# IFI Session in ICFM6

Date September 16, 2014
Plenary Session: IFI Flagship Project
Convener: UNESCO, WMO, UNU, UNISDR and ICHARM
Time 13:30-15:30

## 1. Introduction

The IFI flagship project was developed around the concept note attached in Annex 1 in February 2013, and was launched in May 2013 in New York at the side event of Special Thematic Session on Water and Disasters as:

"Project to support benchmarking flood risk reduction at global, national and local levels".

The project is articulated around three major areas:

1) To identify the original risk with no mitigation measures;

2) To identify the current risks by current mitigation measures and to identify the remaining risk as the benchmark;

3) To facilitate decision making and benchmarking for risk reduction.

## 2. Objective

Within the umbrella of ICFM6 and taking advantage of the participations of leading experts in flood management, IFI is seeking for contribution from the members to any of the steps of the project.

This session aims to review and share the current state of activities of IFI contributing institutes on flood risk monitoring methodology and promote the future joint actions for achieving the IFI flagship project. A special interest is what IFI could offer for monitoring the progress of the post-2015 targets.

## 3. Expected Outcomes

At the end of the session, commitments and task allocations between institutions, IFI members and other participants should be made clear on the road maps with a calendar of meetings and expected achievements.

## 4. Program

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| 13:30 -13:50 | Chairman: Pr Takeuchi (ICHARM)<br>Opening Remarks<br>UNESCO (tbc)<br>WMO<br>Introduction of IFI flagship project | ICHARM, Masahiko Murase | 20' |
| 13:50 -15:05 | Flood Risk Assessment Methodology Proposals to achieve IFI flagship project | | |
| | **KEY NOTE SPEECH: Benchmarking flood risk reduction in Central Europe – The Elbe River.** | BafG, Koblenz<br>Wolfgang Grabs | 15' |
| | **Flood Exposure Assessment Activities in ICHARM** | ICHARM<br>Ai Sugiura | 10' |
| | **Statistical analysis for modelling the hydrological risks in Latin America and the Caribbean** | IFI-LAC<br>Alfonso Gutierrez Lopez | 10' |

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| | **Practices of flood risk mapping under changing environment in China.** | IWHR<br>Xiaotao Cheng | 10’ |
| | **Development of benefits indicator of living with floods** | WMO<br>Giacomo Teruggi | 10’ |
| | **Developing a Comprehensive Water Management System.** | USACE ICIWarm HEC<br>Christopher Dunn | 10’ |
| | **Water Related disaster risk mapping and monitoring methodology at regional and/or global scale.** | UNISDR<br>David Stevens | 10’ |
| 15:05-15:30 | Discussion on the goals and the road maps | All participants | 25’ |

## 5. Abstract

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| Dr. Wolfgang E. Grabs<br><br>Chief, International Water Affaires<br><br>Federal Institute of Hydrology<br><br>Koblenz, Germany | **Benchmarking Flood Risk Reduction in the Elbe River**<br><br>The past decade has seen the development and overall acceptance of the concept of Integrated Flood Risk Management. This approach strives to balance positive and negative effects of riverine floods and combines it with risk management concepts. In practice, this has led to a diversification of flood management practices that go beyond traditional structural flood protection measures such as dams and dykes towards non-structural measures. These include giving more space for rivers, backwards-location of dykes, re-naturalization of flood plains and a suite of improved information systems including improved flood forecasting services, promoting flood risk awareness and self-help capabilities.<br><br>The paper describes in some detail the process of benchmarking to support effective planning, implementation and monitoring of integrated flood risk management activities that require a set of quantifiable measures, against which progress in flood risk management can be referenced. The case of the extreme Elbe River floods in 2002 and 2013 triggered the development and implementation of the Elbe Flood Protection - Action Plan that in large parts has been implemented. The paper shows the basic concepts of the Elbe Flood Protection Plan and its actions and puts these in the context of a benchmarking framework. The paper concludes that although elements of a benchmarking concept are outlined in the Action Plan, the establishment of benchmarking practices as a tool in flood risk management is in its infancy. The development of a consistent benchmarking procedure would have the potential to further improve the effectiveness of Integrated Flood Risk Management practices in national and international river basins. |
| Dr. Ai Sugiura<br><br>Research Specialist, IFI Secretariat<br><br>ICHARM<br><br>Tsukuba, Japan | **Flood Exposure Assessment Activities in ICHARM**<br><br>As ICHARM contributions to the flagship project, ICHARM has been developing methodologies and models in order to assess water-related disaster risk and flood risk in particular. Risk definition chosen in ICHARM is a function of Hazard, Exposure and Vulnerability. So far, ICHARM focused on providing models to assess the exposure including number of people affected and affected asset to a given hazard from global to river basin scale. BTOP model is coupled with FID model, flood inundation depth model in order to simulate inundation. So far, preliminary simulations have been completed globally based on 50years return period rainfall identified from APHRODITE observed rainfall dataset as input for each grid and simulated runoffs were analysed for inundation with FID and the validation process is conducted currently at regional scale through specific river basins. At river basin |

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| | and local scale, ICHARM has also developed IFAS (integrated flood analysis system), an interface enabling from river basin modelling based on global topographic and land-use data, to runoff analysis which was successfully calibrated and validated on project base for river basins in Indonesia, Malaysia, the Philippines and Upper Indus (UNESCO project). Moreover, in addition to these models, for river basin and local scale inundation simulation, RRI, rainfall runoff inundation model was developed in ICHARM. RRI was successfully calibrated and validated on project base for Chao Phraya river basin in Thailand (JICA project) and Indus mid-downstream in Pakistan (UNESCO project) with local hydrometeorological data.<br><br>Currently, ICHARM is developing methodologies to assess current vulnerability resulting from the simulated exposure with BTOP, IFAS or RRI. |
| Dr. Alfonso Guttierez Lopez<br><br>Coordinator and Research Professor, IFI-LAC<br><br>Querétaro Water Research Center CIAQ, Engineering School, University of Querétaro<br><br>Querétaro, Mexico | **Statistical analysis for modelling the hydrological risks in Latin America and the Caribbean**<br><br>Latin America and the Caribbean is characterized both by the frequent occurrence of extreme rainfall, causing floods and severe damages to growing and by long periods of drought. It is therefore crucial, from a risk analysis point of view, to obtain a regional view of the probability of such events. This paper presents a stochastic model of rainfall distribution and its regionalisation, taking into account the seasonal cycle. The analytical formulation of the model and some of its main properties are recalled. The rainfall regime is described by two parameters: the average rain depth per event and the mean number of events during a period of given length $T$. This latter parameter is additive. Both parameters may be considered as non stationary parameters, allowing a description of the evolution of the rainfall regime along the year. The method is applied to 46 rain stations of the hydrological region 10 in Mexico, over a mean period of 25 years. The regionalisation itself is carried out in a geostatistical framework, focusing on three time scales: annual, monthly and daily. The results obtained by the model are compared to those obtained by a direct fitting of a Gumbel distribution to series of extreme values. The scale parameter $\beta$ is used as a measure of the hydrological risk. This provides an integrated approach for the mapping of the hydrological risk over both gauged and ungauged basins. |
| Pr Xiaotat Cheng<br><br>Professor, Vice Chief Engineer<br><br>China Institute of water Resources and Hydropower Research (IWHR)<br><br>Beijing, China | **Practices of flood risk mapping under changing environment in China**<br><br>Features of flood risk have been changing greatly in China since 1998 due to the accelerating process of urbanization in an unprecedented scale, wide range of land subsidence in plains, and construction of various large-scale infrastructures, such as high dams, highways, inter-basin water diversion projects and road building and mining in mountainous areas, as well as the changes of natural climate and ecological environment. Flood risk mapping offers useful information for flood management and emergency response, and has been listed in the government's investment plan since 2013. The presentation introduces the practice and progress of flood risk mapping in China, including the purpose, types, methodologies, and discusses the problems now being faced. |
| Mr Giacomo Terrugi<br><br>Programme Officer at | **Development of benefits indicators of living with floods for IFI-flagship project.**<br><br>Living on a flood plain exposes its occupants to the risk of being flooded, but it also offers enormous socio-economic advantages. Switching from "flood control" to "flood |

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| Associated Programme on Flood Management<br><br>WMO<br><br>Geneva, Switzerland | management" practices has widened the set of available means to maximize the net benefits derived from the use of the floodplain. In doing so, it is important to stress the need for flood resilient development through appropriate planning. Benefit indicators for flood management provide insight useful for sensitizing and assisting in making informed decisions. They should also, of course, be complemented with other socio-economic information necessary for selecting the most appropriate set of solutions for flood management for the given local conditions. |
| Mr Christopher N. Dunn<br><br>Director, Hydrologic Engineering Center Institute for Water Resources<br><br>Davis, USA | **Developing a Comprehensive Water Management System**<br><br>A primary mission of the U.S. Army Corps of Engineers is to manage our nation's water resources. The Corps performs this mission across multiple purposes at the direction of the U.S. Congress. To satisfactorily meet these sometimes conflicting purposes, both now and in the future, it is critical that the nation's water resources are studied and managed in a holistic and comprehensive approach implementing system concepts. Several tools have been developed to study and manage our nation's water resources both from a planning and a real-time water management perspective. The suite of water management tools is called the Corps Water Management System or CWMS and the overarching tool to perform alternative analyses is called HEC-WAT or the Hydrologic Engineering Center's Watershed Analysis Tool.<br><br>CWMS is a comprehensive data acquisition and hydrologic modeling system for real time decision support of water control operations. It helps our water management offices make water management decisions for over 700 reservoir and lock-and-dam projects to reduce flood and drought risk. CWMS retrieves precipitation, river stage, gate settings and other data from field sensors, and validates, transforms and stores those measurements in a database. The data is then ingested by a series of hydrologic and economic tools and the tools help the water managers estimate flows, stages and consequences due to the event and the operation of the projects. This sequence of modeling software allows engineers to evaluate operational decisions for reservoirs and other control structures, and view and compare hydraulic and economic impacts for various real-time "what if?" scenarios. A companion product called HEC-RTS or Real-Time Simulation is also available for public use.<br><br>The HEC-WAT framework integrates the software commonly used by multi-disciplinary teams to perform comprehensive system type studies. The commonly used software in HEC-WAT is the same suite of software as used by CWMS. Capabilities within HEC-WAT include event-based sampling computations and scenario, agricultural damage, structure-by-structure, cost, non-structural and loss-of-life analyses. Risk and uncertainty approaches are employed. Another feature of HEC-WAT is that the entire physical configuration of the watershed can be described within a geospatial context. The HEC-WAT framework provides an intuitive process to build and edit models and to review, evaluate and compare results.<br><br>This presentation will introduce both tools and will emphasize how they could be used to support flood exposure assessments for the IFI flagship project. The presentation will discuss the technological advancements that have been experienced due to the development and implementation of these tools. |