Water (TG1)-Agriculture (TG5)-Droughts (TG6) Joint Session

1. Inputs from each Co-chair:
   1) Brief introduction to each TG
   2) Advantages and issues to be shared
   3) Expected cooperation:
2. Discussion towards coordination and integration:
   1) Mapping the advantages and issues
   2) Implementation design for cooperation

International Flood Initiative

http://www.ifi-home.info/

The International Flood Initiative (IFI) is a joint initiative in collaboration with such international organizations as UNESCO-IHP, WMO, UNDRR, UNU, ICLR, IAHS, and IAHR. The IFI secretariat is located in the International Centre for Water Hazard and Risk Management (ICHARM) in Japan.

IFI Partners

Contributions

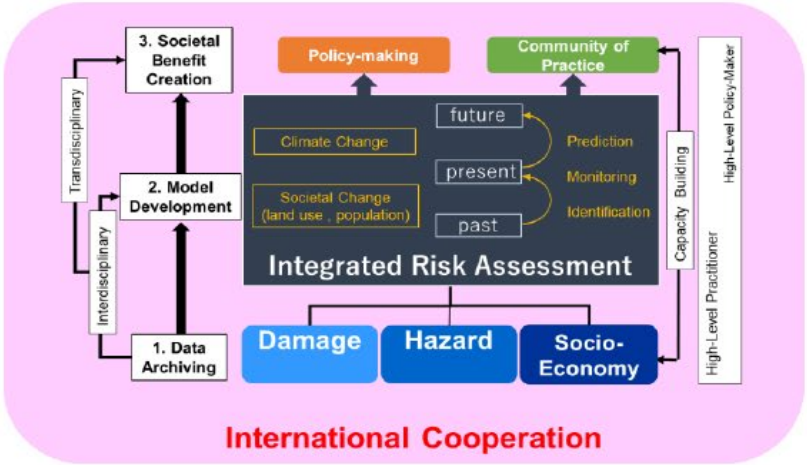
Sendai Framework for Disaster Risk Reduction 2015 - 2030

PARIS2015 COP21·CMP11

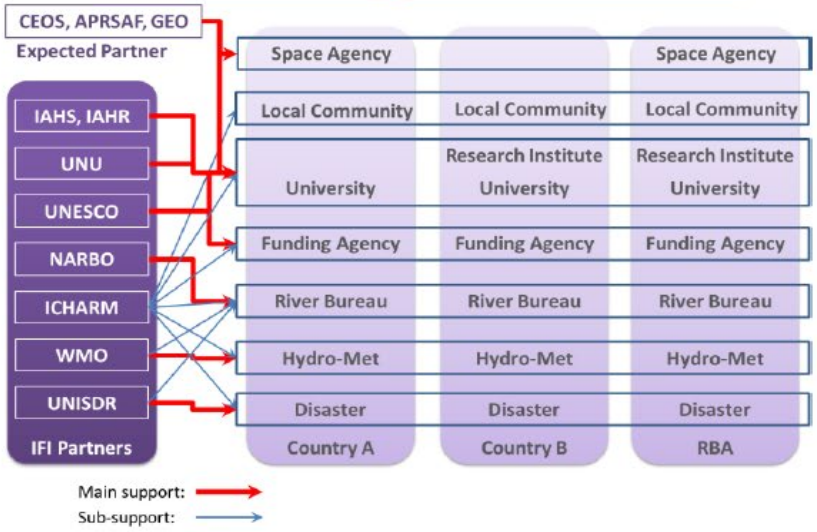
SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD

WATER ACTION DECADE 2018-2028

Concept of Platform on Water Resilience and Disasters

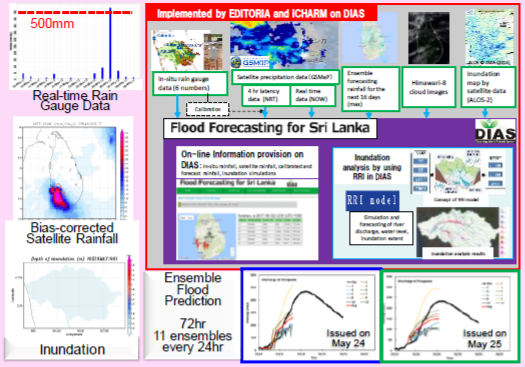


National and Regional Coordination

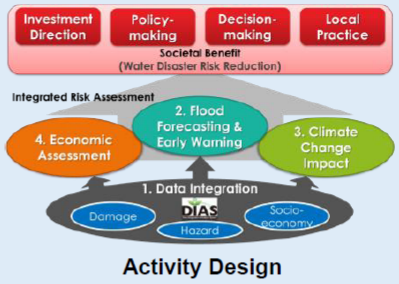


Sri Lanka

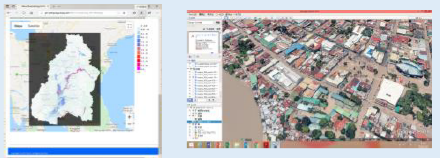
Training on CC and RRI model (August 2019)



Philippines



Activity Design

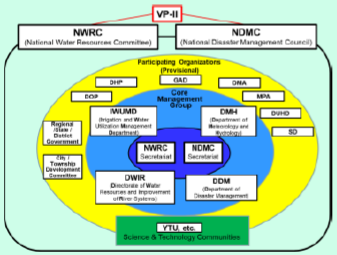


Dynamic Flood Early Warning System

Plenary Meeting (February 2019)

Myanmar

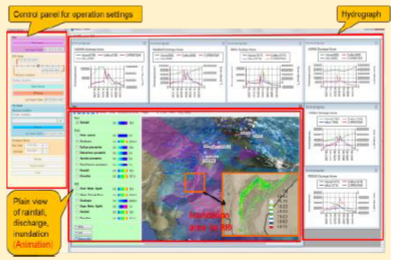
DIAS training participants (February 2019)



Institutional structure of Platform

Objective: To identify current and future disaster risks for preparation (e.g., early warning) and mitigation (e.g., contingency planning).
Target basins: Sittaung River and Bago River

Pakistan



"Strategic strengthening of Flood Warning and Management Capacity of Pakistan"
ICHARM contributed to the three components of the project
1. Development of a flood forecasting system covering a large part of the Indus River basin

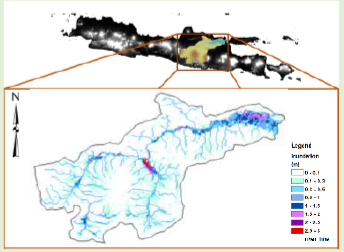
2. Floodplain and Hazard Mapping of lower Indus
3. Capacity building for Pakistan

Indonesia

Core group:
- Ministry of Public Works and Housing,
- Ministry of Environment and Forestry,
- National Agency for Disaster Countermeasure,
- Agency for Meteorology, Climatology and Geophysics

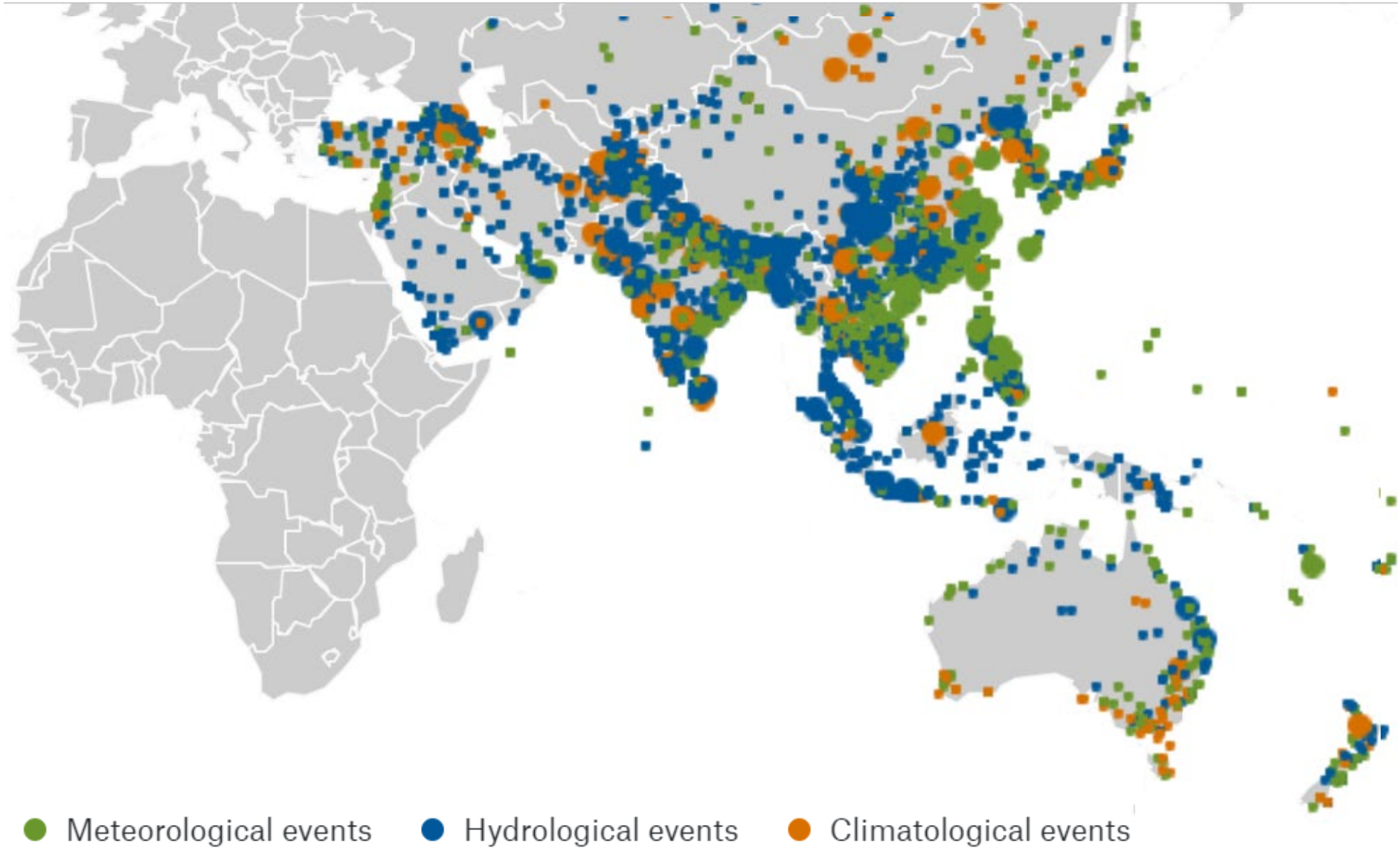
Pilot river basin: Bengawan Solo river

Platform Meeting (August 2019)



Inundation simulation

2000-2015


Meteorological events
Hydrological events
Climatological events

2000-2015

Percentage distribution for relevant weather-related loss events in Asia and Australia/Oceania 2000 – 2015

Number of events: **3,586**

- 35.2 %
- 55.3 %
- 9.5 %

Overall losses: **US$ 627 bn**

- 36.2 %
- 47 %
- 16.8 %

Fatalities: **267,376**

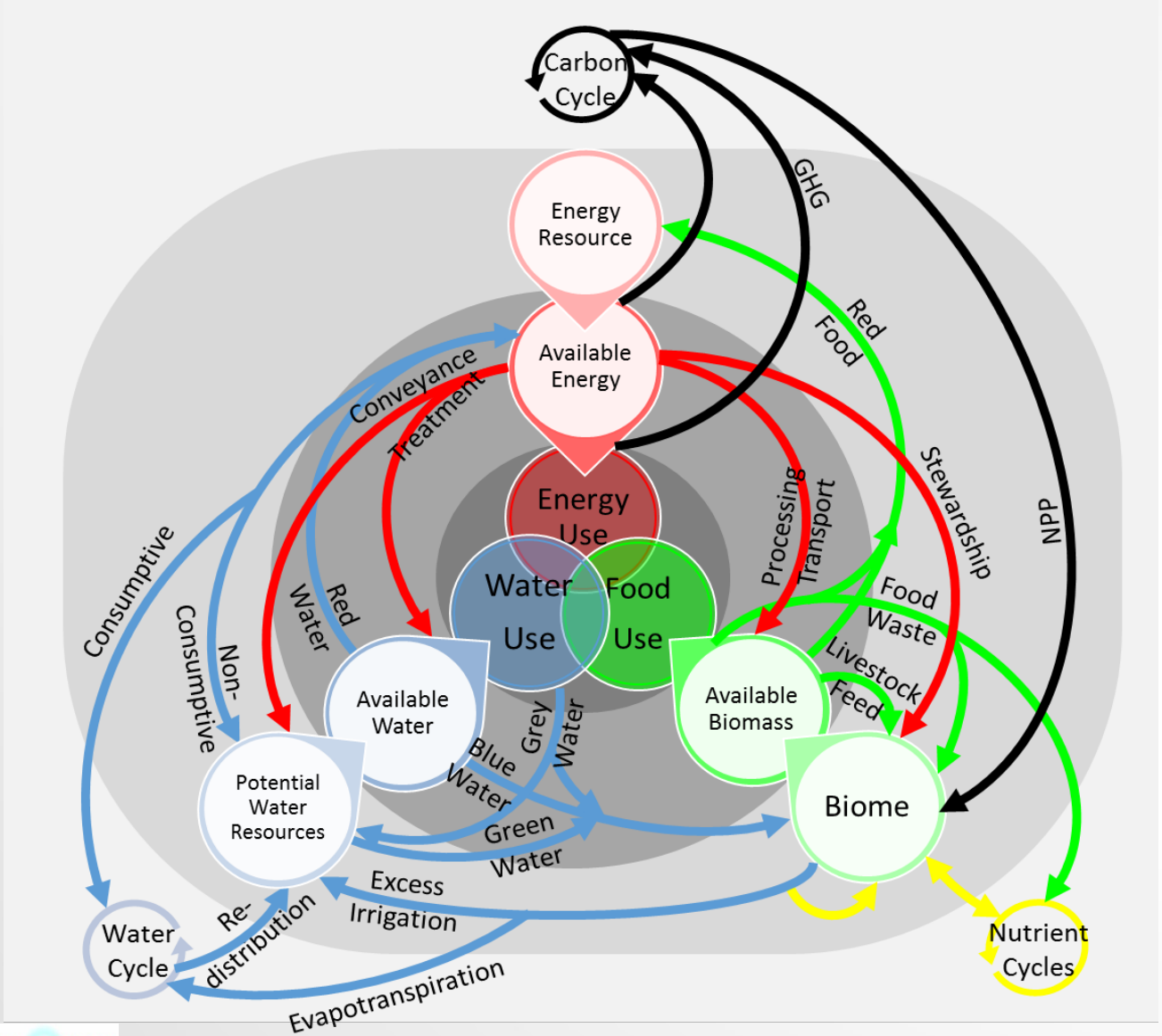
- 65.9 %
- 27.4 %
- 6.7 %

Insured losses: **US$ 77bn**

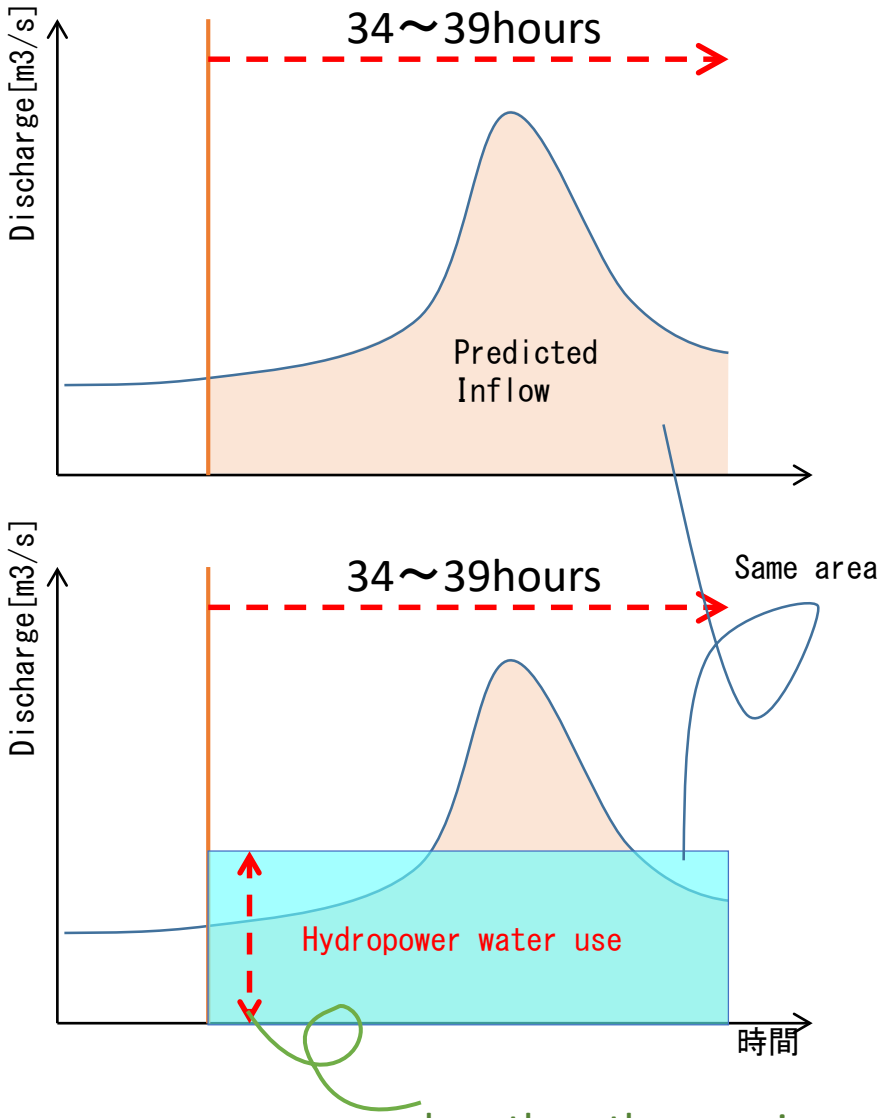
- 50.4 %
- 37.9 %
- 11.7 %

Meteorological events Hydrological events Climatological events

Water –Energy-Food Nexus

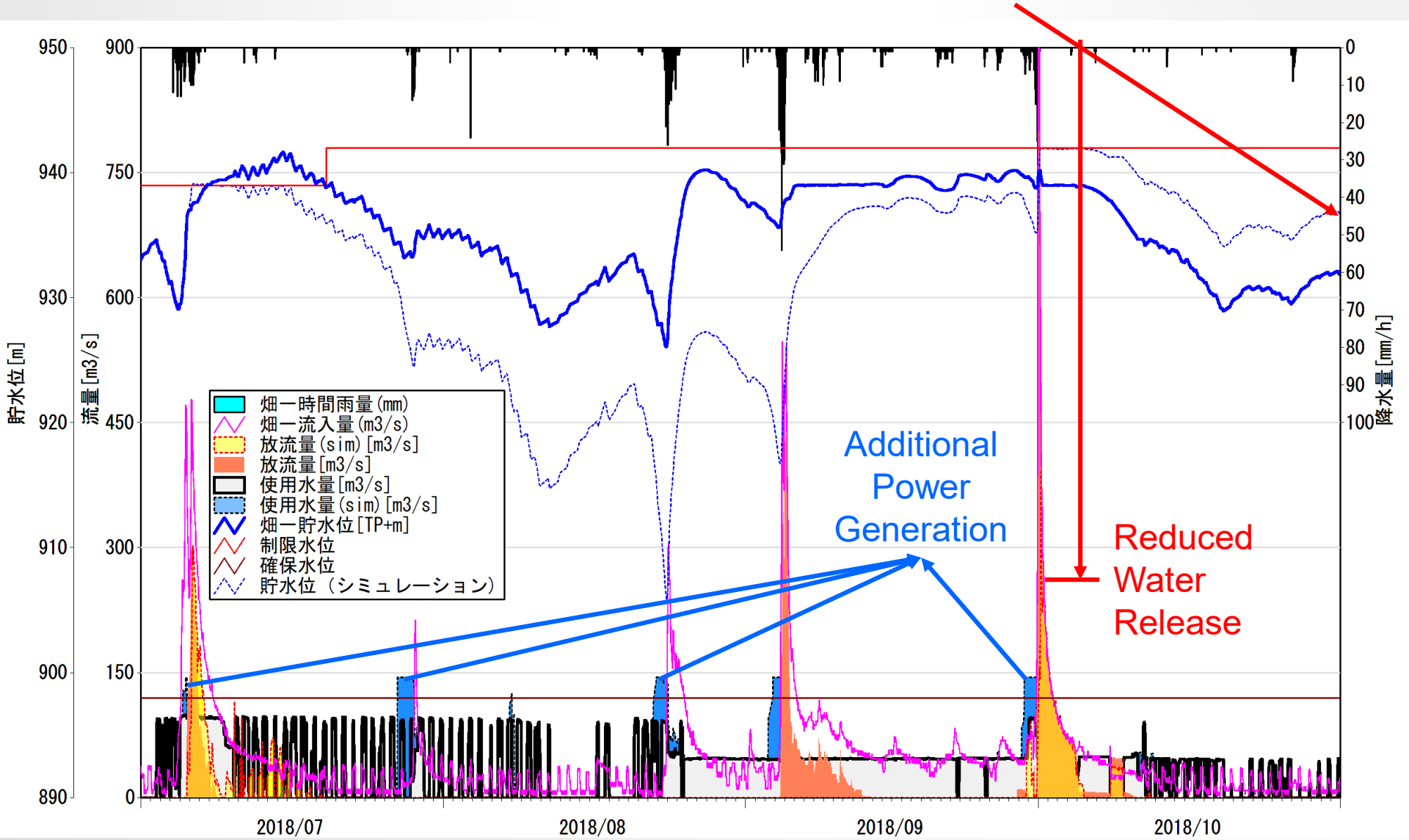


Hydropower Operation Optimization based on Ensemble Inflow Prediction



less than the maximum power generation capacity

Increase of power generation by 16% Higher water level at the end of flood season



Integrated Hydrological Modeling and Seasonal Prediction

United Nations Educational, Scientific and Cultural Organization

International Centre for Water Hazard and Risk Management under the auspices of UNESCO

ICHARM: Delivering best available knowledge to local practices

WATER-AGRICULTURE-DROUGHTS JOINT SESSION - AOGEO-2019

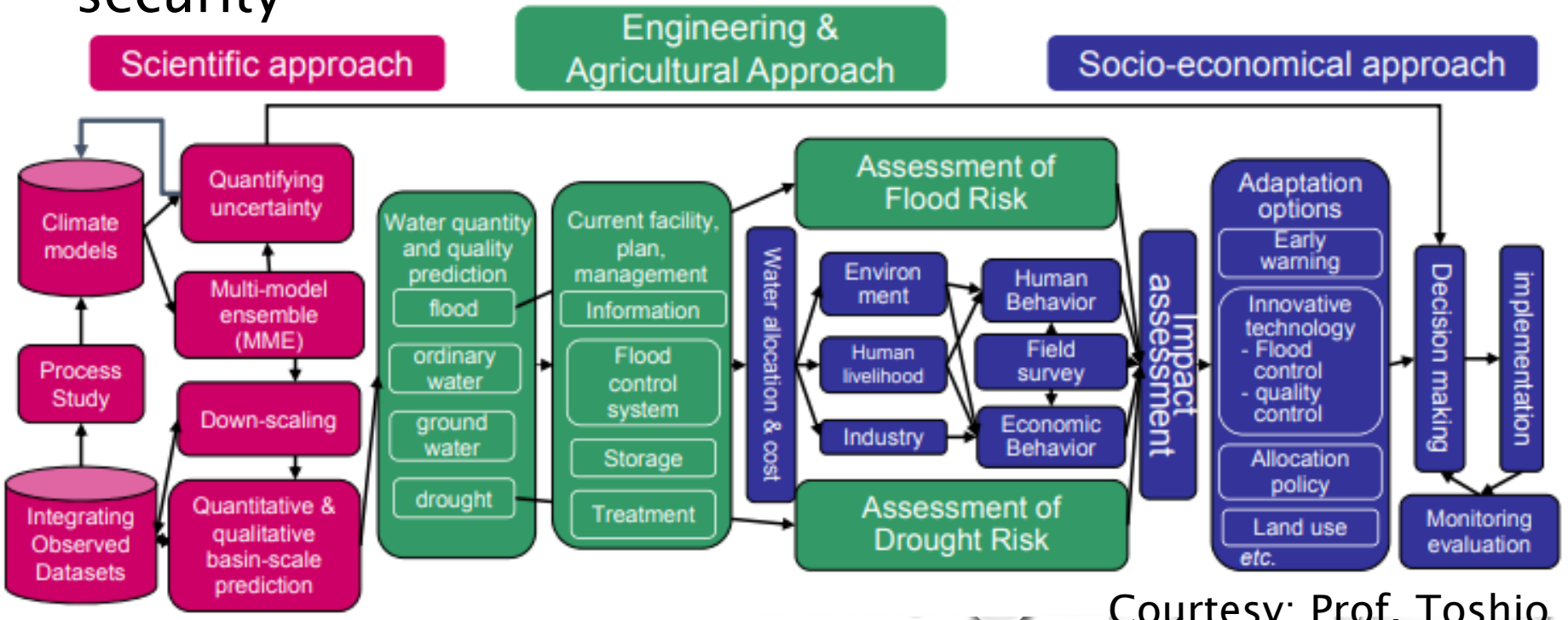
A Seamless Modeling Approach for effective Climate Change Adaptation planning

Dr. Mohamed Rasmy
Senior Researcher,
ICHARM/PWRI
Associate Professor, GRIPS

Adaptation

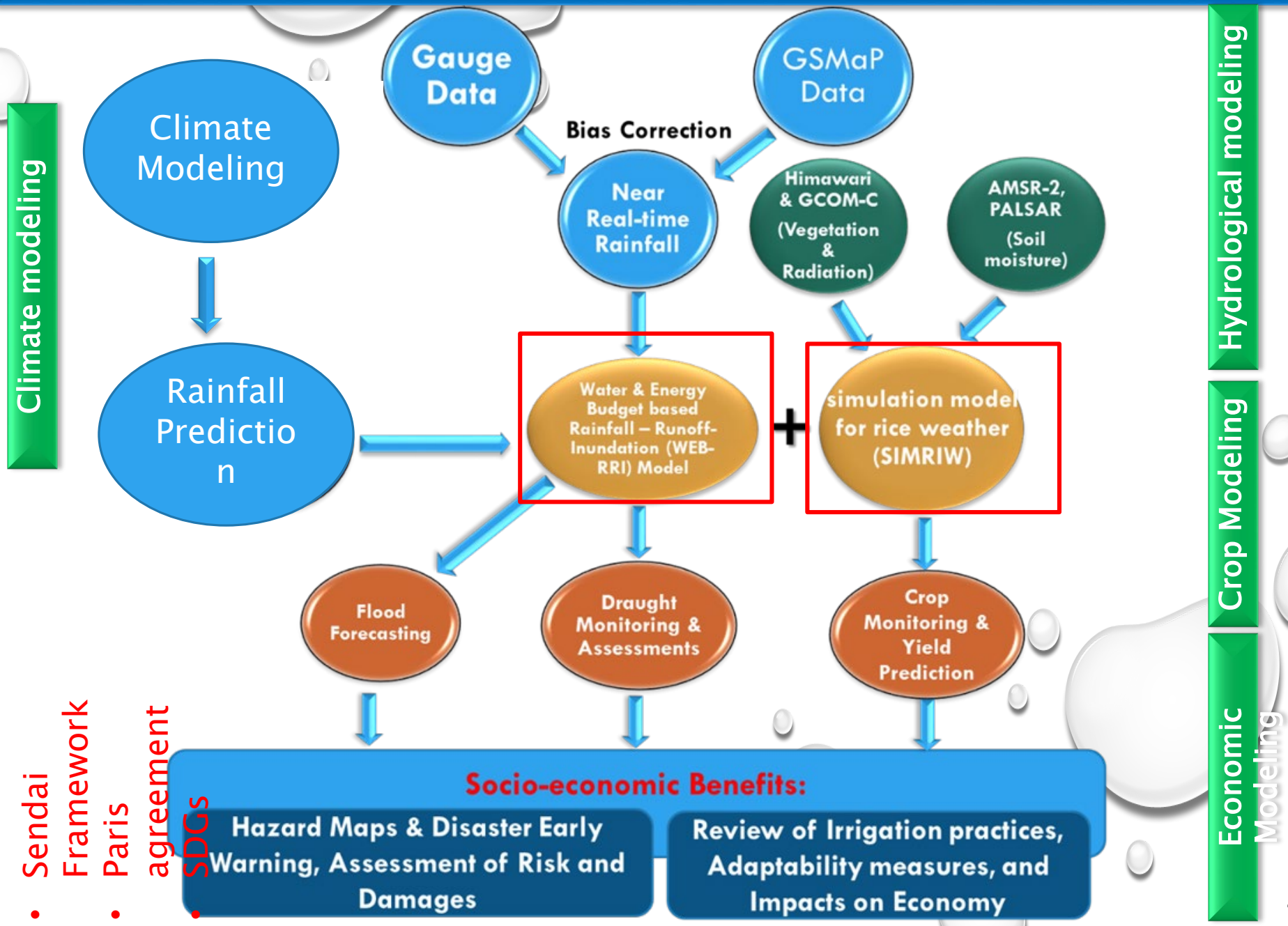
- Climate change (CC) is a massive threat to sustainable development

- Reliable assessments of CC impacts very essential to draw efficient adaptation strategies for effective water resources management and thus ensuring food security



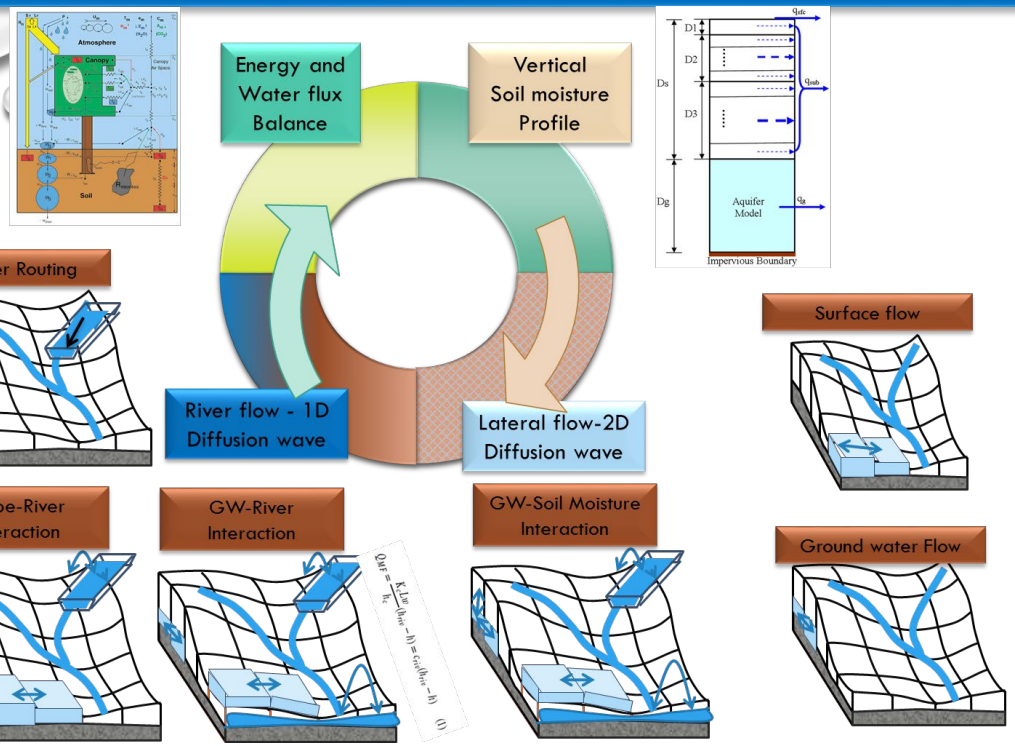
Courtesy: Prof. Toshio Koike

climate



- Sendai Framework
- Paris agreement
- SDGs

Hydrological Modeling for A Seamless Approach

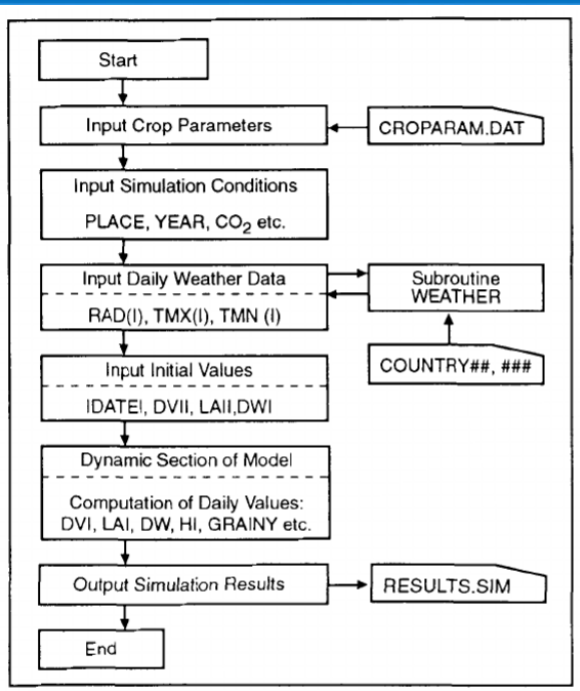


Water and Energy budget Rainfall-Runoff-Inundation (WEB-RRI) Model

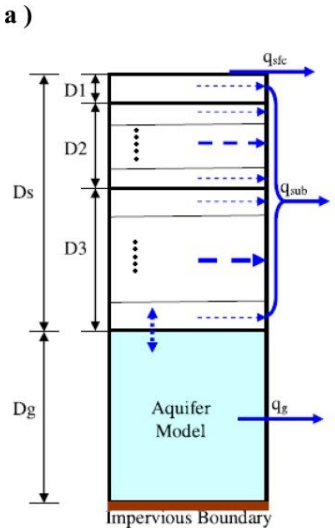
Rasmy et al., 2019: Journal of Hydrology

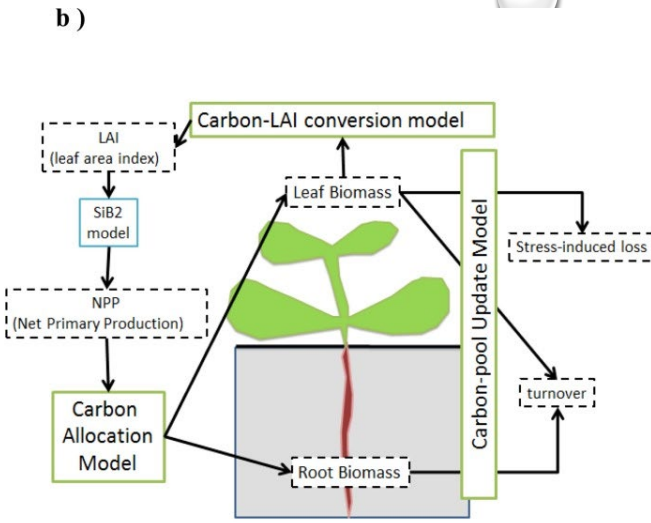
- Physical formulations for ET, and soil moisture → improve reliability of flood and drought
- Reliable responses to the water cycle variability as well as climate change scenarios → Assessment of hydrological extremes with a great confidence
- Complete consideration of hydrological cycle with restarting function → enable reliable real-time applications such as flood forecasting

Rice & Eco-Hydro Modelings



4.7. Flow chart of the SIMRIW program.





Simulation Model for Rice-Weather Relations (SIMRIW) model developed by Prof. Horie (1987)

SIMRIW predicts the potential yield that can be expected from a given cultivar under a given climate

Eco-hydrological Model with and vegetation dynamics by Sawada et al., 2014

The model solve water-vegetation interactions and contribute to an understanding ecosystem responses to hydrological extremes.

Climate Change Impact Assessments on Agriculture and Ecosystem

Daily ground rainfall data

MODIS 8-daily LAI & FPAR data

Meteorological forcing data (JRA-55)

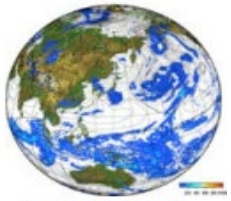
DEM, soil, and land-use data

Irrigation Practices

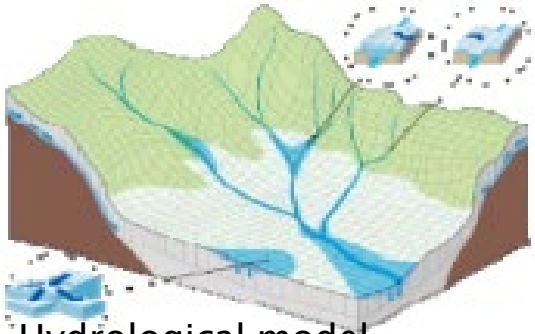
Rice Type

CMIP-5 Climate Projection Data

Past-Climate Data (Observation)

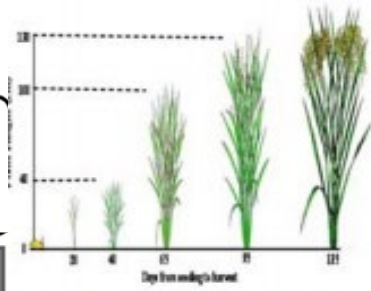


Climate Model



Hydrological model

WEB-RRI Model Coupled with SIMRIW & Eco-Hydo Models

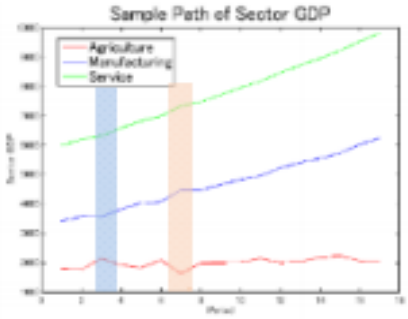


Agricultural model

Simulated Rice Production for floods, drought. Climatology Change

Water Allocation Scenarios

Scenarios for Crop type/calendar



Socio-economic model

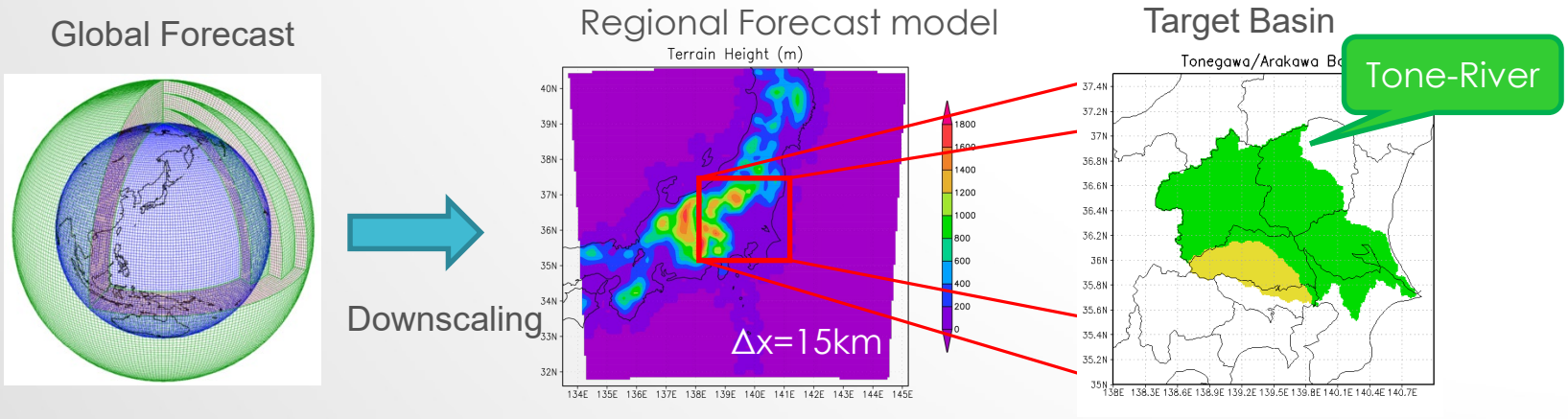
Climate Change & Adaptability Impacts on Economy

ONE MONTH LONG PREDICTION OF RAINFALL/TEMPERATURE IN TONE-RIVER BASIN

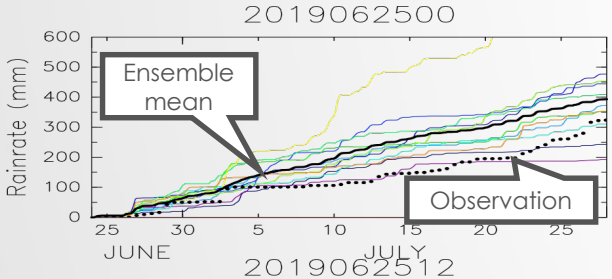
Tomoki Ushiyama
Research Specialist
International Centre for Water Hazard and Risk Management (ICHARM)
under the auspices of UNESCO, Public Works Research Institute (PWRI)

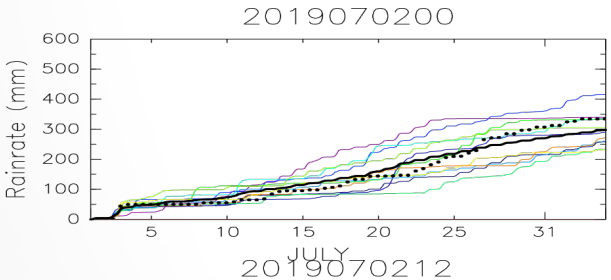
ONE MONTH LONG PREDICTION OF RAINFALL IN TONE-RIVER BASIN

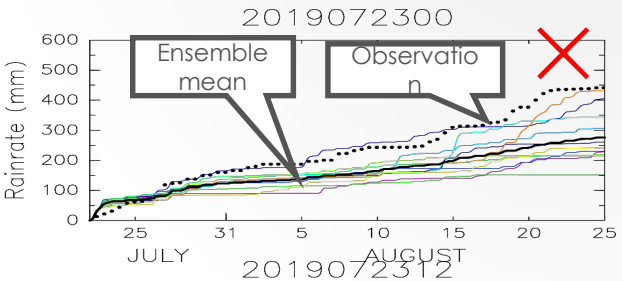
- For water resource risk management in Tokyo area, Tone River basin rainfall is quite important.
- We evaluated one month prediction of rainfall/temperature provided from Japan Meteorological Agency (JMA).
- We further downscaled the global forecasts into 15km resolution by using WRF model.

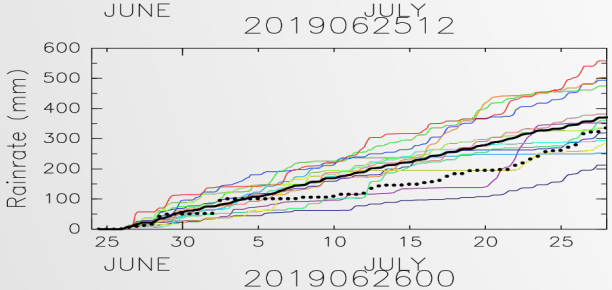


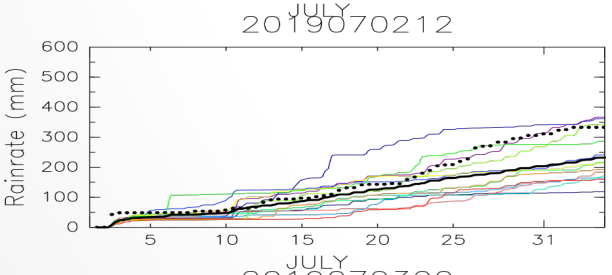
ACCUMULATED RAINFALL

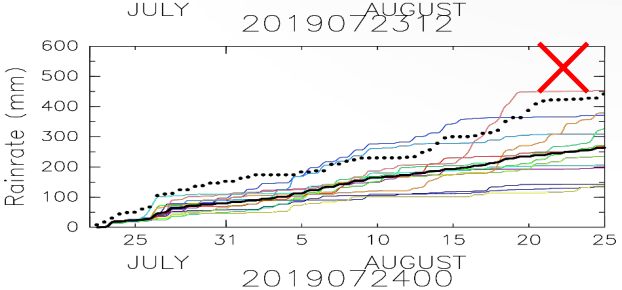


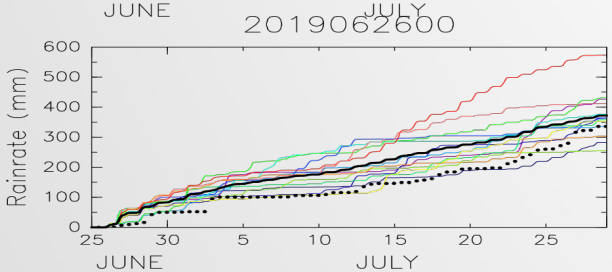


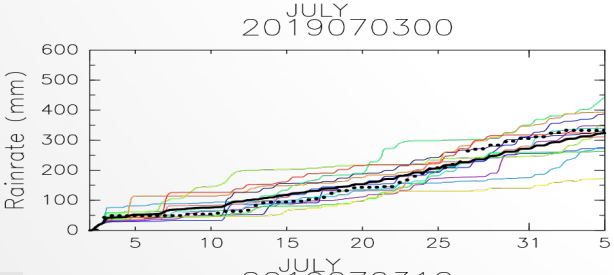


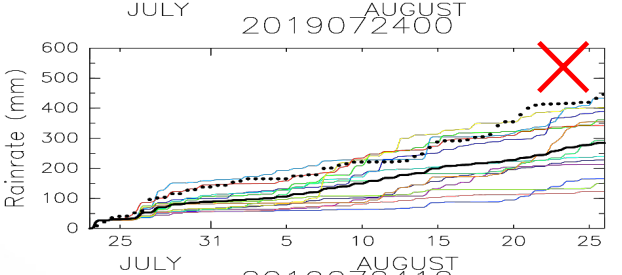


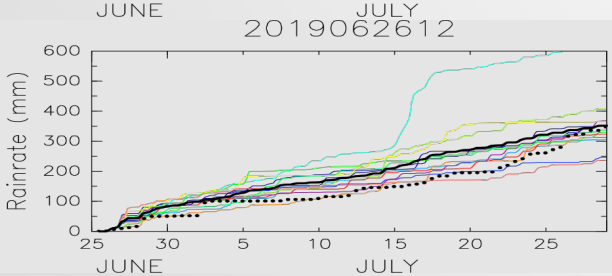


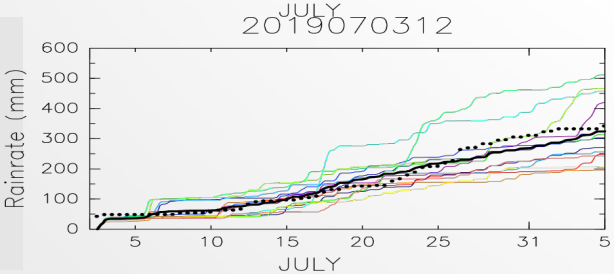


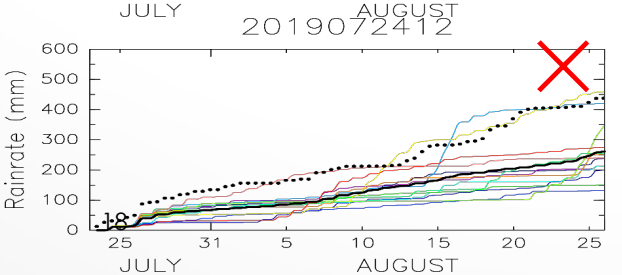










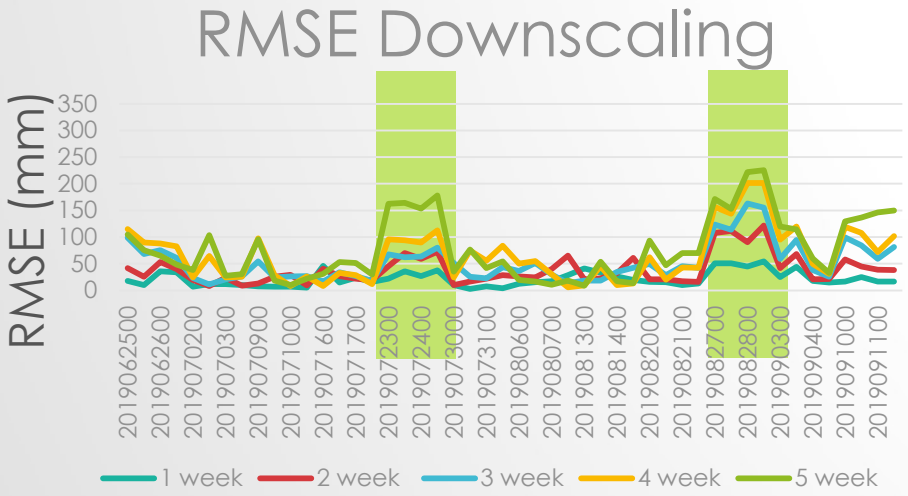


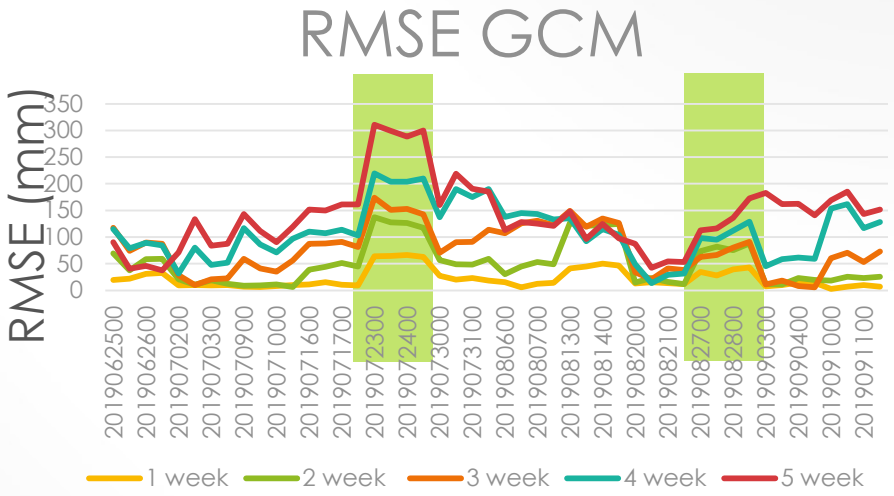
AO GEO
Earth Observations for Asia-Oceania

GEO GLOWS

AWCI
Asian Water Cycle Initiative

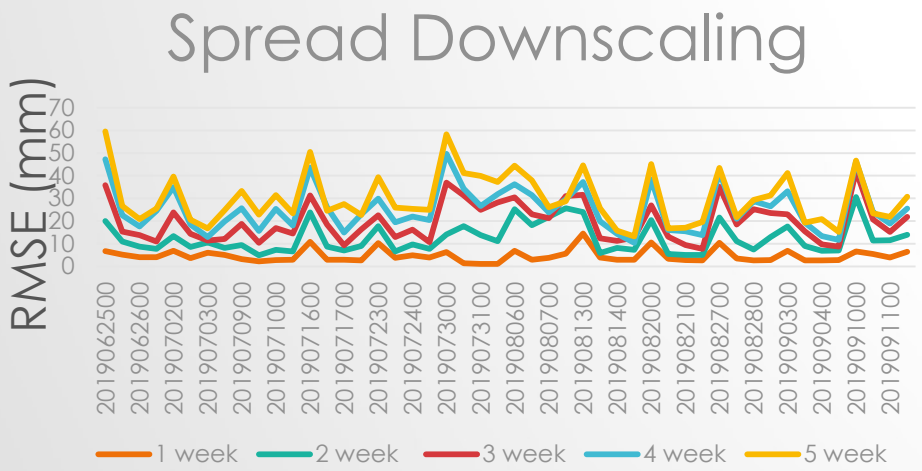
RMSE FOR ACCUMULATED RAINFALL

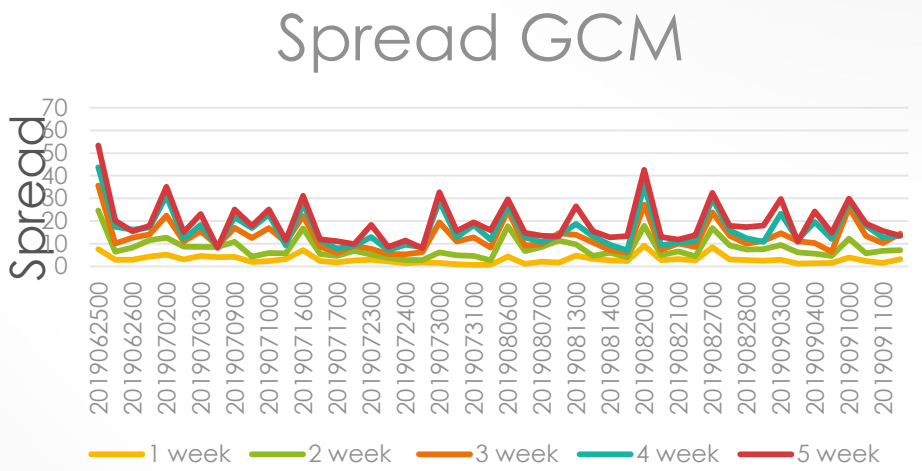




- Downscaled rainfall (left) is mostly better than GCM original (right).
- There are periods of bad accuracy (23, 24 July, 27,28Aug.)

ENSEMBLE SPREAD FOR ACCUMULATED RAINFALL





- Ensemble spread is larger in downscaled rainfall (left) than GCM original (right). (Wider probability of uncertainties)