts of very rare, difficult to identify the probability of, and extremely high consequent events (black swan events) and cascading events should be more fully focused and developed.
- **Scientific Advancement of Prediction.** Unlike earthquakes, floods are largely predictable and to some extent controllable. Disasters of hydro-meteorological origin can be far better managed through the applied use of science and technology. Research and knowledge-based decision making should be greatly promoted in the flood management field.
- **Floodplain Protection.** A large number of concentrated populations throughout the world are living in floodplains and utilizing seasonal flooding water as a heavenly gift for their agriculture, fishery, transportation, etc. Flood management should not destroy nor neglect, but rather protect such ecological health and lifestyle of living with nature.

3. AGREE:

- **Implementation of HLEP/UNSGAB Action Plan.** UNSGAB/HLEP's Action Plan on Water and Disaster is unique in its commitment to implementation. The national and international organizations that participated in this Conference should make strong commitments to the important items discussed during ICFM5, including early warning systems, preparedness indices, climate change adaptation and mega-delta protection.

- **Spreading the Word.** The participants agree to distribute this statement at other key related international events, such as the 1st Integrated Research on Disaster Risk Conference (Beijing, 2011), the 6th World Water Forum (Marseille, 2012), Rio+20 (Rio de Janeiro, 2012), Flood risk 2012 Conference in Rotterdam and the 3rd World Conference on Disaster Reduction (Japan, 2015).

- **Sharing Knowledge and Experience.** Information sharing on the local, regional, national and international scales is an essential element of the flood risk management process.

- **Education and Training.** The participants recognize the huge need to enhance education and training related to the field of Integrated Flood Management (IFM). Furthermore, the education needs to be revised to train effective experts in IFM with a strong interdisciplinary background. A system thinking, that considers the different components of the system in relation to each other and tries to understand the whole systems in a holistic way, is pivotal to improve IFM and has to be introduced to students and practitioners. The importance of live long learning in an IFM context is essential.

4. INVITE:

- **ICFM6.** The Ad Hoc Committee will organize a 6th ICFM to continue the exchange of innovative flood management research and practices and national, regional and international policy developments.

ATTACHMENTS

The two plenary and 34 special and parallel technical sessions focused on several flood management themes, including risk management, emergency response, early warning, climatic regimes and cross-cutting themes. Related discussions took place on how communities, nations and regions can, based on scientific knowledge, reduce levels of flood-related disasters and create resilient societies that are adaptive to global changes and future uncertainties. The outcomes of these discussions are attached in Annex 1.

The International Forum on Mega-Water-Disasters was organized in conjunction with ICFM5 in order to incorporate recent experiences and lessons learned from the Great East Japan Earthquake and Tsunami. Sessions of high-level experts and decision makers were convened and the discussions were reflected during the conference. The outcome and message of the Forum (Tokyo Statement) is attached in Annex 2.

Annex I:

ICFM5 Plenary and Special Session Outcomes

Plenary Session 1: **Flood Forecasting and Early Warning Systems**

UN Secretary-General's Advisory Board (UNSGAB)'s High-Level Expert Panel in the "Water and Disaster" identified flood early warning as an essential element that supports the Hyogo Framework for Action. Many international efforts are focusing on assisting nations and regions in dealing with challenges of water related disasters. The International Flood Initiative jointly proposed by UNESCO and WMO and supported by ISDR, UNU, IAHS and IAHR; the Associated Program on Flood Management and other similar initiatives, in their own way are implementing follow up on the actions identified therein. The session provided a brief overview of some of the present mechanisms being used for transferring the existing technologies in flood forecasting and early warning to the developing countries and discussed the advancements in the flood forecasting and early warning technologies and the gaps that need to be addressed through research.

Plenary Session 2: **Floods, Landslide and Debris Flow due to Torrential Downpours**

The objective of this plenary session was to explore the new features of such calamities in context of the global climate change and socioeconomic development, and how to strengthen the capacity building in a comprehensive way to restrain the growth of the risk effectively. The key points that were discussed in the session include:

- Disaster chain of torrential downpours, floods, landslide and debris flow and their risk features;
- Predictability of the outburst floods, landslide and debris flow and the effectiveness of countermeasures
- Appropriate coping strategies for nations or regions with different social economic development level.
- The session highlighted the main issues to be addressed and then to look at the measures that can be taken to mitigate the risk.

Special Session 1: **Flood Risk Management Approaches as Being Practiced in Japan, the Netherlands, United Kingdom and United States**

The Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Dutch Rijkswaterstaat, the United Kingdom Environment Agency, and the United States Army Corps of Engineers agreed to develop a document to explore risk-informed approaches as being practiced and developed primarily in those four countries.

These include adapting to new understandings of risk that take into account the impacts of climate

change, bridging gaps between land-use decisions and flood risk management considerations, effectively communicating risk to the general public in a way that promotes individual as well as societal responsibility, and aligning planning and actions to identify and meet the most critical risks within a framework that is socially, environmentally, economically, and politically acceptable.

This special session provided an overview of the four countries' collaboration and their resulting jointly-prepared document. Presentations by each country highlighted example approaches, the drivers for those approaches, and practices that are working or hold particular promise.

Special Session 2: **Practical Steps for Adapting to Climate Change**

UNSGAB Action 29 (Report: Water and Disasters: High Level Expert Panel on Water and Disasters/UNSGAB, March 2009) reads as follows:

"National and international hydrological institutes must take the initiative to identify underlying analytical and data requirements to meet climate changes that are likely to be highly uncertain and so as to support structural and non-structural measures for disaster risk deduction."

Major practicing hydrologic research institutions worldwide should form a consortium to develop a new family of practical hydrologic engineering tools, methods, procedures and professional standards for the planning, design, operation and maintenance of infrastructure under non-stationary climate trends and climate change uncertainty. The consortium would assess existing, and generate new 'best management practices' under climate uncertainty, that could be used by water managers and specialists throughout the developed and developing countries that would guide them through the transitional period of improved GCM development. International aid agencies such as the World Bank, USAID, FAO and UNDP, would be engaged, as they would also benefit from these new procedures.

Special Session 3: **Associated Programme on Flood Management 10th Year Anniversary**

Established jointly by the World Meteorological Organization (WMO) and the Global Water Partnership (GWP) in 2001, the Associated Programme on Flood Management (APFM) is the world's premier comprehensive knowledge base for the development and implementation of best practices in Integrated Flood Management (IFM), worldwide.

Case studies, demonstration projects, and a considerable number of technical tool publications are the main elements that form the growing knowledge base of the APFM since its inception. The IFM HelpDesk is the main access gate to this knowledge base that has been accumulated to facilitate finding pragmatic solutions bridging the gap between international policy consensus and management challenges.

In occasion of ICFM5, the APFM Team and its partners presented its achievements and lessons learnt over the past decade and to express its continued dedication to promote the IFM concept.

Special Session 4: **Education and Capacity Building in Flood Management**

This session discussed (i) challenges for education with particular emphasis on integrated flood management. (ii) Competency profiles for flood experts of the future. And finally, (iii) different ways to improve the education of flood experts. This includes revisiting the university curricula, CPD programmes, applied teaching and learning methods, and joint educational activities in knowledge partnerships.

The participants recognize the huge need to enhance and education related to the field of Integrated Flood Management. Furthermore, the education needs to be revised to train effective experts in IFM with a strong interdisciplinary background. Systems thinking, that considers the different components of the system in relation to each other and tries to understand the whole systems in a holistic way, is pivotal to improve IFM and has to be introduced to students and practitioners. The importance of live long learning in an IFM context is essential.

Special Session 5: **Building Flood Resilient Communities**

Building community resilience to flood risk, which promote an integrated flood risk management approach that incorporates both hard and soft measures with active participation of community, is the way forward. Building flood resilient communities will become an essential adaptation measure to cope with flood risk increases brought about by climate change. This necessitates the need to incorporate 'flood resilient communities' as a specific target in development programmes. This session discussed the following themes:

- Capacity building at different institutional levels to enhance community based flood management
- Flood risk reduction projects that contribute to community development and vice versa
- Interventions and strategies that enhance community flood resilience

Special Session 6: **Advances and New Directions in Hydraulics of Flood Modeling**

During this special session four invited presentations introduced a variety of topics such as automated two-dimensional dam-break modeling, operational flood modeling using game programming, bank stability and sediment transport issues during floods, the use of observations in flood modeling, and urban flood modeling. The panel discussion following the presentations discussed recent advances and new directions in hydraulics of flood modeling.

Special Session 7: **Flood Risk Management tools and their application**

This special session was about Flood Risk Management (FRM) tools and their applications, with a focus on showing how FRM tools can be used to assist decision makers and practitioners involved in

flood risk management. Several international projects are presented in which FRM tools have been developed and successfully applied for flood mapping, risk mapping, calculation of failure probabilities of flood defenses, risk assessment, etc.

Special Session 8: **Flood resilience: Interdisciplinary approaches emerging from recent European research projects**

This session shared and demonstrated the research output of five leading EU projects, in a comprehensive way, to a wider scientific audience. Also another major objective of this session was to bridge different aspects of floods resilience (economic, social, communication, vulnerability) and to open the dialogue for establishing an integrated flood risk assessment approach. The primary ambition of this session was to deliver a step change in flood risk management communities' ability to exploit capacities as a way of enhancing resilience.

Annex II:

International Forum on Mega-Water-Disaster Outcome (Tokyo Statement)

- to be better prepared for Mega-Water-Disaster in future -

September 27th, 2011, Tokyo, Japan

Water is life. But, water is also a threat to life. When a mega-water-disaster strikes a country people suffer, and national development is severely hampered for years, making recovery even more challenging. Unfortunately, many areas of the world are struck by such disasters over and over. These disasters also know no borders, severe value chains and result in political social and economic shocks, severely affecting human development.

Countries that are considered vulnerable to recurring disasters often also have to deal with highly variable and challenging water, natural resources, social and economic situations. The poor suffer the most from disasters as they tend to live under more vulnerable conditions with less protection and preparedness. Human rights are recurrently violated through vicious circle of their living in lowland slums and losing everything by water-disasters.

Global changes including climate change, population growth and fast urbanization are drastically increasing risks of water-disaster. There are increasingly more people in crowded urban areas who will feel the impact of climate change through water. Green growth will not be materialized without squarely addressing mega-water-disasters.

Having the above in mind, we share common understanding that water disaster should be urgently addressed by leaders at global, national and municipal levels. Towards this end, we recommend the following as priority actions for the international community which are inspired from Action Plan by HLEP/UNSGAB:

- International community, especially the UN, to conduct regular dialogue and promote actions in order to share experiences and lessons globally and develop effective counter measures to mitigate mega-water-disasters.
- Governments to build social, administrative, and technical systems to be “reduce disaster risk before disasters strike and be prepared for unexpected event” especially those to ensure “best mix” of structural and non-structural measures that optimally mitigate mega-water- disasters.
- Regional bodies, including UN Regional Commissions and regional development banks to establish mechanisms for regional cooperation to ensure concerted disaster response especially across river basins.

Appropriate processes and mechanisms should be established to turn the recommended actions into reality. To implement the above we strongly support the recommendation by HLEP/UNSGAB that a plenary discussion session on water and disaster takes place at the next UN General Assembly.