



**ICHARM CHALLENGES FOR  
CONTRIBUTION TO WATER RELATED  
DISASTER REDUCTION AND PREVENTION**

**Nov. 25, 2013**

**GEOSS Joint Asia-Africa Water Cycle Symposium**

**YOICHI IWAMI**

**ICHARM**

**International Center for Water Hazard and Risk  
Management**

under the auspices of UNESCO hosted by PWRI, Tsukuba

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# ICHARM Objective

International Centre for Water Hazard and Risk Management

- To be the global Center of Excellence to provide and assist implementation of the **best practicable strategies** to localities, nations, regions and the world **to manage the risk of water related hazards** including floods, droughts, land slides, debris flows and water contamination.
  - At the first stage, the priority is **flood-related disasters**.



6 March, 2006 at Tsukuba

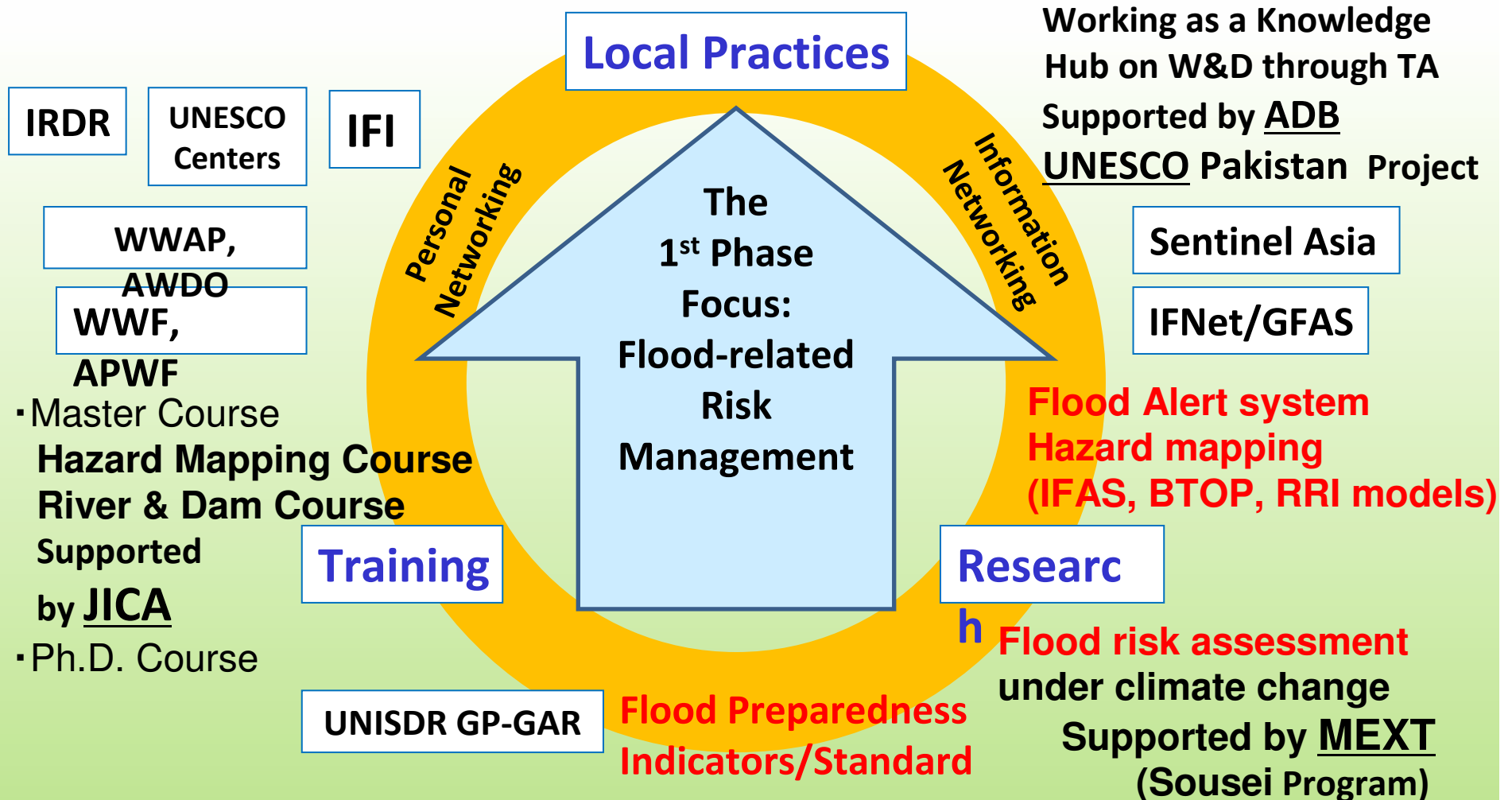


United Nations  
Educational, Scientific and  
Cultural Organization



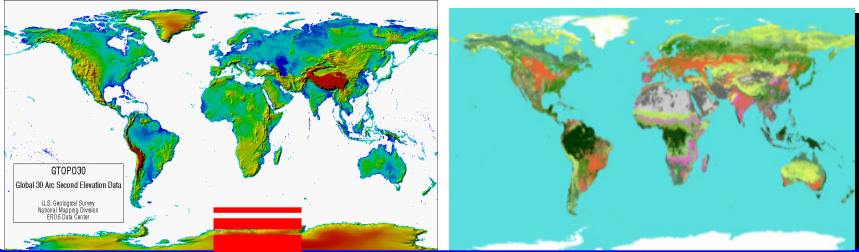
# ICHARM's Philosophy: **Localism**

Delivering best available knowledge to local practices

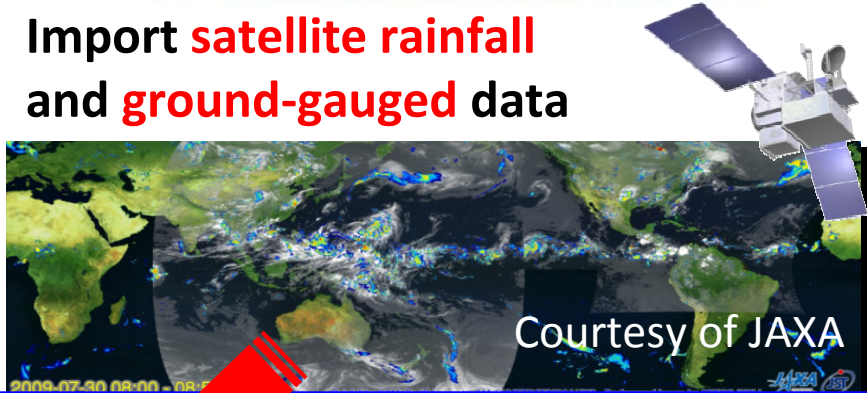


# Early Warning - IFAS(Integrated Flood Analysis system) for insufficient observed basin

**Global data:** topography, soils, land use, and so on



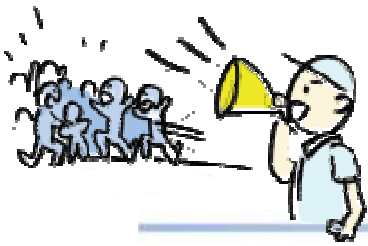
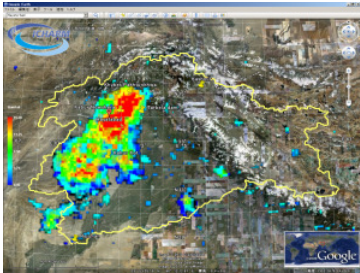
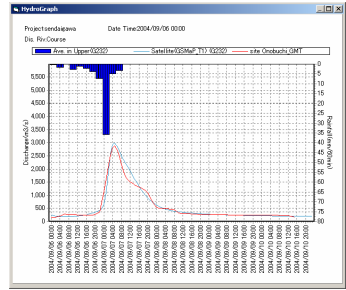
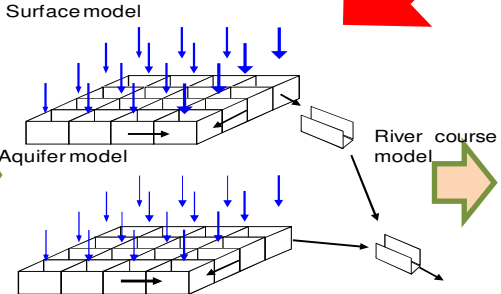
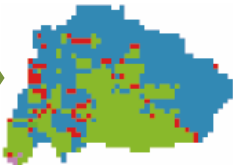
Import **satellite rainfall** and **ground-gauged data**



Run-off analysis by PWRI **distributed tank model**

Output: River discharge, Water level, Rainfall distribution

Model creation



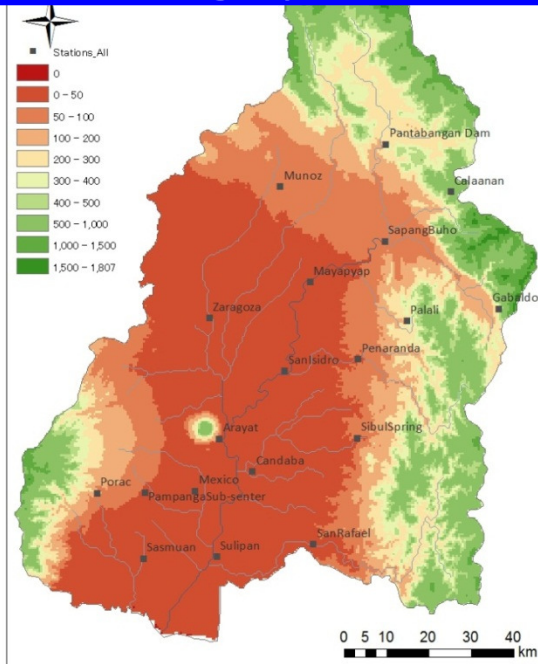
**Evacuate from dangerous areas**

Judge by River management authorities

**Alert message** by E-mail and on the display for river management authorities

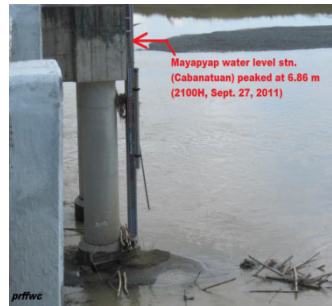


# IFAS installation and identifying flood causes in Pampanga and Cagayan river basins in the Philippines

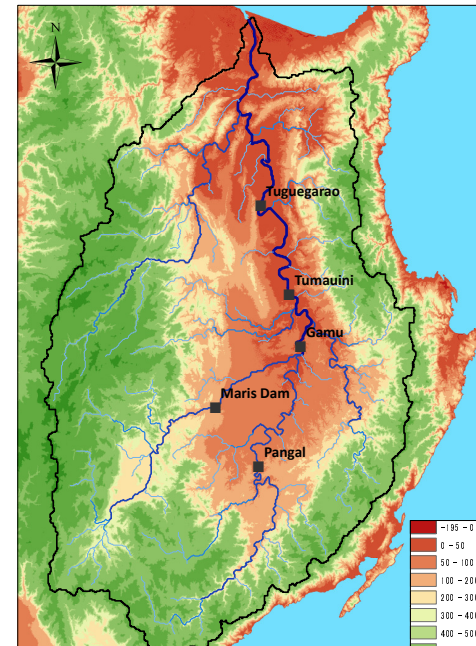


## Pampanga River

10,454km<sup>2</sup>  
18 rainfall stations  
11 water level stations



Mayayap station

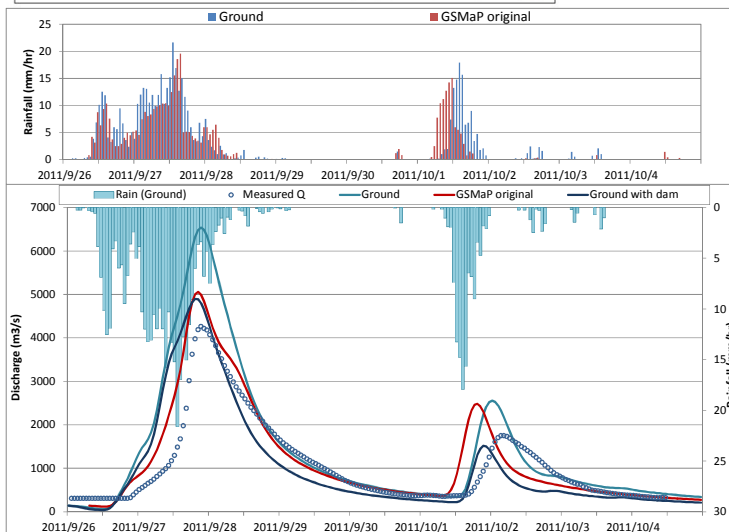


## Cagayan River

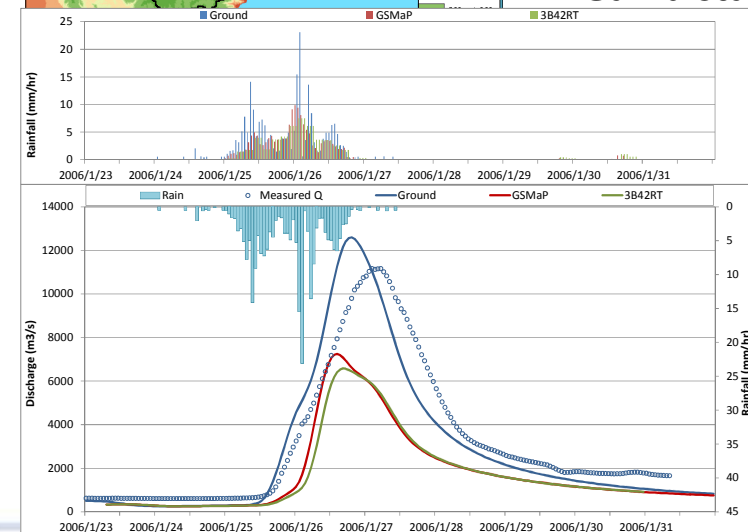
27,280km<sup>2</sup>  
5 rainfall stations  
5 water level stations



Gamu station



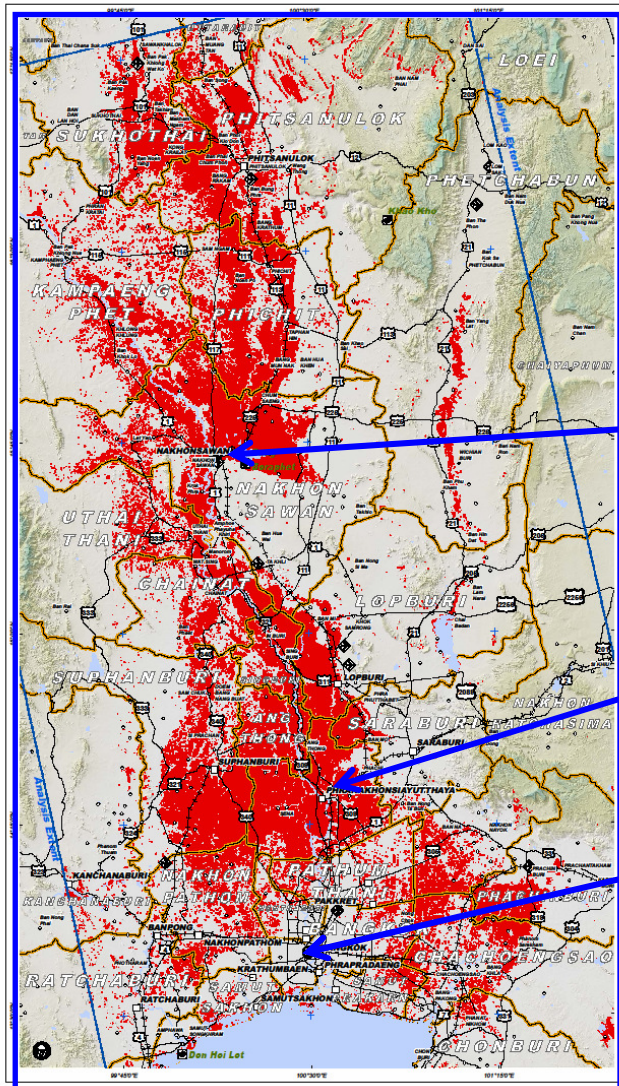
IFAS results at Mayayap station



IFAS results at Gamu station

# 13 Oct, 2011 by MODIS

## UPDATE2: OVERVIEW OF FLOOD WATERS OVER CENTRAL PROVINCES, THAILAND



**Tropical Cyclone & Flooding**  
 Production Date: 13/10/2011  
 Version 4.0  
 Globe Number: FL-2011-000135-THA

This map presents the standing flood waters over the affected Central Provinces of Thailand based on analysis of satellite data recorded 13 October 2011. A preliminary analysis shows extensive flooding over the provinces of Phra Nakhon Si Ayutthaya, Nakhon Sawan, Chaiyaphum, Pathum Thani, Nakhon Pathom, Ang Thong, Lopburi, Singburi and Suphanburi. This analysis has not yet been validated in the field. Please send ground feedback to UNSTAR/UNOSAT.

**Legend**

- Major Towns/City
- Towns/Villages
- Province Boundary
- International Boundary
- Primary & Secondary Roads
- Protected Areas
- Railway Line
- Probable Flood Waters as on 13 October 2011
- Pre-Crisis Water Extent (2010)

geopictures

Satellite Data (1) : Earthstar AGAR W3-NH  
 Images Date: 13 October 2011  
 Resolution : 125 m  
 Source: European Space Agency  
 Provided by: GeoPictures/AGSAT  
 Settlement Date: EU-W3/NH4  
 Road Data: EDR  
 Other Data: OCHA, USGS  
 Analysis: UNSTAR/UNOSAT  
 Produced with: UNOSAT  
 Analysis conducted with: ArcGIS v10  
 This work by UNSTAR/UNOSAT is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Map Scale for A3: 1:1,250,000

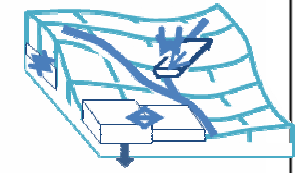
Coordinate System:  
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 Projection: Transverse Mercator  
 Datum: WGS 1984  
 Spheroid: GRS 1980  
 Scale Factor: 0.9997  
 False Northing: 0.0000  
 Central Meridian: 96.0000  
 Scale Factor: 0.9997  
 Latitude of Origin: 0.0000

The depiction and use of boundaries, geographic names and related data shown here are not intended to be authoritative or to imply official endorsement or recognition by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery and related geographic information, research and analysis to UN humanitarian & development agencies & their implementing partners.

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Emergency inundation Simulation in Chao Phraya river basin in Thailand as of Oct.14, 2011

Simulation on Oct 18, 2011 by ICHARM 5m



Sayama's RRI (Rainfall - Runoff - Inundation) model by using satellite data (3B42RT)

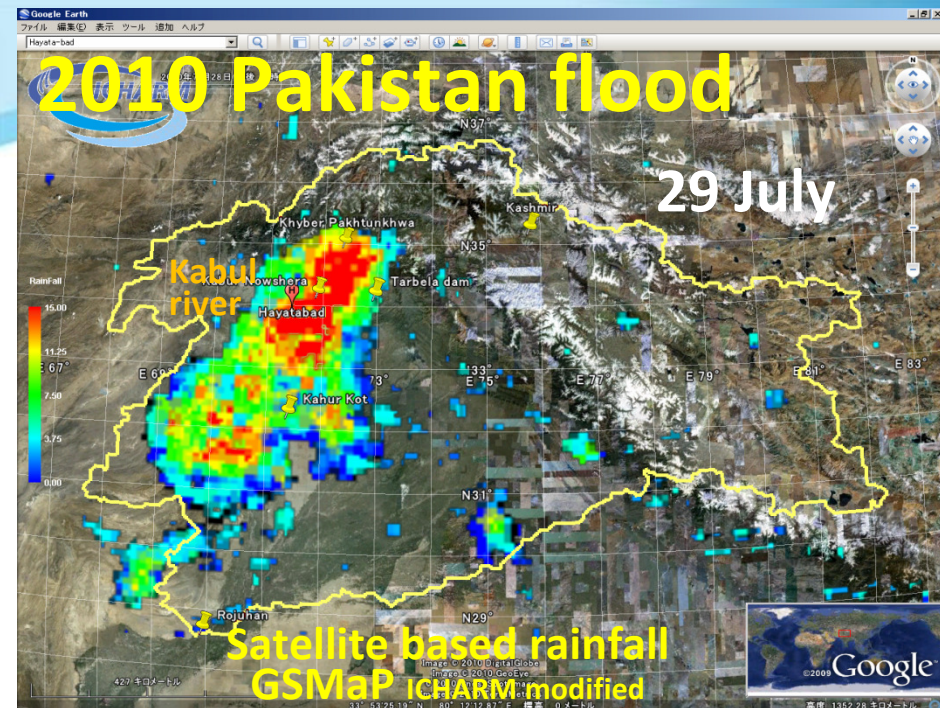
Nakhon Sawan

Ayutthaya

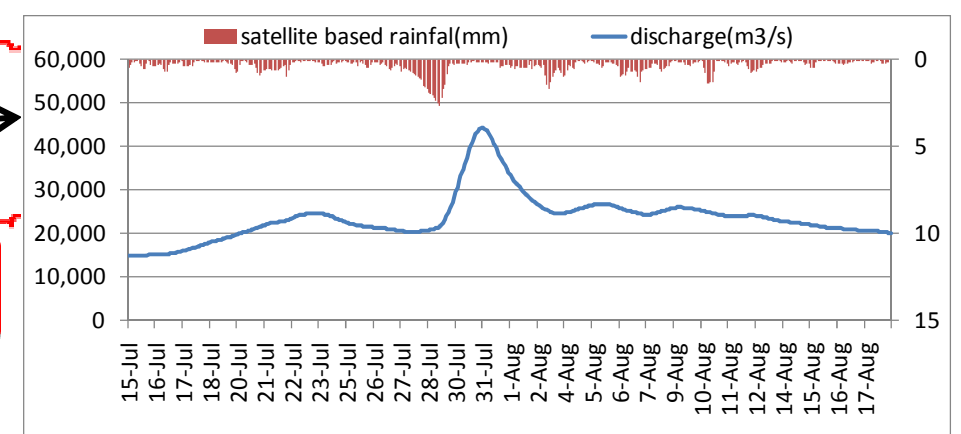
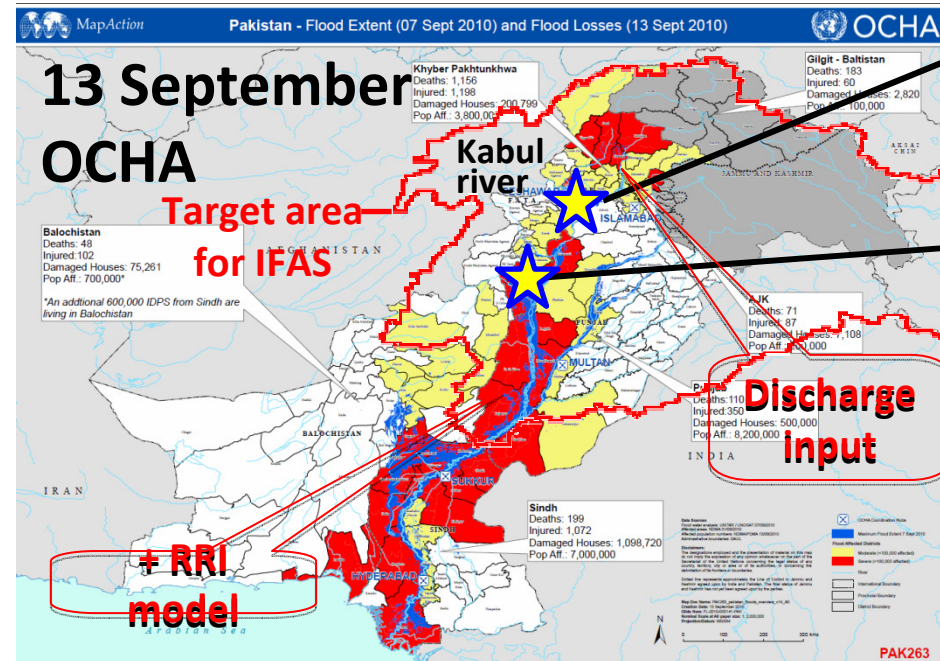
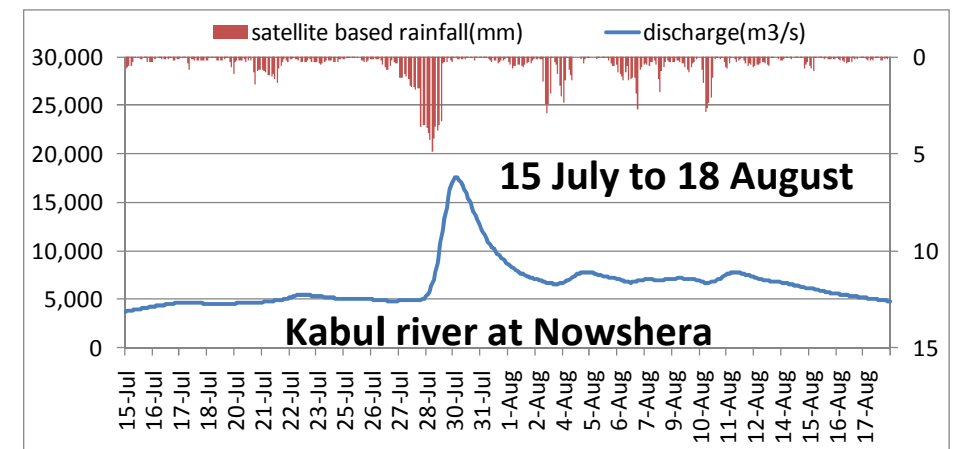
Bangkok

- 1 : July 2
- 31 : Aug 1
- 62 : Sep 1
- 92 : Oct 1
- 123 : Nov 1
- 152 : Nov 30

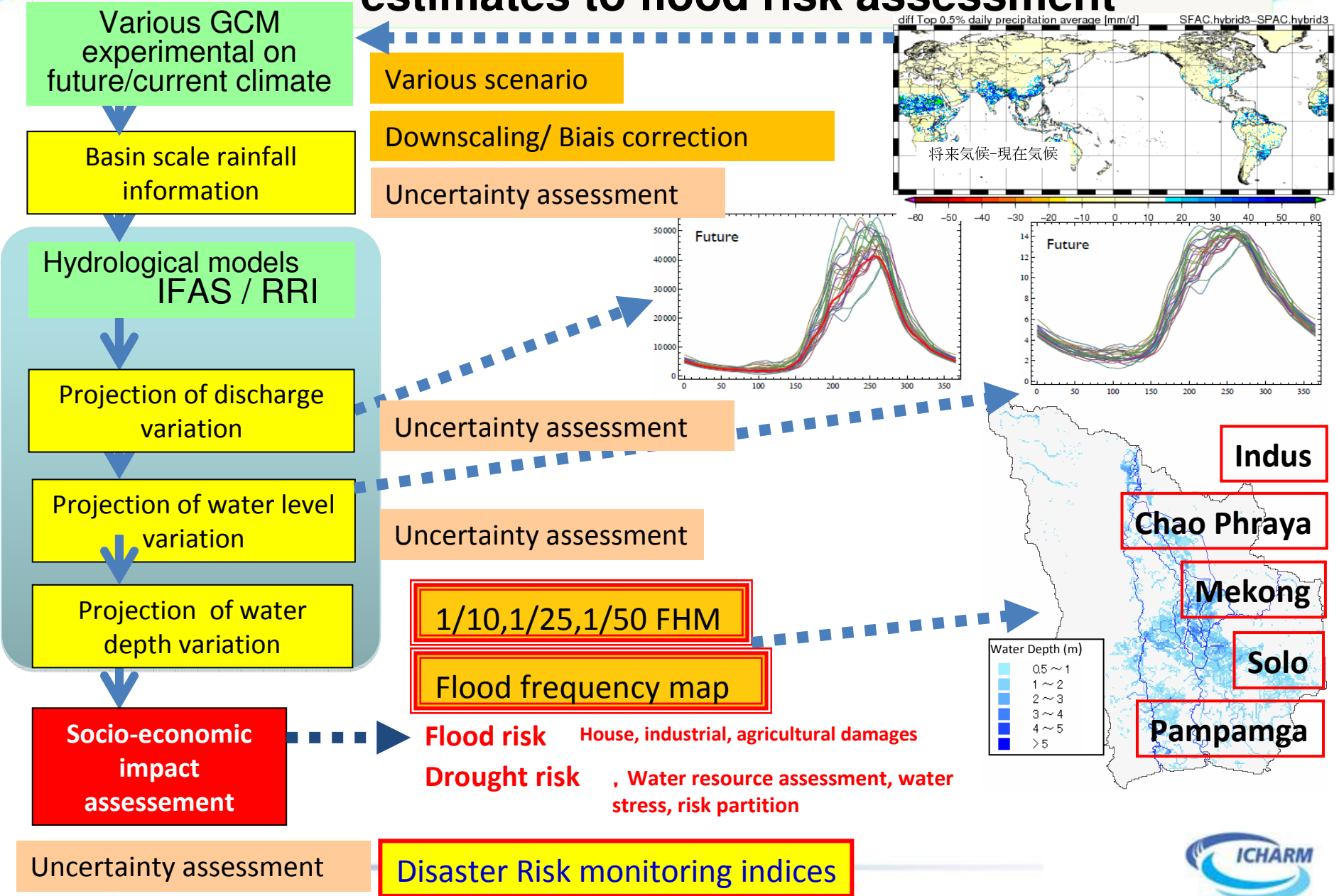
0m



# UNESCO Project (2 years: 2012-14) Strategic Strengthening of Flood Warning and Management Capacity of Pakistan



# Basic technology from GCM rainfall estimates to flood risk assessment





## ICHARM Challenges for contribution to Hyogo Framework for Action 2 & post-2015 MDGs : **Development of Global Risk Indices**

This consultation is planned to offer water-related risk assessment methods, and help policy-makers and investors take risk sensitive actions. We show that extreme flood risks are measured by using improved methods and risk indices, and provide practical implications for Asia Pacific region

- **Type of disasters: flood (and drought)**
- **Spatial coverage: Asia-Pacific region**

The results of several river basin examples to be introduced for explaining success, difficulty and limitation as case study

- **Risk concept: fatalities (or economic damages) are functions of hazard, exposure, and vulnerability**

in cooperation with MLIT and UNISDR Kobe office

### ◆ **Expected recommendations**

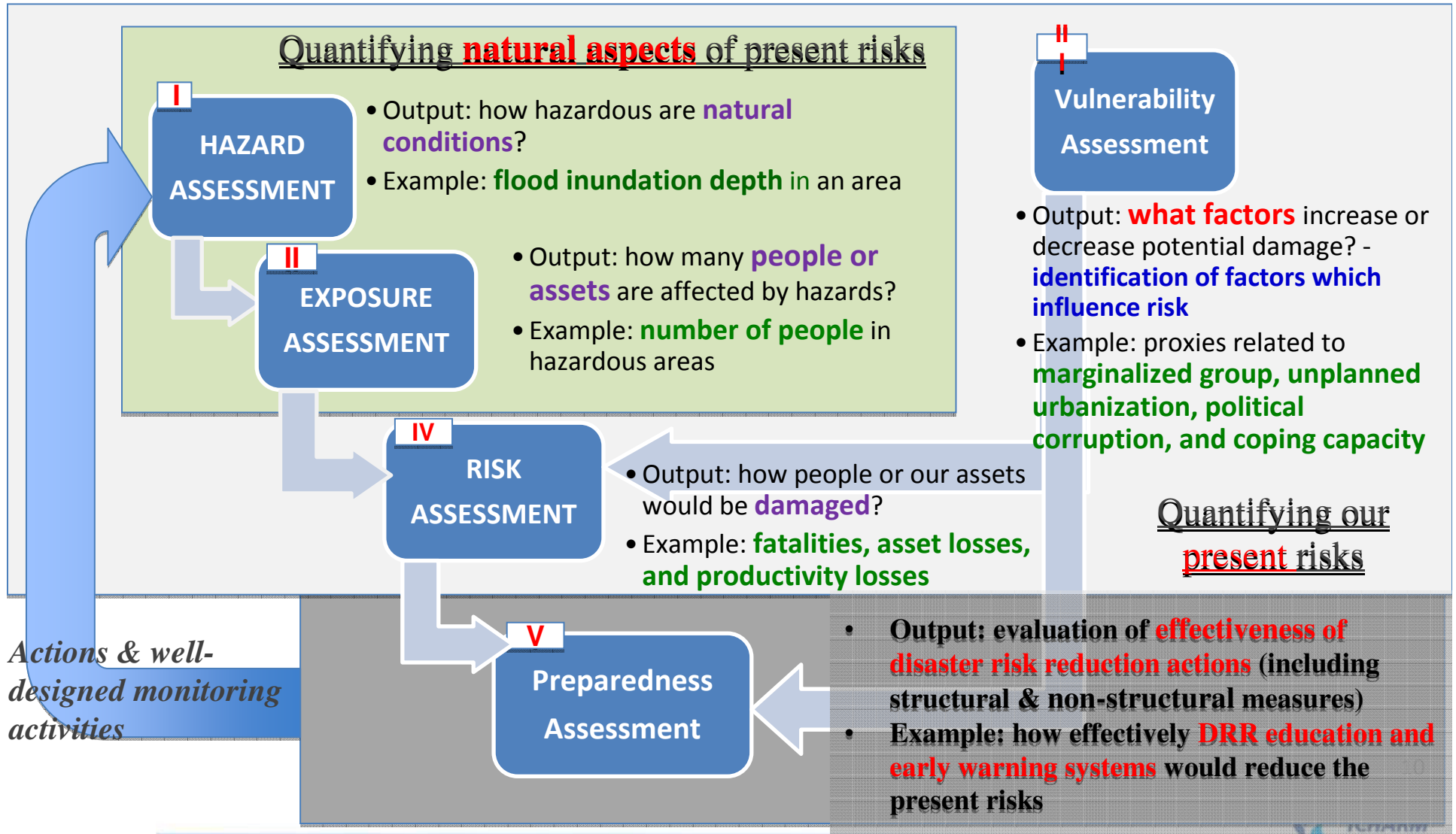
#### *Major inputs to the Asia-Pacific consultation*

- Identification of methodological limitations and improvement plans
- Suggestion on the way to measure DRR-related targets in the HFA2 and post-2015 MDGs
- Suggestion on the practical and credible risk assessment methodologies
- Suggestion on the possibilities of improving national risk profiles, which include sub-national level information about risk indices, effectiveness of prevention efforts, and key risk drivers



# OUTLINE OF GLOBAL FLOOD RISK INDICES

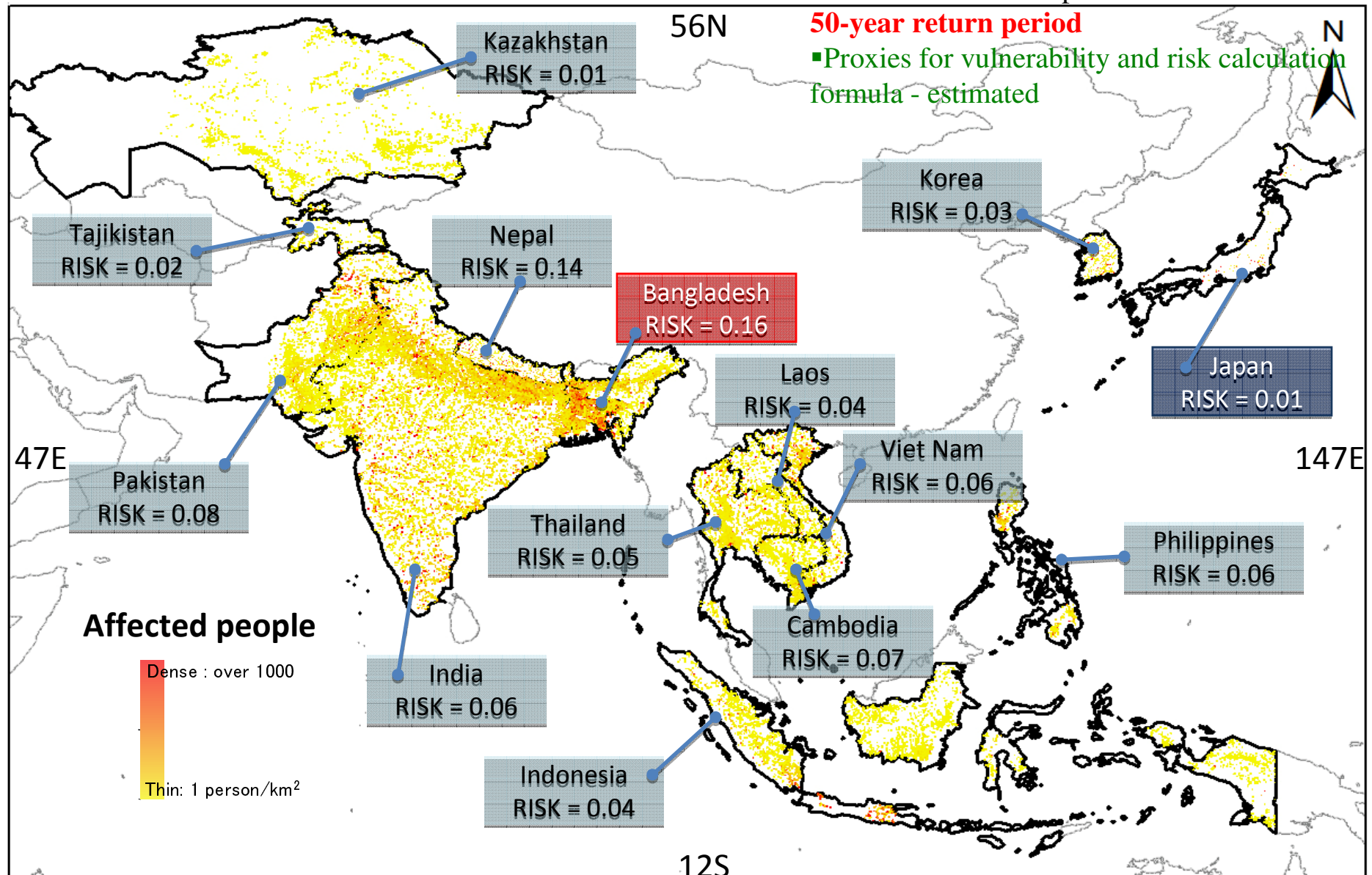
For a comprehensive, integrated, multi-disciplinary approach



# PRELIMINARY OUTCOMES OF ICHARM

## Study sites: 14 countries in Asia

- Flood hazard and exposure - simulated at the **50-year return period**
- Proxies for vulnerability and risk calculation formula - estimated



## 2. Results of mapping flood risk

- Affected people: 1km cell-gridded
- Risk index (flood fatalities) was measured at country level, but it was possible to anticipate **hotspots within the**

**RISK = flood fatalities per 100 km<sup>2</sup>**



Thank you for your kind attention !