GEOSS-Asian Water Cycle Initiative (AWCI)

Flood WG

- Activity Report -

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Srikantha HERATH (UNU)

5th GEOSS-AP Symposium,
Tokyo, Japan, 3 April 2012

Asian Water Cycle Initiative

Major Activities of Flood WG

- Preparation of Generic template for demonstration projects in GEO on use of satellite information for flood risk Management (led by Prof. Herath)
- **Demonstration projects**
- Identification of member countries' needs and resources for capacity building → shifted to capacity building WG
- APN-ARCP "Flood Risk Management Demonstration Project under the Asian Water Cycle Initiative for the Global Earth Observation System of Systems (FRM/AWCI/GEOSS)" for 2008-2010 (two years).
  - To enhance demonstration projects through holding meetings (ICGs) and workshops (GFAS/IFAS Validation WS)
- Contributions to 4th APHW (Beijing) and GEOSS-AP activities (typhoon and cyclone session)
- Contributions to APWF's Steering Group for climate change adaptation strategy → climate change WG

Goal of APN-ARCP (Flood)

- To build up a scientific basis for sound decision-making and developing policy options for most suitable flood risk management for each country and region in Asia, through the full utilization of new opportunities on global, regional and in-situ dataset under the scheme of AWCI (contributing to GEOSS)

Objective of APN-ARCP (Flood, 2008-2010)

1. To convert observations and data, both through space borne platforms and data integration initiatives, to usable information for flood reduction
2. To improve quantitative forecasts for coupled precipitation - flood-forecasting systems
3. To facilitate flood risk assessment through the provision of scenarios and data for exposure estimation

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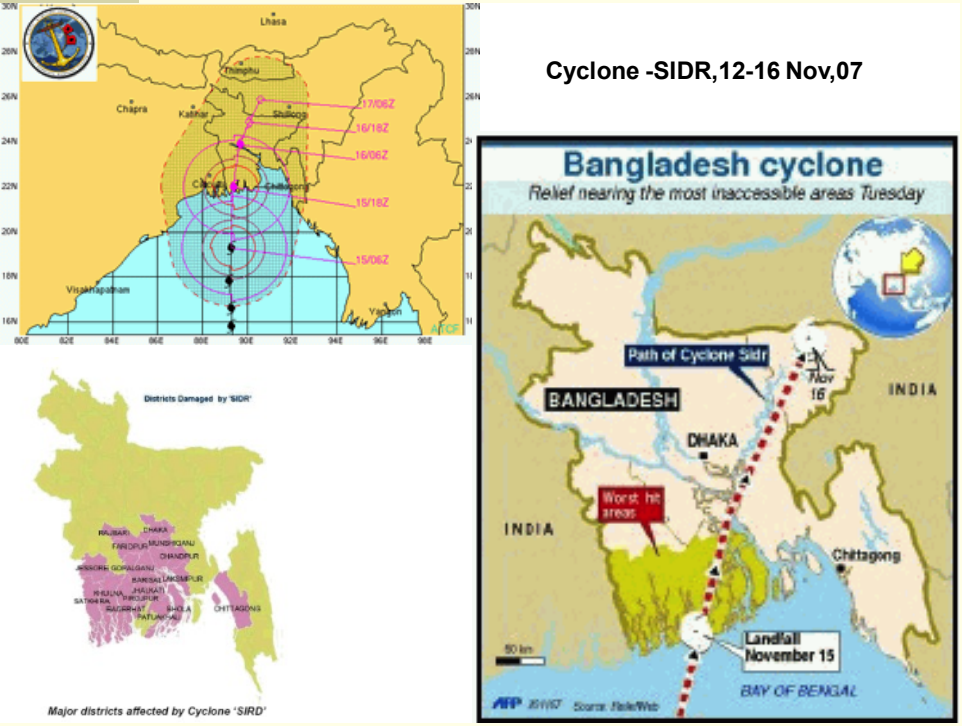
Some examples of demonstration projects related to Flood WG (1/4)



from Bangladesh

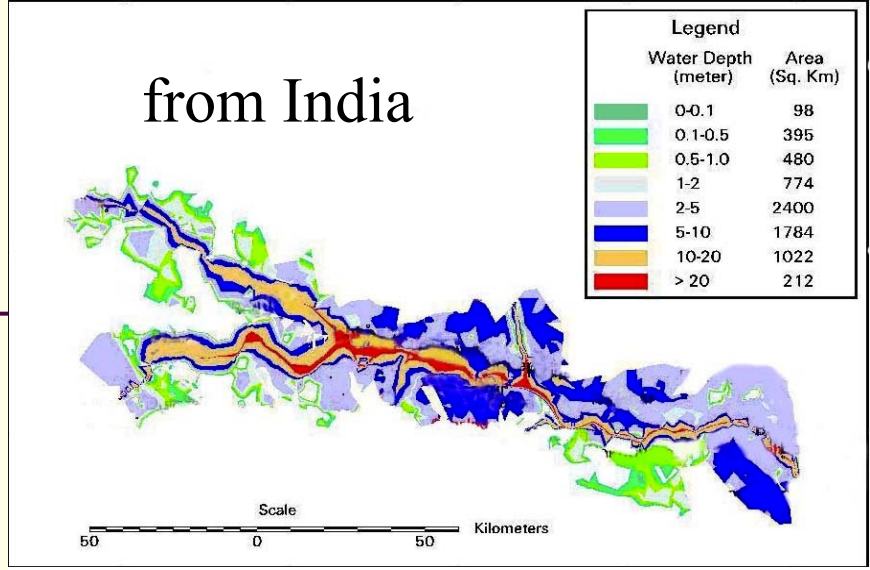
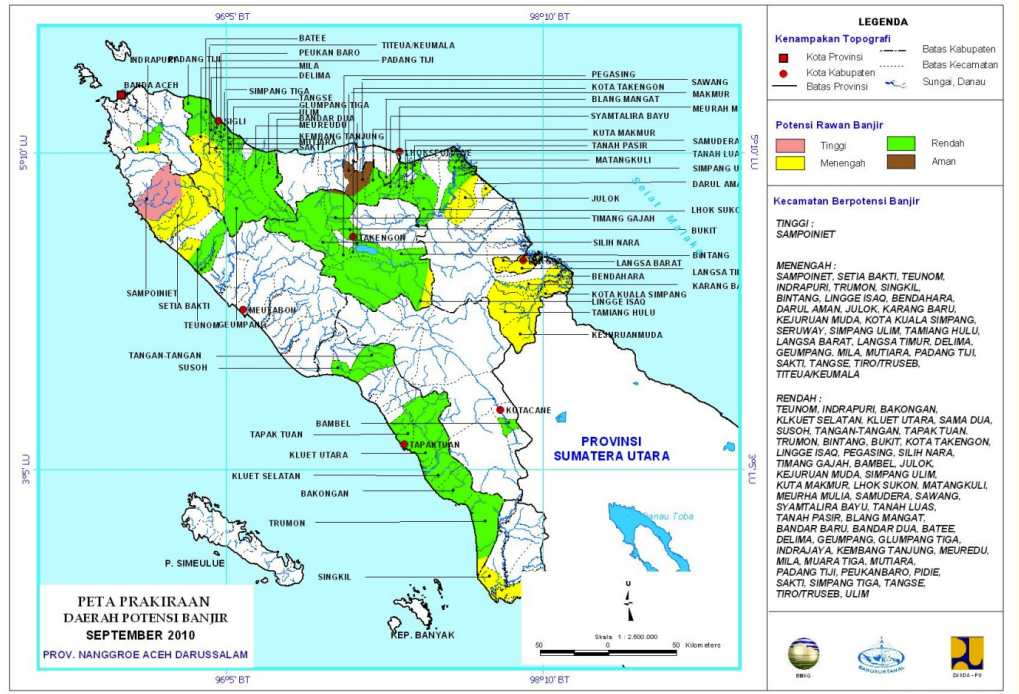


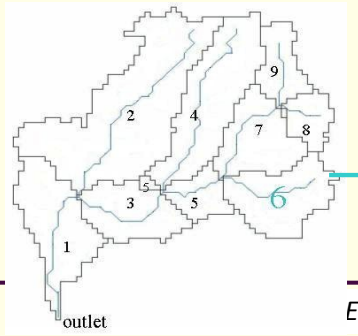
Fig.7 Example of flood inundation and depth mapping for 1000 year return period flood for the study area (Kumar, 2005)

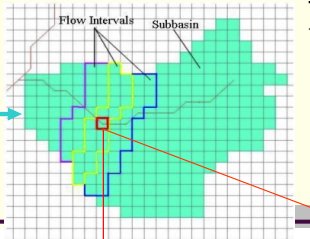


from Indonesia

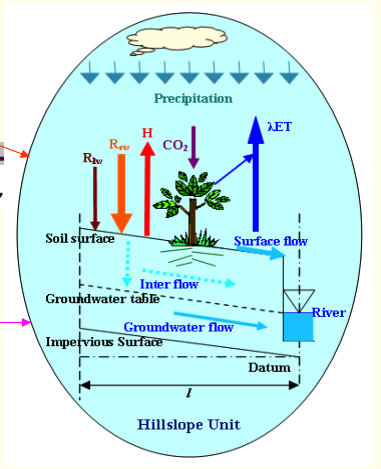
Some examples of demonstration projects related to Flood WG (2/4)

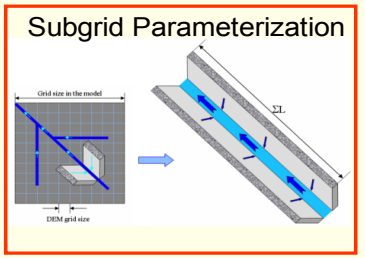
from UT, Japan

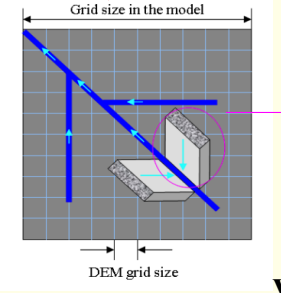




EB-DHM of UT (Saavedra et al.,







Wang, Koike et al., 2009

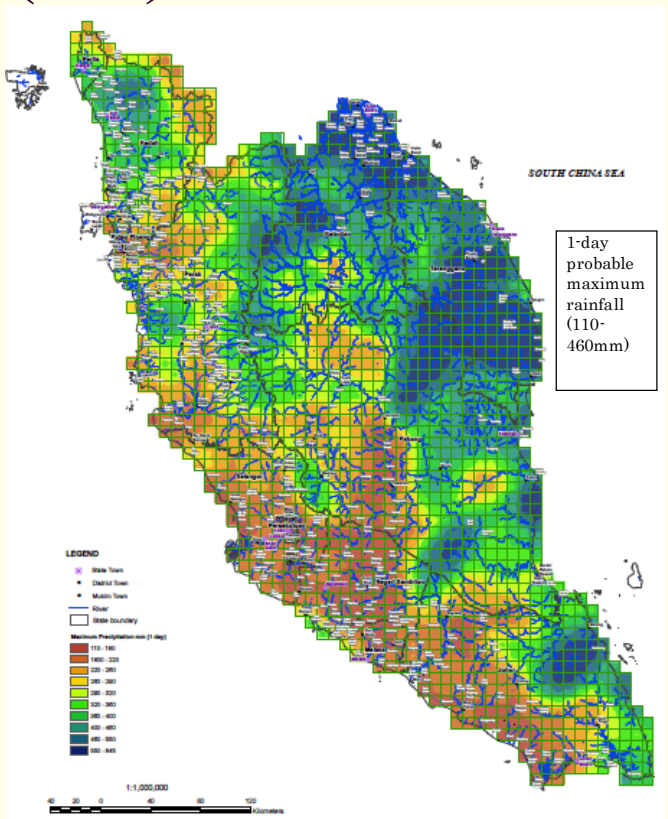
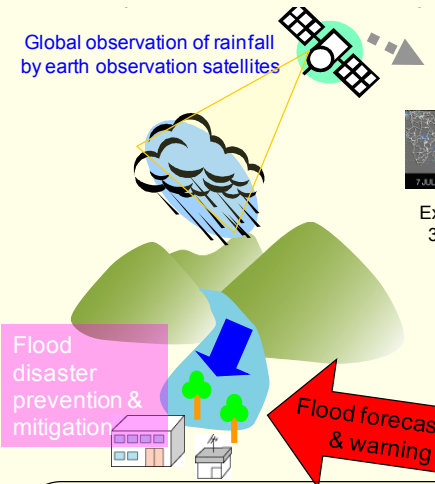


Fig.24 Maximum 1-day rainfall estimation over the peninsula of Malaysia in the future (2025-2034 & 2040-2050) (Amin, 2010)

from Malaysia



Current situation

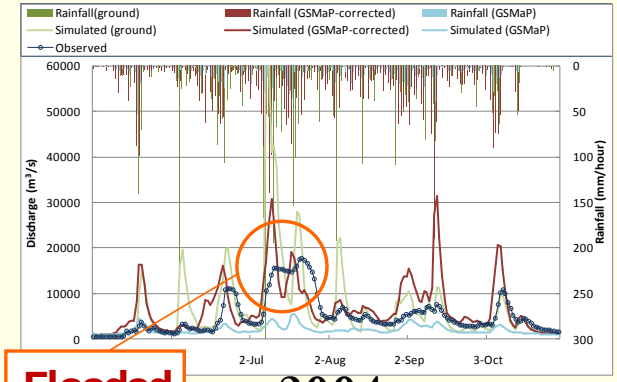
Despite of the needs for flood forecasting/warning,
No rainfall, GIS data, nor analytical tools
→ Required much money & time for implementation

After the application of IFAS:

Prompt & efficient implementation
No need to develop original core system
Step-by-step improvement of accuracy with hydrological observational network

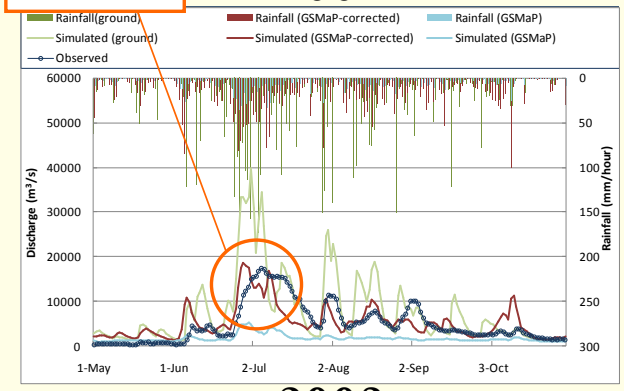
from ICHARM, Japan

Some examples of demonstration projects rela to Flood WG (3/4)



Flooded

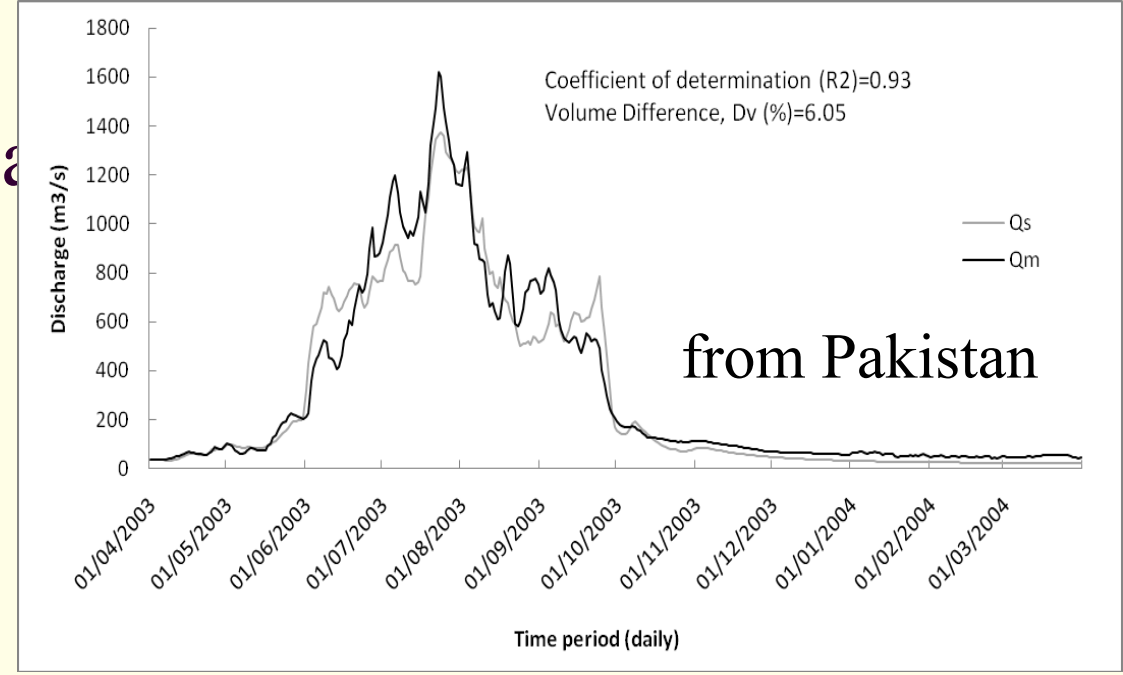
2004



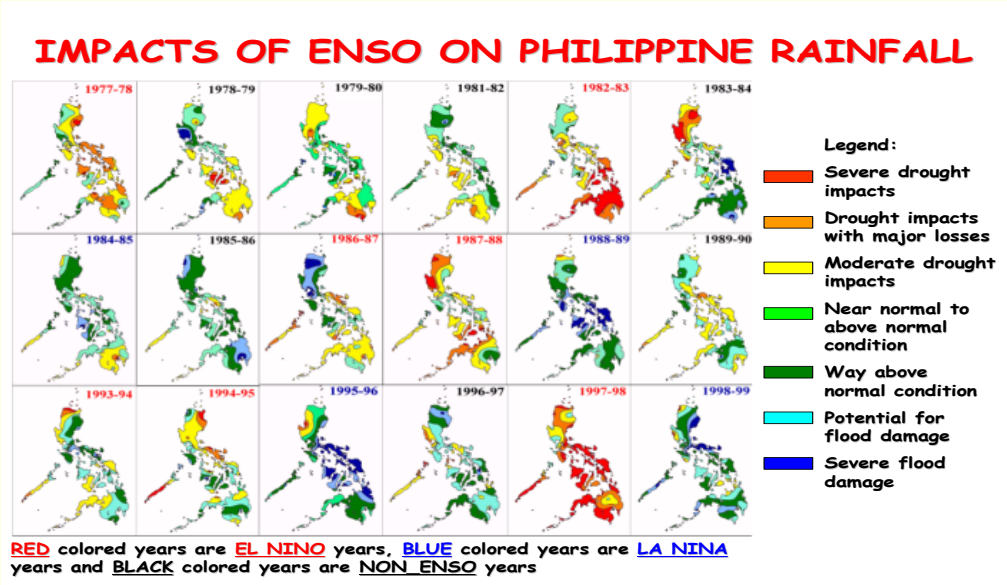
2003

Fig.29 Comparison of IFAS simulation for 2003 & 2004 using ground-based and satellite-based rainfall data with observed river flow (Htay Htay Than, 2009)

from Myanmar



from Pakistan

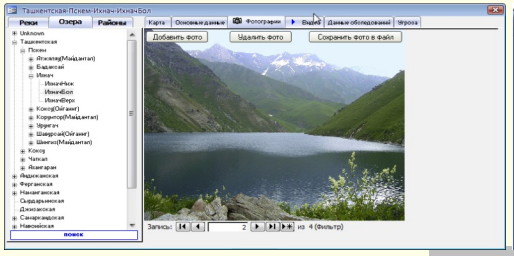


from Phillippines

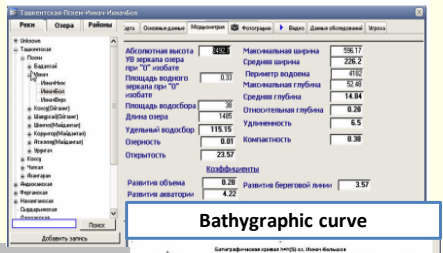
Fig.36 Interannual variation of hydrological impacts from 1977 to 1988 in the Philipines (Hilario, 2009)

Some examples of demonstration projects related to Flood WG (4/4)

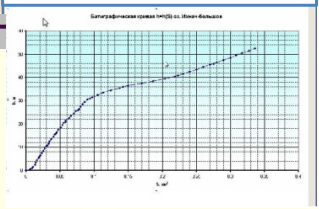
Pictures and video material



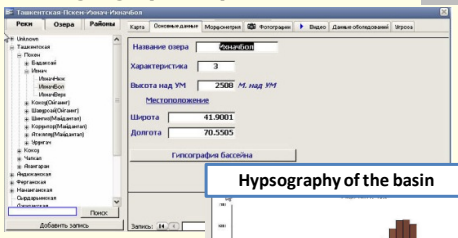
Morphometric characteristics of lake



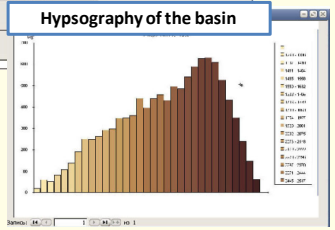
Bathygraphic curve



The geographical position of the lake



Hypsography of the basin



from Uzbekistan

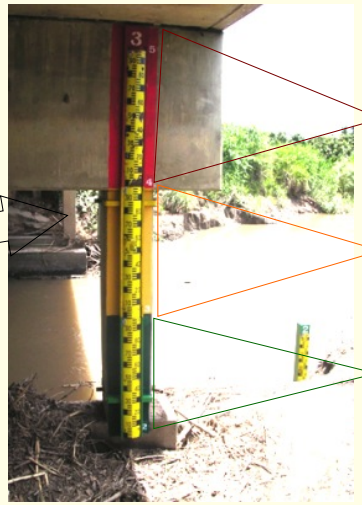
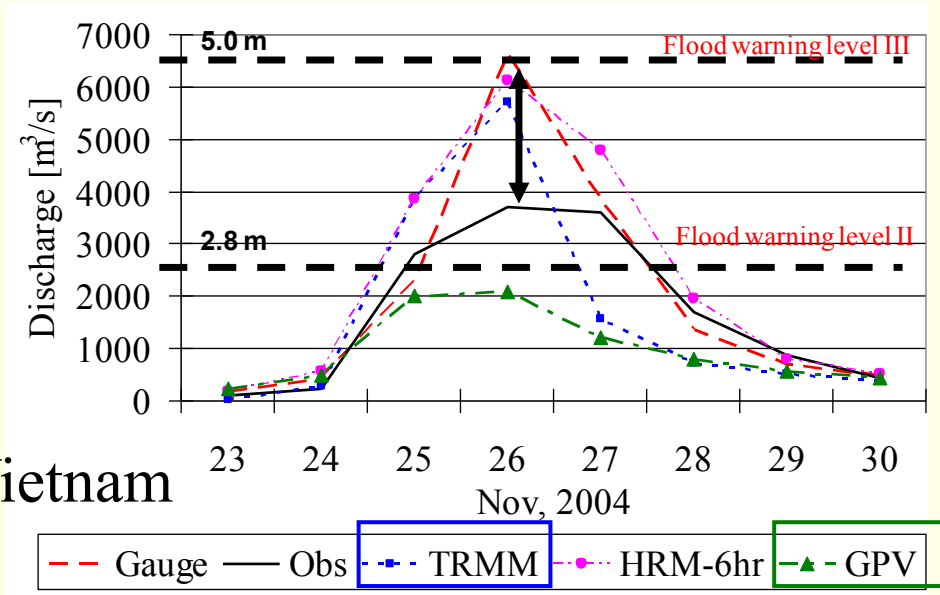


Fig.40 Colored staff gauge to easily identity flood risk (Thadu, 2009)

from Thailand

Fig.41 Flood information board for public

Fig.41 Flood information board for public



from Vietnam

Indonesian Seminar and Workshop on the Use of Satellite Base Information in Flood Risk Management (Jakarta & Bandung, July 2008)

From Dr. Loebis's presentation

Workshops for Validation & Application of Global Flood Alert System (GFAS) & IFAS

1) 3-8 October 2008, 2) 3-7 August 2009

Contents

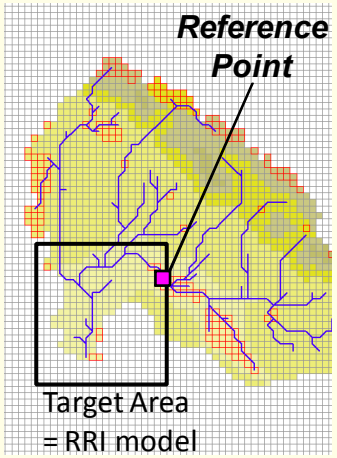
- The purposes is to build capacities in the countries to be able to undertake hydrological prediction/ forecasting in relatively ungauged catchments, to share local experiences and subjects, and to consider next actions

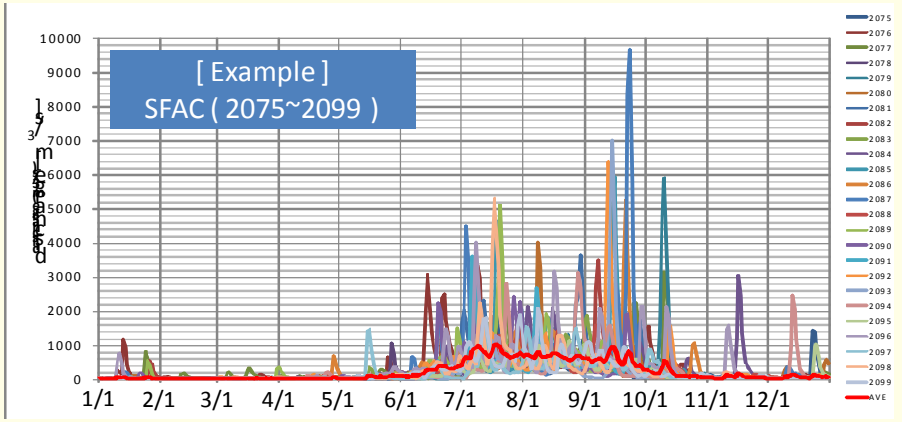
From

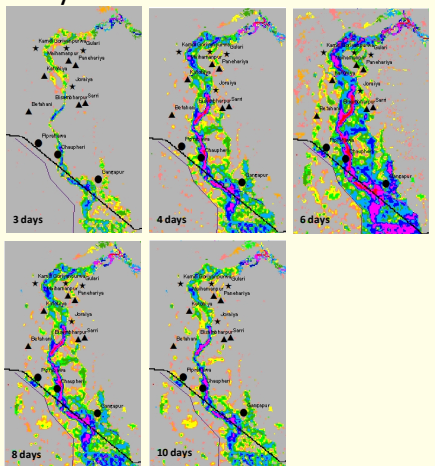
- 1) Ethiopia, Zambia, Cuba, Argentina, Bangladesh, Guatemala, Nepal (7countries)
- 2) Bangladesh, India, Indonesia, Lao PDR, Nepal & Vietnam (6 countries)

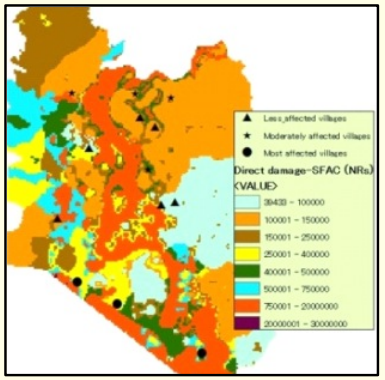
ICHARM-NDRI Workshop on Assessment of Flood and Inundations under the Effect of Climate Change in Lower West Rapti River Basin in Nepal

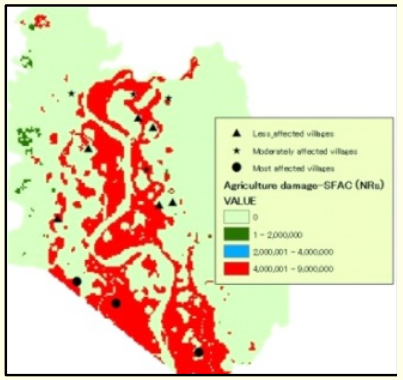
5 March, 2012
at The Himalayan Hotel, Kathmandu, Nepal











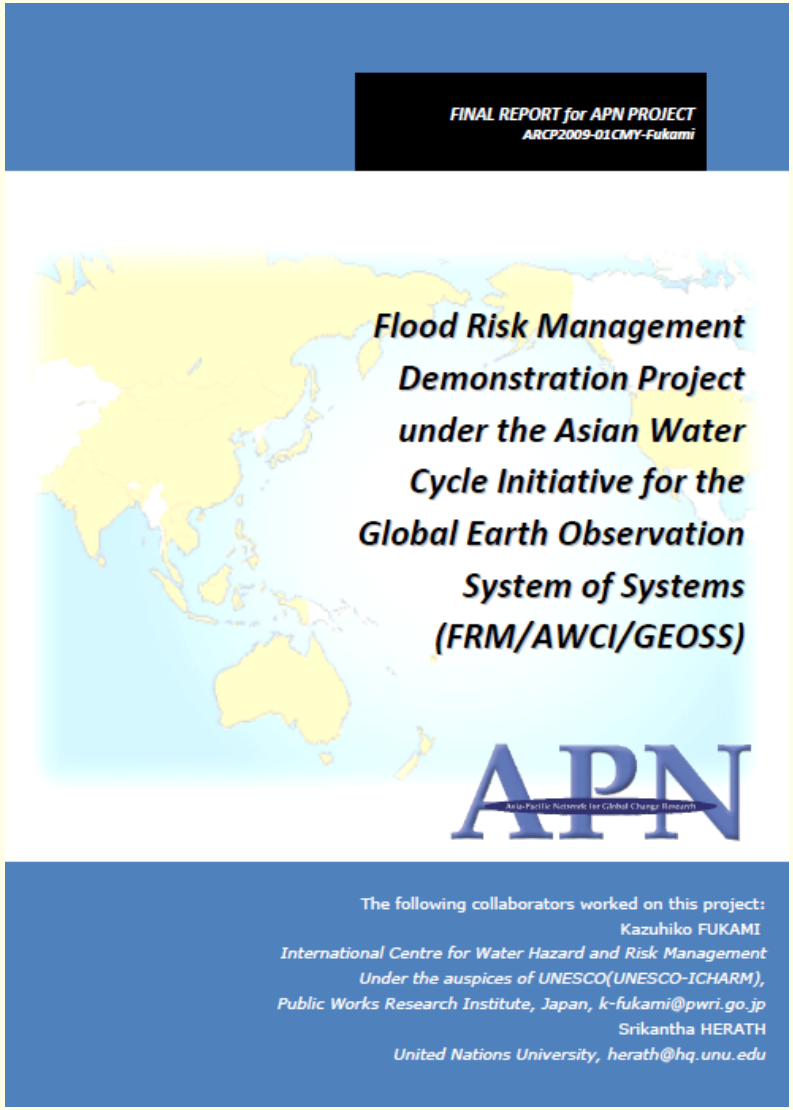
1) households 2) rice
Projection of future damage as of 2085

KAKUSHIN

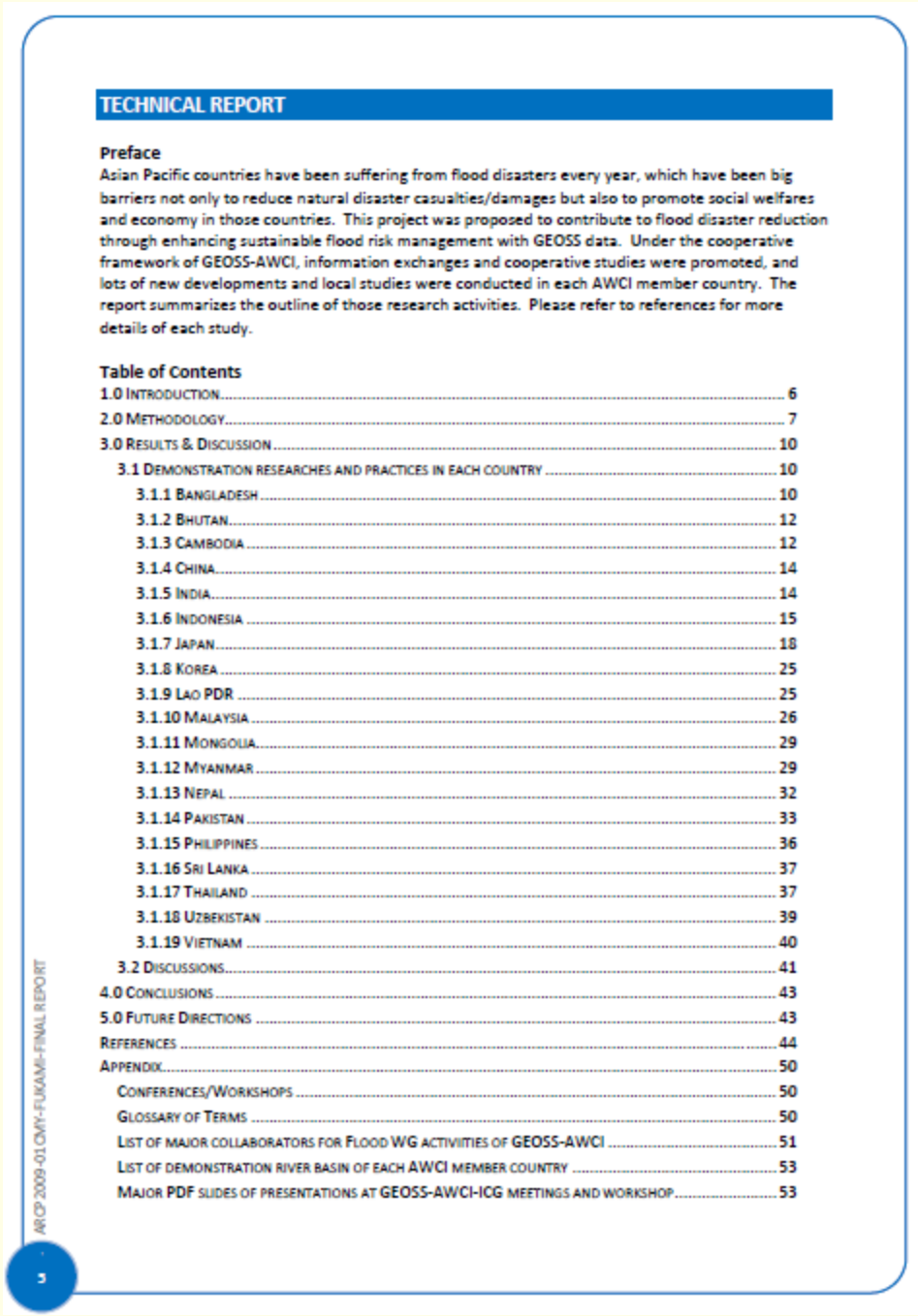
- ✓ MRI-AGCM3.1S&3.2S
- ✓ IFAS-PDHM(Ver.2)
- ✓ RRI (Rainfall-Runoff-Inundation Model

(MEXT)

Final Report for APN-ARCP (1st Year, FY2008-2009)



Feb. 2011



TECHNICAL REPORT

Preface

Asian Pacific countries have been suffering from flood disasters every year, which have been big barriers not only to reduce natural disaster casualties/damages but also to promote social welfares and economy in those countries. This project was proposed to contribute to flood disaster reduction through enhancing sustainable flood risk management with GEOSS data. Under the cooperative framework of GEOSS-AWCI, information exchanges and cooperative studies were promoted, and lots of new developments and local studies were conducted in each AWCI member country. The report summarizes the outline of those research activities. Please refer to references for more details of each study.

Table of Contents

Conclusions (from the APN-ARCP final report)

- As a result of 2 to 3 years' cooperative research activities among Flood WG of GEOSS-AWCI, there have emerged many promising technologies and practices for the future sustainable flood risk management.
- Typical examples of new technologies developed and/or validated through those activities are WEB-DHM, DRESS & FLOWSS of UT, IFAS of ICHARM, RegHCM-PM of NAHRIM, and so forth. Through our repetitive meetings, discussions and cooperative activities, advanced technologies and many other innovative practices have been shared among all the members of Flood WG of GEOSS-AWCI, which will be expected to lead to updating and enhancing a variety of science- & data-based foundations toward sound decision-making and developing policy options for effective flood disaster risk reduction in Asia.

2-year Project Proposal to 2011 Annual Regional Call for Research Proposal (ARCP)

Title of proposed project (TBD):

Study on Innovative Hydrometeorological Technologies and Societal Practices through Coupled Use of Global & In-Situ Earth Observational Data for Flood Risk Management in Asia

2-year Project Proposal to 2011 Annual Regional Call for Research Proposal (ARCP) , TBD

- Abstract:

Integrated Flood Risk Management is the key measure to reduce flood disasters in Asia where both flood hazard and vulnerability are high. By taking advantage of new capacities, resources and networks developed through the past ARCP2009-01CMY-Fukami, several selected innovative hydrometeorological monitoring and/or modelling technologies and societal practices for integrated flood risk management coupled with global/in-situ earth observational data will be tested in flood-prone areas of Asia under GEOSS/AWCI (Asian Water Cycle Initiative). **Their effectiveness in wide-range natural and societal conditions will be evaluated and capacity building tools will be developed for operational flood risk management** under climate-change impacts with raising public and stakeholders' awareness.

Proposed project methodologies (TBD):

1) To organize international coordination meetings as Flood WGs under the framework of GEOSS/AWCI and to decide multiple test sites for some selected innovative hydrometeorological monitoring and/or modelling technologies such as WEB-DHM (Water and Energy Budget-based Distributed Hydrological Model) and Flood Warning Support System (FLOWSS) developed by University of Tokyo (UT), Rainfall downscaling tool developed by United Nations University (UNU), Integrated Flood Analysis System (IFAS), etc. with self-corrected satellite-based rainfall developed by ICHARM, etc. and societal practices.
2) To organize such technologies' & practices' sharing workshops at selected "top-runner" sites.
3) To apply them in test sites with the involvement of the public & stakeholders.
4) To share their experiences and improvements through Flood-WGs.
5) To extract key findings, including organizational issues, and develop capacity building tools, for integrated flood risk management.

Your comments, opinions and contributions are very welcome!

Thank you for your understanding and cooperation to promote integrated flood risk management under GEOSS-AWCI-Flood WG, in advance!

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