Collecting, Sharing, Integrating and Disseminating Flood and Drought Data
- contributions from ICHARM and DIAS

Global Centre for Disaster Statistics Partnership Meeting
March 15, 2016, IRIDeS, Tohoku Univ. Sendai, Japan

Toshio Koike
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Director, International Centre for Water Hazard and Risk Management (ICHARM)
The world knows that countries cannot act in isolation to address these risks.

Concerted Action is Required

- **March 2015**: Sendai Framework on Disaster Risk Reduction
- **September 2015**: Sustainable Development Goals
- **December 2015**: Paris Agreement (COP 21)
International Symposium on Integrated Actions for Global Water and Environmental Sustainability

In line with the Commemoration of the 70th Anniversary of UNESCO

21-22 October 2015, Medan, Indonesia

International Flood Initiative (IFI) and International Drought Initiative (IDI)
Implementation Now! How to Address?

Learn from and support to national and local platforms to practice evidence-based flood and drought risk reduction.
- Considering how to share best practice eg. WWF Implementation Road Map.
- Monitoring
  - Activities, progress, achievements
- Data Collection & Sharing, Statistics
- Risk Monitoring
- Early Warning and Risk Assessment
- Financing mechanism
- Capacity Building

Mobilize existing networks of scientific and research institutions, at national, regional and international levels.
- Synthesis
- Advice to Stakeholders
- Communication and Engagement
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Second UN Special Thematic Session on Water and Disasters

9:30-17:50
Wednesday, November 18, 2015
The UN Headquarters, New York

Organizers
UN Secretary-General
coz-organized by
UN Secretary-Generals’
Special Envoy on Disaster Risk Reduction and Water
and High-level Experts and Leaders Panel on Water
and Disasters (HELP)

Science and Technology to Advance DRR on Water
Key Directions and Actions

Key Direction 1:
Improve data collection, sharing, integration and dissemination

Suggested Actions
• Support countries to collect damage data and maintain disaster statistics.
• Develop methodologies for measuring flood and drought risk and resilience based on improved understanding of disaster mechanisms and socio-economic characteristics.
• Enhance real-time data availability for early warning.
• Promote coordinated and sustained satellite observations: rainfall (PR), flooding area (SAR), drought index (MR)
• Enhance data integration and analysis capability.
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Key Directions and Actions

Key Direction 2:
**Advance inter-disciplinary and trans-disciplinary research on flood and drought risk reduction**

**Suggested Actions**

- Promote dialogue among stakeholders, share needs and co-design collaborative research plans.
- Enhance collaboration between natural science and socio-economic science communities by taking advantage of data integration and analysis infrastructure for assessing risk and resilience.
- Co-produce evidence-based actionable information and knowledge for reducing flood and drought risk and building resilience.
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Key Directions and Actions

Key Direction 3: Promote regional cooperation by mobilizing existing international initiatives for supporting local/national efforts.

Suggested Actions

• Promote dialogue among representatives of administrative, civil and scientific communities, UN agencies, regional development banks and private sectors.

• Develop regional cooperative frameworks on flood and drought and make implementation plans for demonstration and/or prototyping of regional flood and drought monitoring and early warning support system.

• Share good practices of evidence-based flood and drought risk reduction.
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Suggested Actions

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- Share good practices of evidence-based flood and drought risk reduction.
Asia Water Cycle Symposium (AWCS2016)
1-2 March 2016, Tokyo, Japan

161 participants from 20 countries and 4 UN organizations
Day 1: Tuesday 1 March 2016
09:30 – 10:00 Opening
10:20 – 12:20 Panel Debate: Flood and Drought in the Asia Pacific Region
13:30 – 18:00 Flood Session: “Towards IFI-AP and GEO Water”
   • AWCI member countries reports:
   • NARBO member reports:
   • Flood Early Warning System (Presentations):
   • Flood Disaster Risk Reduction (Panel Discussion)
   • IFI-AP: Deliberations towards the start-up action plan

Day 2: Wednesday 2 March 2016
09:00 – 10:00 Drought Session
10:00 – 12:20 Capacity Building Session
   • UNU Program
   • ICHARM Capacity Building Program
13:30 – 17:00 Panel Discussion: “Towards water disaster risk reduction in Asia and the Pacific Ocean region”
   • Part 1: Collection and statistics of water disaster data
   • Part 2: Inter-disciplinary and Trans-disciplinary cooperation
   • Part 3: Promotion of regional cooperation
17:00 – 17:30 Summary Discussion Session
17:30 – 17:40 Closing
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Data & Statistics

- Promoting data collection, storage, sharing, and statistics
- Integrating local data, satellite observations and model outputs
Risk Assessment

- Developing integrated disaster risk assessment
- Identifying locality and commonality

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25-Year Flood
Inundated area (˃0.5m depth) = 77,396 ha

50-Year Flood
Inundated area (˃0.5m depth) = 103,376 ha

100-Year Flood
Inundated area (˃0.5m depth) = 127,008 ha

Estimated damage:
- 25-Year Flood: 737.32 million Peso
- 50-Year Flood: 1327.55 million Peso
- 100-Year Flood: 1952.22 million Peso
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Risk Change Identification

- Monitoring and predicting changes in disaster risk
- Identifying locality and commonality

Numerical Weather Prediction

- Rainfall
- Hydrological Model
- Flood Prediction

Land Surface Scheme

- Atmos. Data Assimilation
- Land Data Assimilation
- Ground Water Monitoring

Vegetation

Soil Moisture

Drought (Hydrology, Agriculture) Monitoring & Prediction

Rain Gauge

Bias-Correction

GPM-Core

GSMaP

Rain Gauge

Bias-Correction

GPM-Core

GSMaP
Data & Statistics

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Support in Sound Policy-making

- Analyzing and formulating policies
- Visualizing values of preparedness and investment efficiency

Flood simulation

1. Develop flood models to reproduce actual flood damage.
2. Demonstrate counter measure effects for reducing damage.
3. Translate flood model outputs into economic model inputs.
4. Develop economic models to reproduce actual economic parameters.
5. Simulate effect of the counter measures on economy and society with several scenarios.

Economic simulation

(Dependency-based Macro scale Floodplain model, Yamazaki, 2012)

GDP comparison
- Low levee/No levee
- Middle levee/No levee

Gini coefficient reduction (%)
- LW and MD levee against NO levee

MD: more GDP growth
MD: increase equality
LW: less GDP growth
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Support in Community of Practice

• Improving disaster literacy
• Promoting co-design and co-implementation among stakeholders

Risk Change Identification

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DIAS: Structure

Challenges to 4V (veracity, variety, volume, velocity)

Extra-large volume data storage (25PB)

High Speed Network

Analysis Server

Base System

ICT Experts

Field Specialists

R&D Community

Data Archive

Application Development

Search / Download

ICT Experts

Climate

Health

Economy

Urban

Biodiversity

Agriculture

Disaster Risk Reduction

Water

Joint Research

Social Implementation

International Contribution

CMIPS

GRENE-ei

RECCA

Climate Change Adaptation

Hydroelectric power

DIAS/CEOS Water Portal

GEOSS/AWCI

GEOSS/AfWCCI

ASIAN Monsoon Year

Joint Research

S-8

DIAS-P

Climate Change Adaptation

ASIAN Monsoon Year

International Contribution

Field Specialists

Health

Economy

Urban

Biodiversity

Agriculture

Disaster Risk Reduction

Water

Joint Research

Social Implementation

International Contribution

ICT Experts

Field Specialists

R&D Community

Data Archive

Application Development

Search / Download

ICT Experts

Base System

High Speed Network

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Extra-large volume data storage (25PB)
Data Integration and Analysis System

a legacy for Japan's contributions to GEOSS

accelerating data **veracity**, including data loading, QC and metadata registration
Data Integration and Analysis System
a legacy for Japan's contributions to GEOSS

tackling a large increase in **variety** of the Earth observation data.
Improved performance of data quality check by the strong IT back-up

CEOP/AWCI/JICA

Number of data cleansing per person per day
Improved performance of data quality check by the strong IT back-up

CEOP/AWCI/JICA

Number of data cleansing per person per day

QCデータ数/(日・人)

Ver1.71
Ver2.00
Ver2.10
Ver2.30
Ver3.02(JICA)
Ver3.03(AWCI)
Ver3.03(JICA)

QC開始日

2002/9/1 2004/1/14 2005/5/28 2006/10/10 2008/2/22 2009/7/6
Data Integration and Analysis System
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tackling a large increase in volume of the Earth observation data.


600TB (2007)

2.7PB (2012)
Data Integration and Analysis System

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archiving, analyzing and disseminating data and information with high velocity.

X-band MP Radar

New Gestational Satellite