Imperative Needs to Develop Water-related Disaster Risk Information

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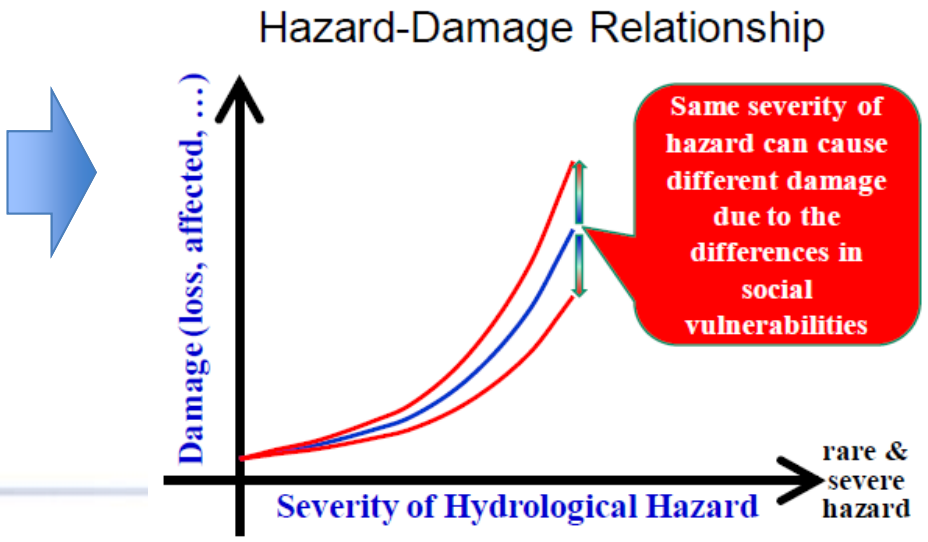
What Information Is Missing in the Water-Related Disaster Risk Management?

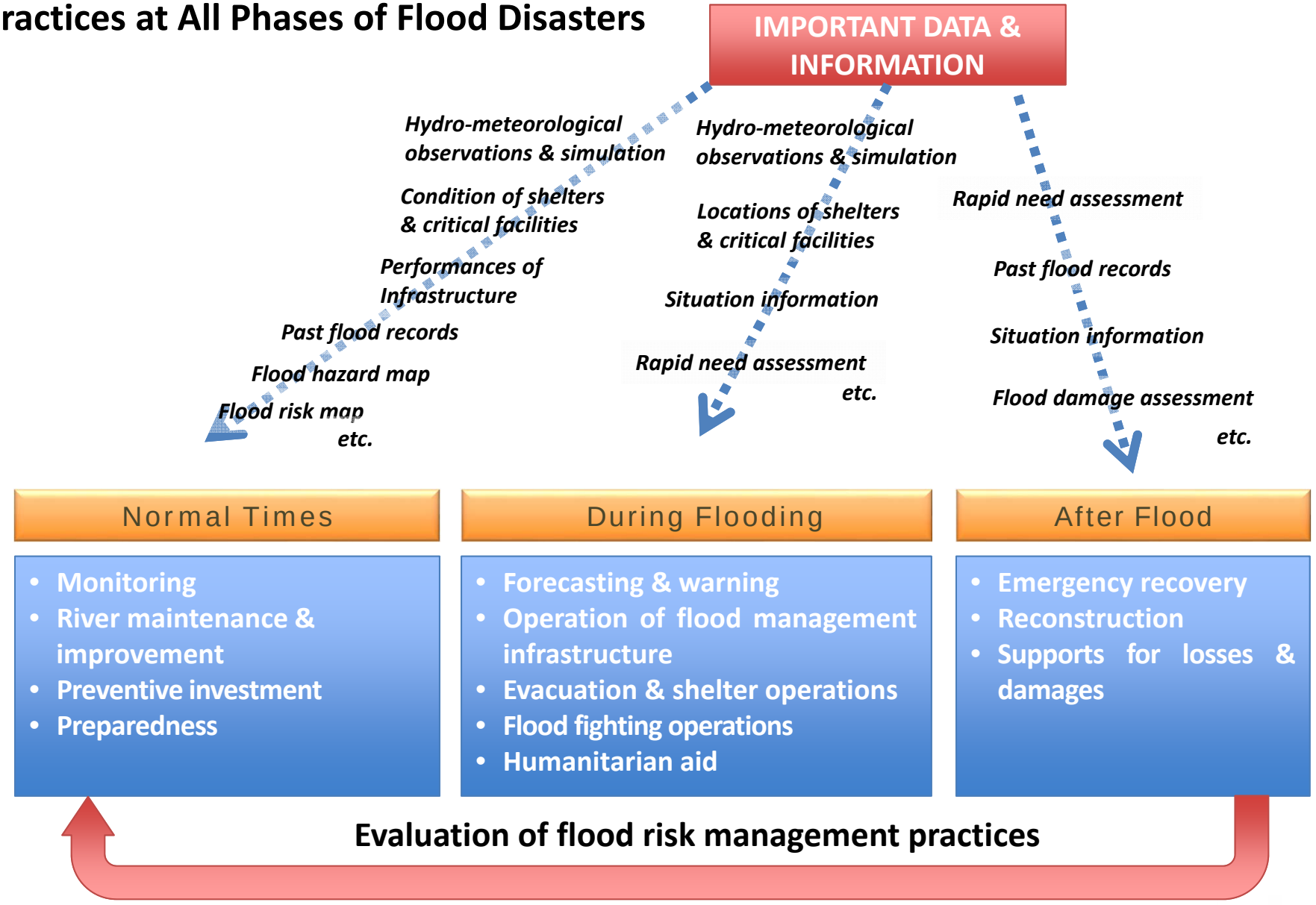
❖ **UNESCO International Hydrological Programme (2012): Eighth Phase (2014-2021) Strategic Plan – Focal Area 1.1: Risk management as adaptation to global changes**

There remains a big gap between the relatively accurate estimates by latest hydrological models and the information required to support decision making based on an evaluation of risk. The relationship between flow volume or rain intensity and expected damages, such as number of casualties, economic losses, and affected area/population, are critical but poorly studied. There is a need to establish methodologies to assess risk, considering the hydro-climatological and social conditions of the area of concern.

Compile, share, and analyze data on socio-economic damages due to water-related hazards, taking into consideration the magnitude of the hydrological hazard and the social vulnerabilities.



Water-Related Disaster Risk Management Practices at All Phases of Flood Disasters



✓ **All practices and actions require data and information.**

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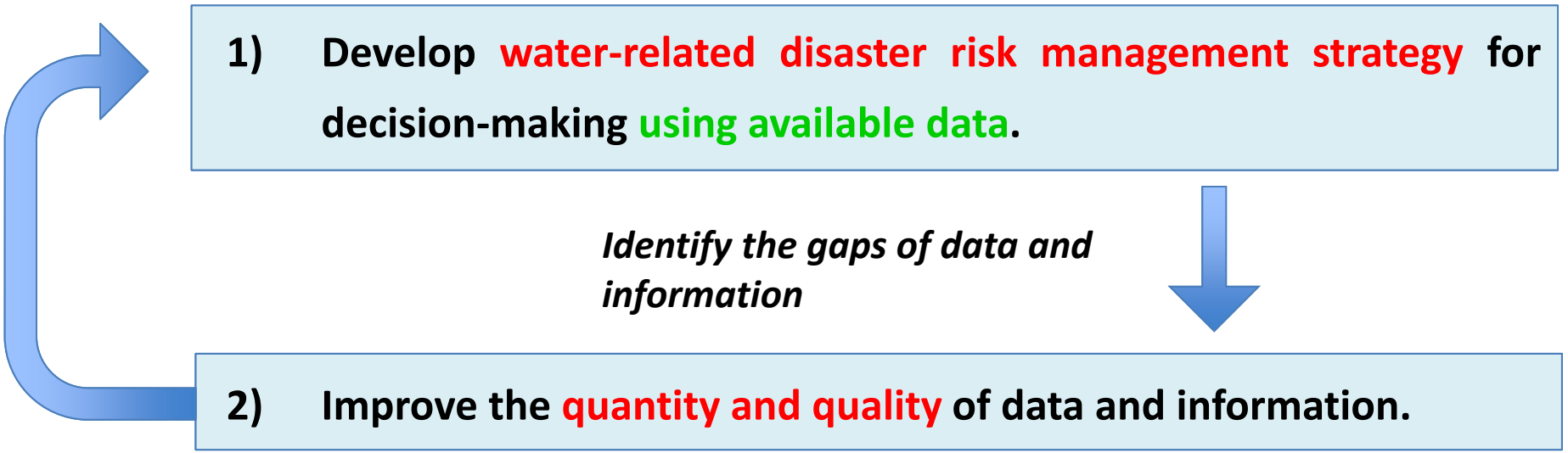
Crucial Roles of Government Officers in Developing Risk Information (1)



- **Water-Related Disaster Risk Management Strategy**
  - Emergency actions
  - Preventive investment

Crucial Roles of Government Officers in Developing Risk Information (2)

➢ Data/Information Requirement for Emergency Actions

Advanced Stage

- X-band data
- High-resolution image data (camera, etc.)
- Geographic data integration on GIS

- Development of network of telemetry systems
- River cross section
- increased number of stations
- Advanced hydrologic simulation with local measurements (RRI, etc.)

- Simple method observation systems for weather and river condition
- Simplified model for hydrologic simulation with satellite rainfall data (BTOP, FID, IFAS, etc.)

First Stage

Example of the simple method observation system (gauging rainfall)

➔ Grasp the situation precisely and in a timely manner.

Crucial Roles of Government Officers in Developing Risk Information (3)

- **Data/Information Requirement for Preventive Investment**

  - **Risk evaluation**

    - **Hazard: data/information about hydrological characteristics**
    - **Exposure: data/information about population, assets & socio-economic activities**
    - **Vulnerability: data/information about socio-economic conditions and coping capacity**

    ⇓

    - **Number of casualties, socio-economic damages and affected area/population**

➔ **Show the current level of risk and the effectiveness of preventive investment to policy-makers, practitioners, and the public**

Crucial Roles of Government Officers in Developing Risk Information (4)

- Hold the view that **preventive investment** is inevitable to protect people and economic growth from disasters.
- **Compile, share and analyze technical data** about hazard, exposure, vulnerability, and damage at all levels.
- **Conduct risk assessments at all levels** in order to understand how water-related disasters cause casualties and economic damages.
- Evaluate the effect of preventive investment in terms of ***"information required to support decision making"***

Int. Research Organizations and Academia

- Theoretical knowledge
- Hydrological models (especially, less data-dependent simulation models)
- Risk assessment tools
- Know-how and experiences

- Global datasets

Based on UNESCO IHP 8th Phase Strategic Plan (2012), discussions at the UNISDR 4th global platform for DRR (2013), UNISDR synthesis report of consultations on HFA2 (2013), ICHARM report for HFA2 contribution (2014)

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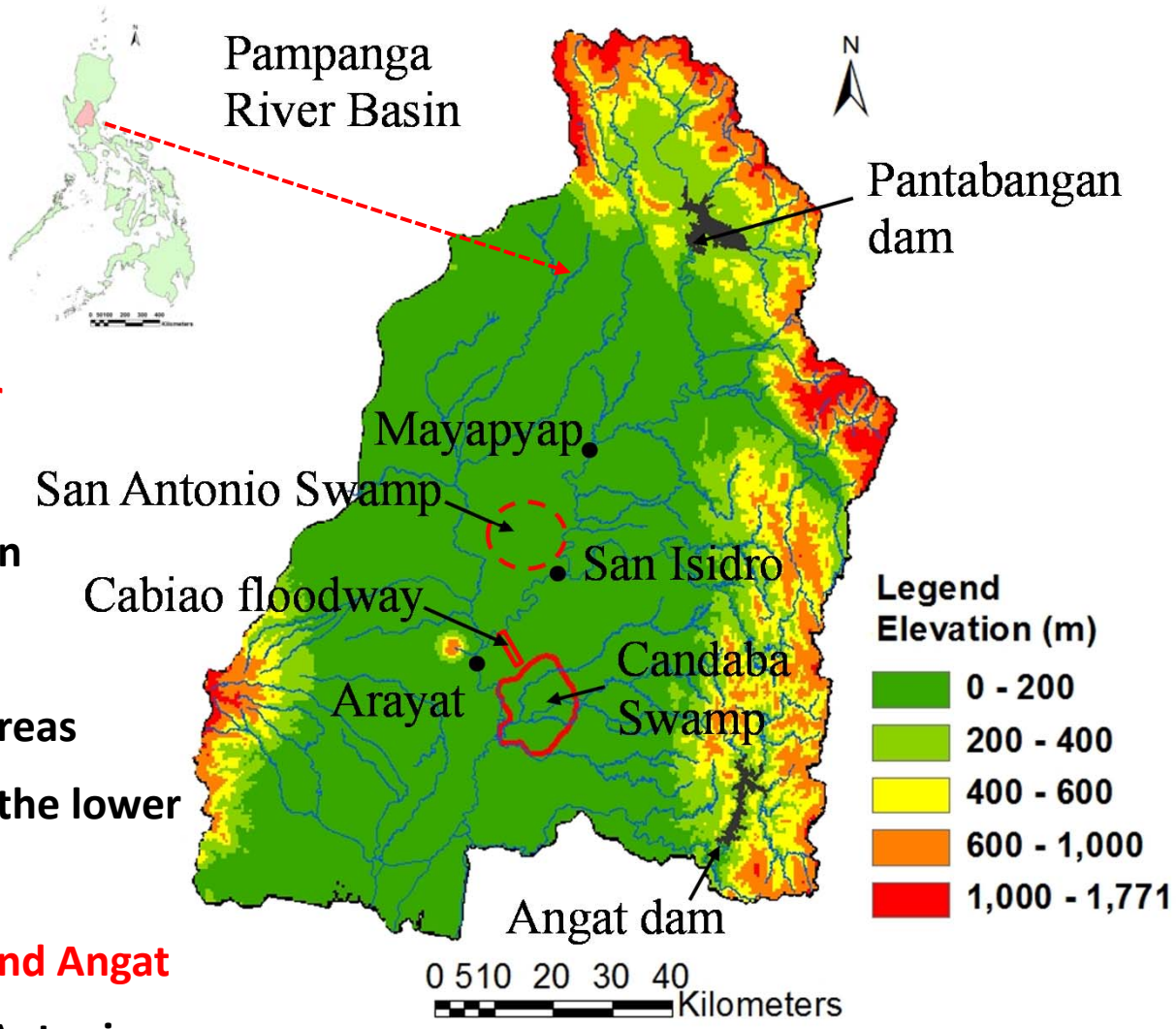
A Pilot Practice

- Collaboration between ICHARM and Government of Philippines
- Investigation of flood disaster risks in the Pampanga River Basin

Pampanga River Basin: General Features

- Catchment Area: 10,434 km^2
- River Length: 260 km
- Population: 5.8 million
- Average annual rainfall: 1,155mm/year
- At least one flooding in a year
- The frequency of tropical cyclone passage over the basin is about 5 in 3 years
- Flood prone area: low-lying areas (approximately 2,600 km^2) of the lower river basin
- 2 major dams: Pantabangan and Angat
- 2 Swamps: Candaba and San Antonio



Meetings for Collaboration among ICHARM and Government Offices

➢ Meetings

- **Dates: 16 – 22 June 2013**
- **Government of Philippines: PAGASA, Department of Public Works and Highways, Office of Civil Defense, Bureau of Agricultural statistics, many dam offices, etc.**

➢ Collaboration

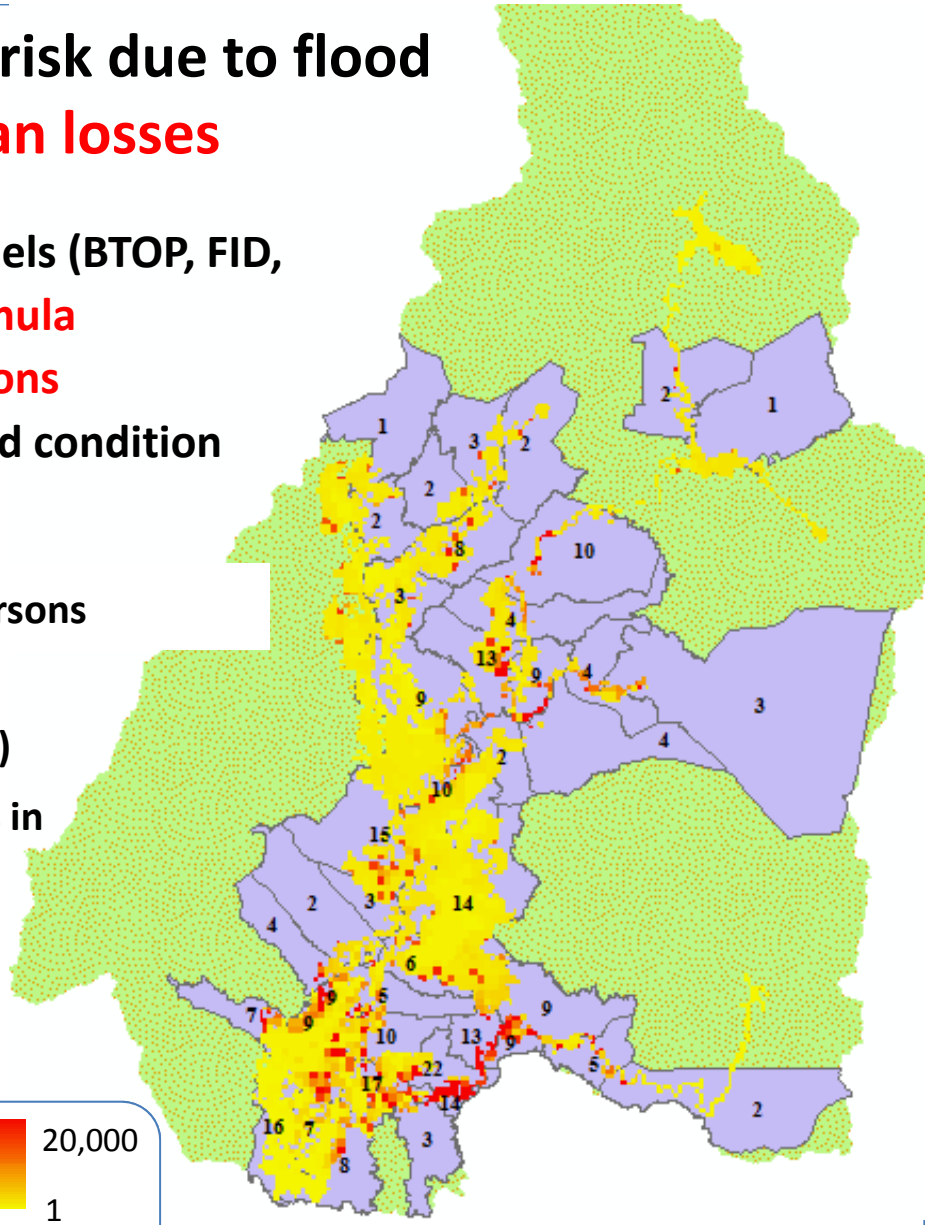
- **Launch pilot activities using available government offices' data and ICHARM's technologies**

- Example of data available to develop flood risk information

Hazard-related data	Rainfall data, water level, rating curves, dam operation data, etc.
Exposure-related data	Digital land use map, agricultural statistics, etc.
Vulnerability-related data	raw data of national census and local statistics, technical reports about crop growth and damages, data books for IWRM plan, etc.
Damage-related data	Flood disaster records such as disaster situation reports and disaster statistics, etc.
Other	Relevant regulations, manuals and guidelines, etc.

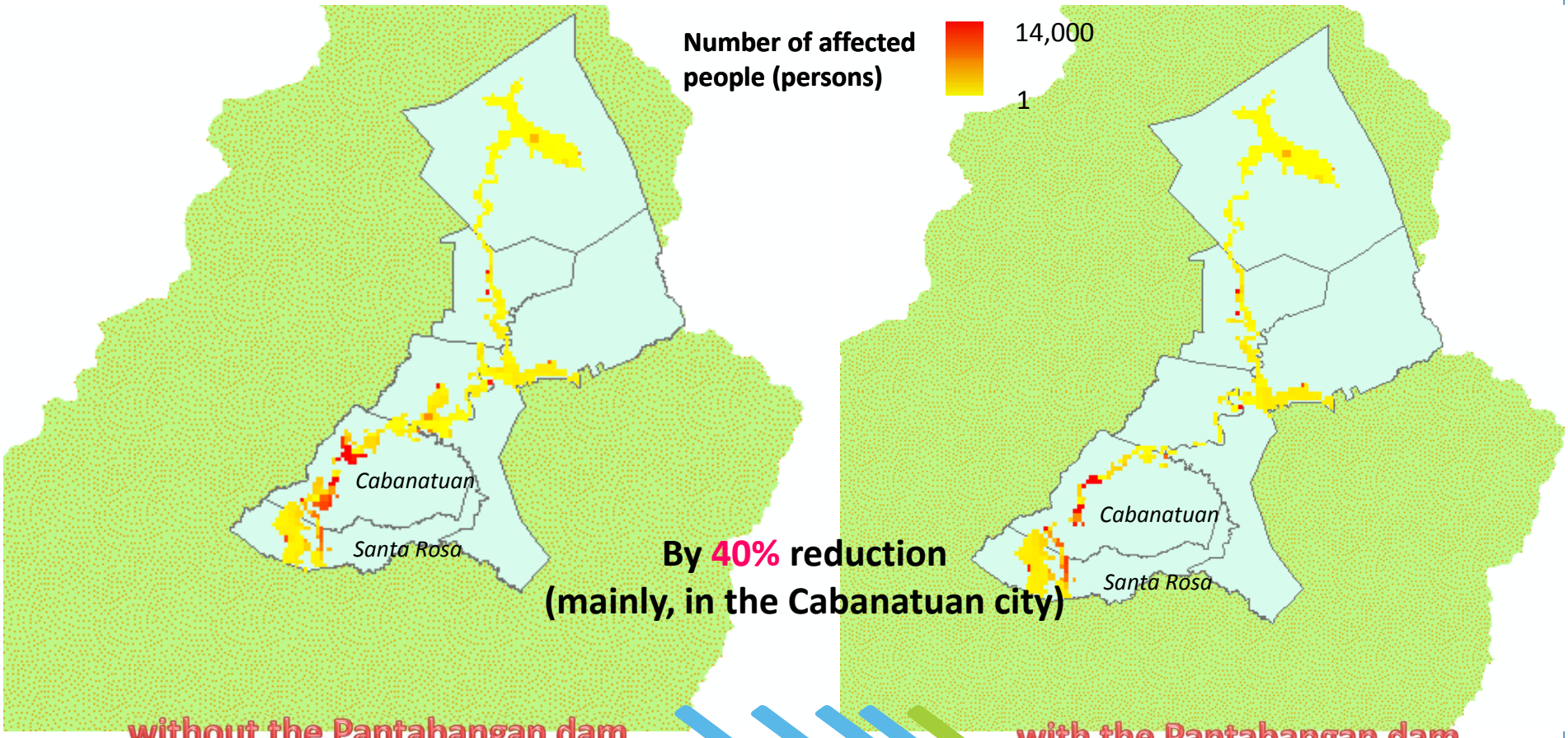
Identification of locations at higher risk due to flood from the viewpoint of human losses

- Using ICHARM's hydrologic simulation models (BTOP, FID, etc.) and collected data to develop the formula correlating human losses and flood conditions
- Simulate the disaster for 50-yr return period condition
- **Simulation results**
  - ✓ The total number of affected people: 993,000 persons
  - ✓ The value of risk indicator: 301 (as an estimate correlated with the equivalent number of deaths)
  - ✓ Areas at high risk: Southern areas (municipalities in Pampanga and Bulacan provinces)
    - (1) Pulian: 22 (76,000 affected)
    - (2) Calumpit: 17 (60,000 affected)
    - (3) Macabebe: 16 (54,000 affected)



Procedures: [data collection] → [risk calculation formula building] → [simulation]

Analyzing the effectiveness of the Pantabangan dam in reducing the number of affected people under 50-yr return period condition



The number of affected people within the management zone:
100,977 persons

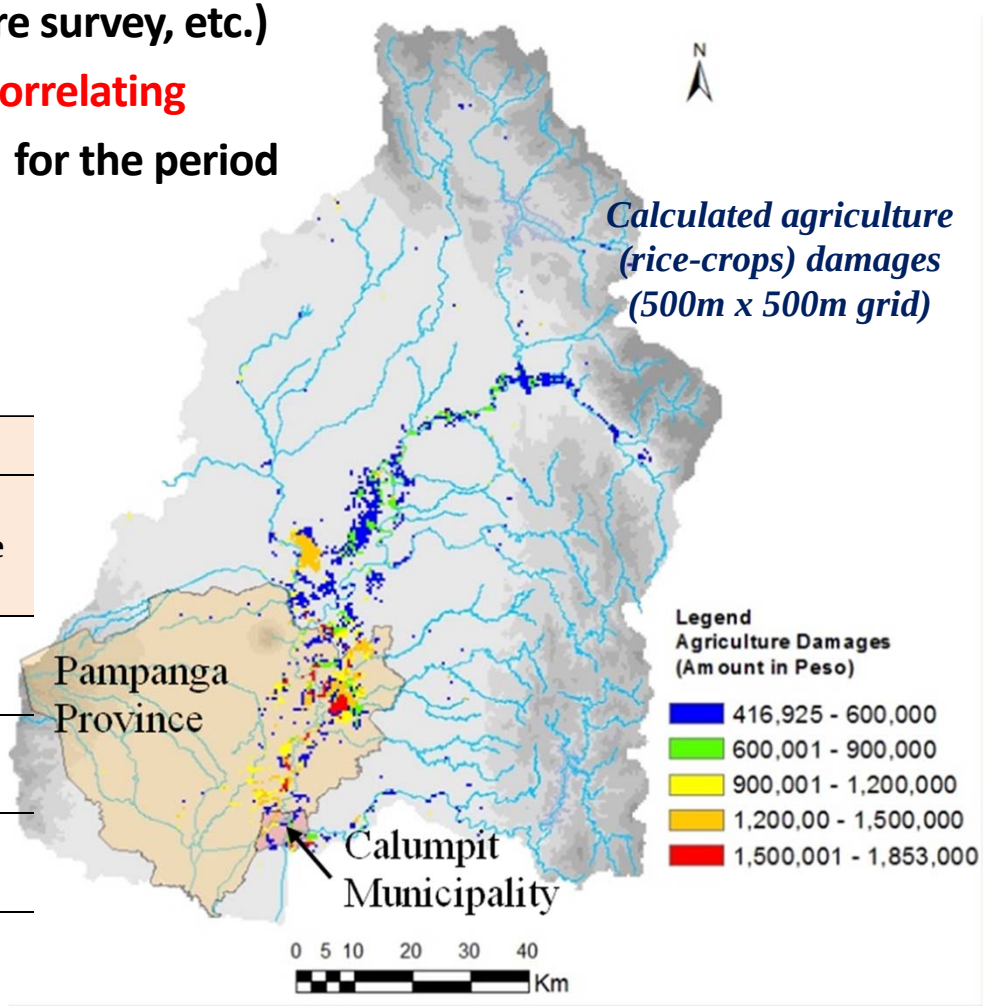
The number of affected people within the management zone:
60,729 persons

Identification of locations at higher risk due to flood from the viewpoint of agricultural damages

- **Using ICHARM's methods (RRI, questionnaire survey, etc.) and collected data to develop the formula correlating agricultural damages and flood conditions - for the period September 26th to October 4th, 2011**

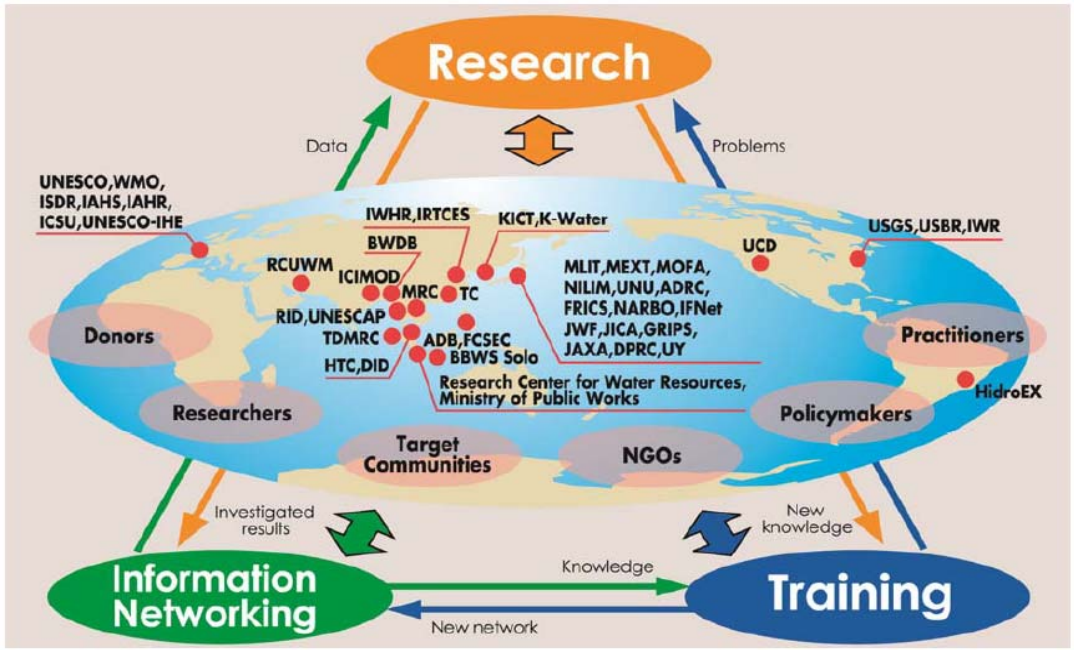
- **Simulation results**

Descriptions	Rice crops damages (million Peso)	
	Reported values	Calculated using proposed damage functions
Pampanga River Basin (Affected area 45,900 ha)	-	1,461
Pampanga Province (Affected area 15,900 ha)	1,376	652
Calumpit Municipality (Affected area 1,250 ha)	37	42



Procedures: [data collection] → [risk calculation formula building] → [simulation]

THANK YOU FOR YOUR ATTENTION



OBJECTIVE OF ICHARM

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.