

The Second Global Summit of Research Institutes for Disaster Risk Reduction :

Development of a Research Road Map for the Next Decade

Organizer: Kyoto University
Co-Organizer:
Disaster Prevention Research Institute,
Kyoto University
Natural Disaster Research Council, Japan



International Study for Disaster Risk Reduction and Resilience

-towards integrating disaster risk reduction and sustainable development-

Toshio Koike

Professor, The University of Tokyo

Director, International Centre for Water Hazard and Risk Management (ICHARM)

Sustainable
Development

Management of Disaster & Environmental Risks

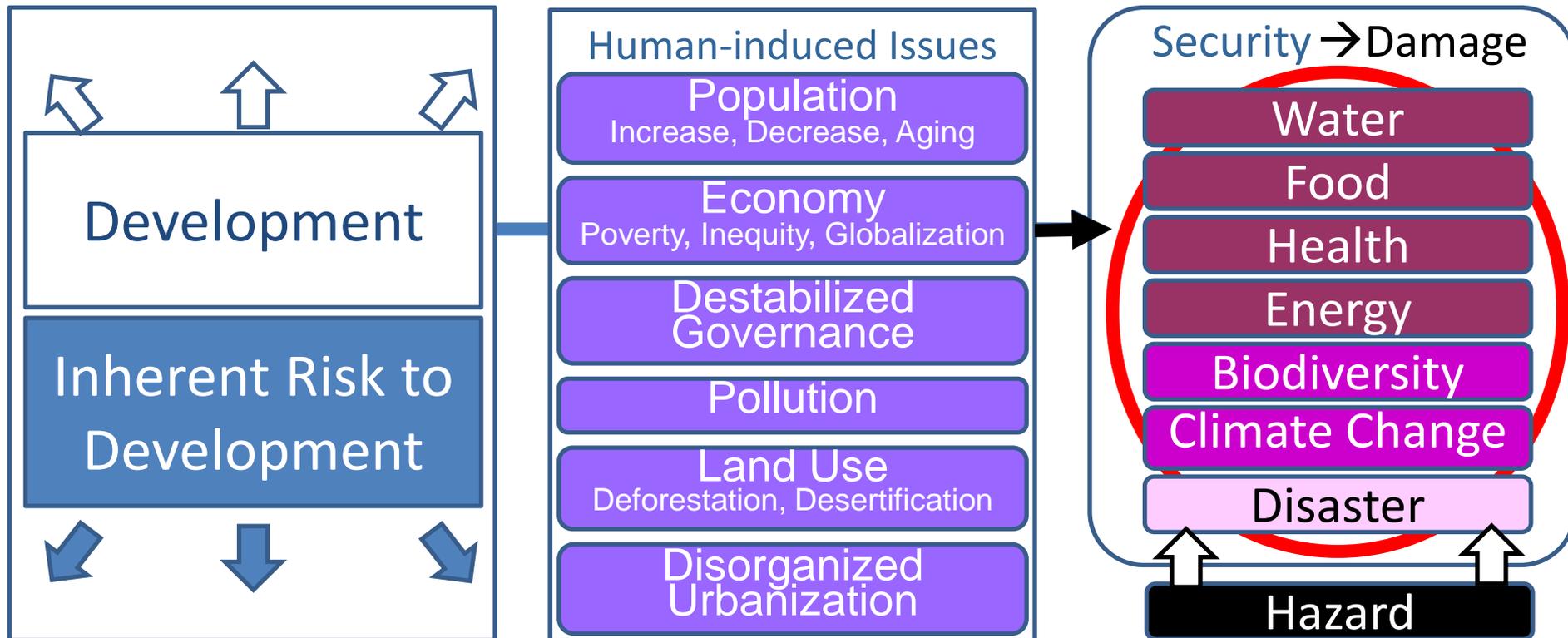
Preventing
Future Risk

Reducing
Current Risk

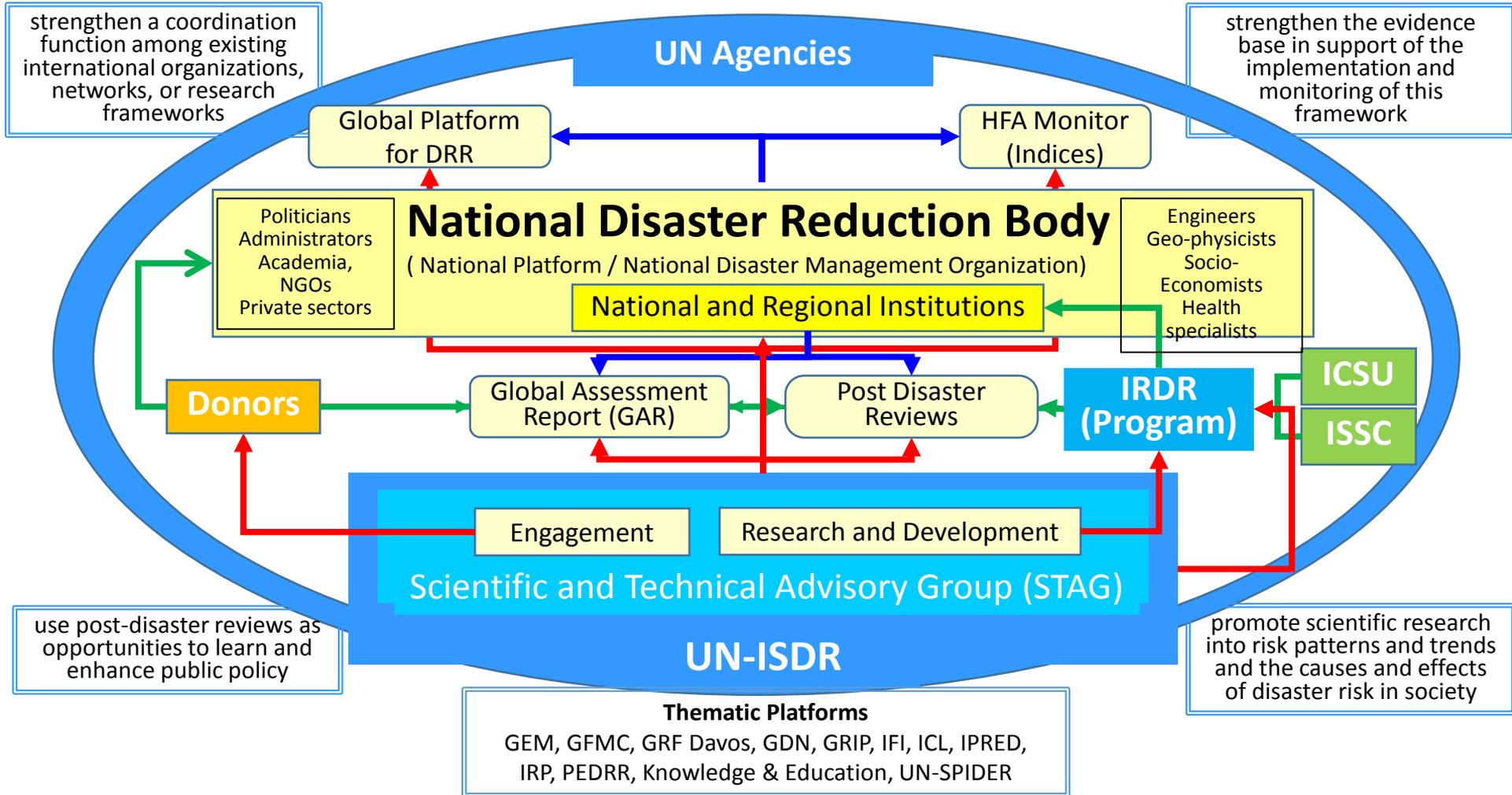
Building
Resilience

Science and Technology

inter-disciplinary & trans-disciplinary



inter-disciplinary & trans-disciplinary



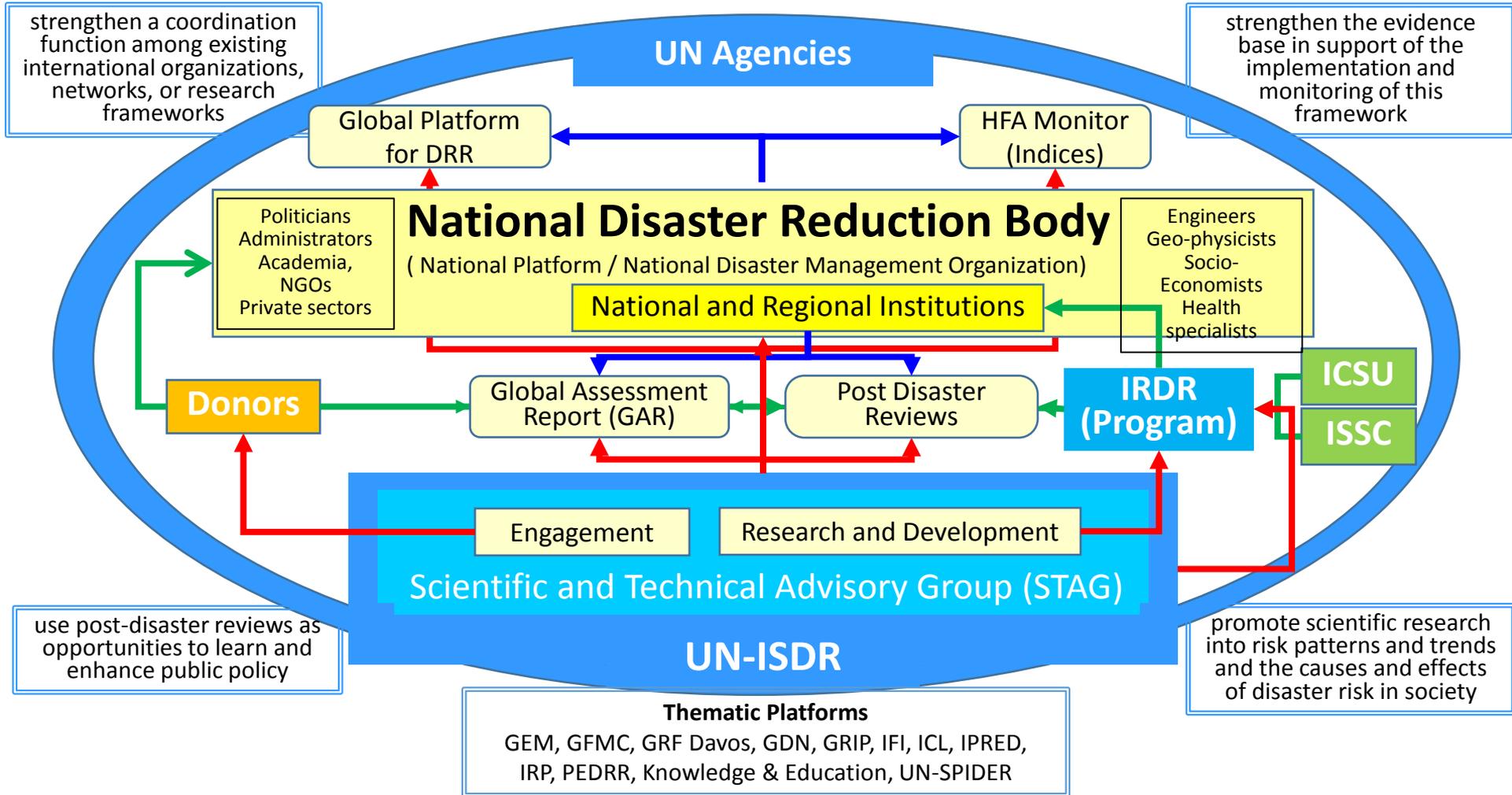
New Approach to Empower National Platforms and their Decision-making on DRR

Data

System for Inter-linkage

Opportunity

inter-disciplinary & trans-disciplinary

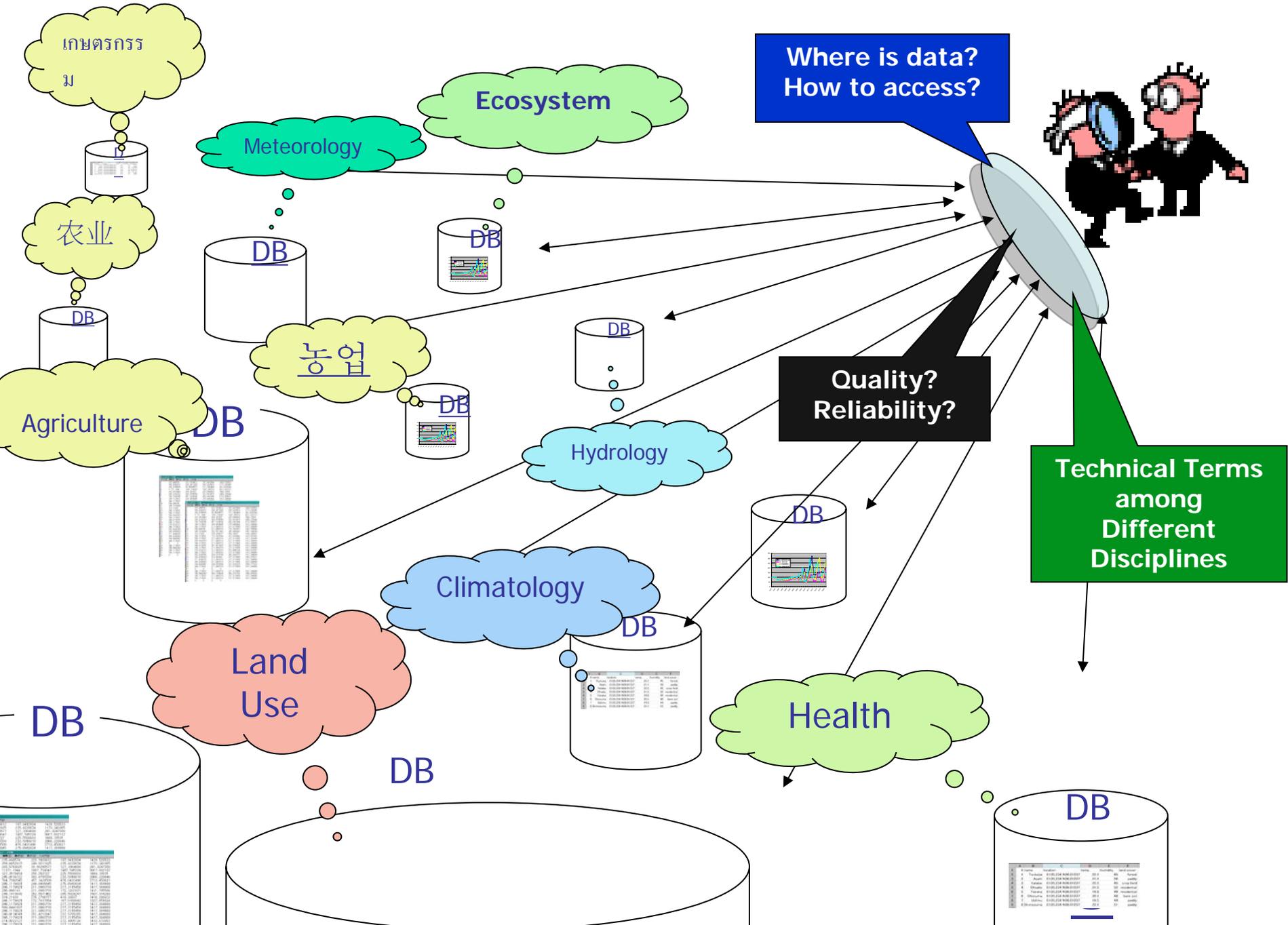


New Approach to Empower National Platforms and their Decision-making on DRR

Data

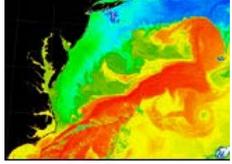
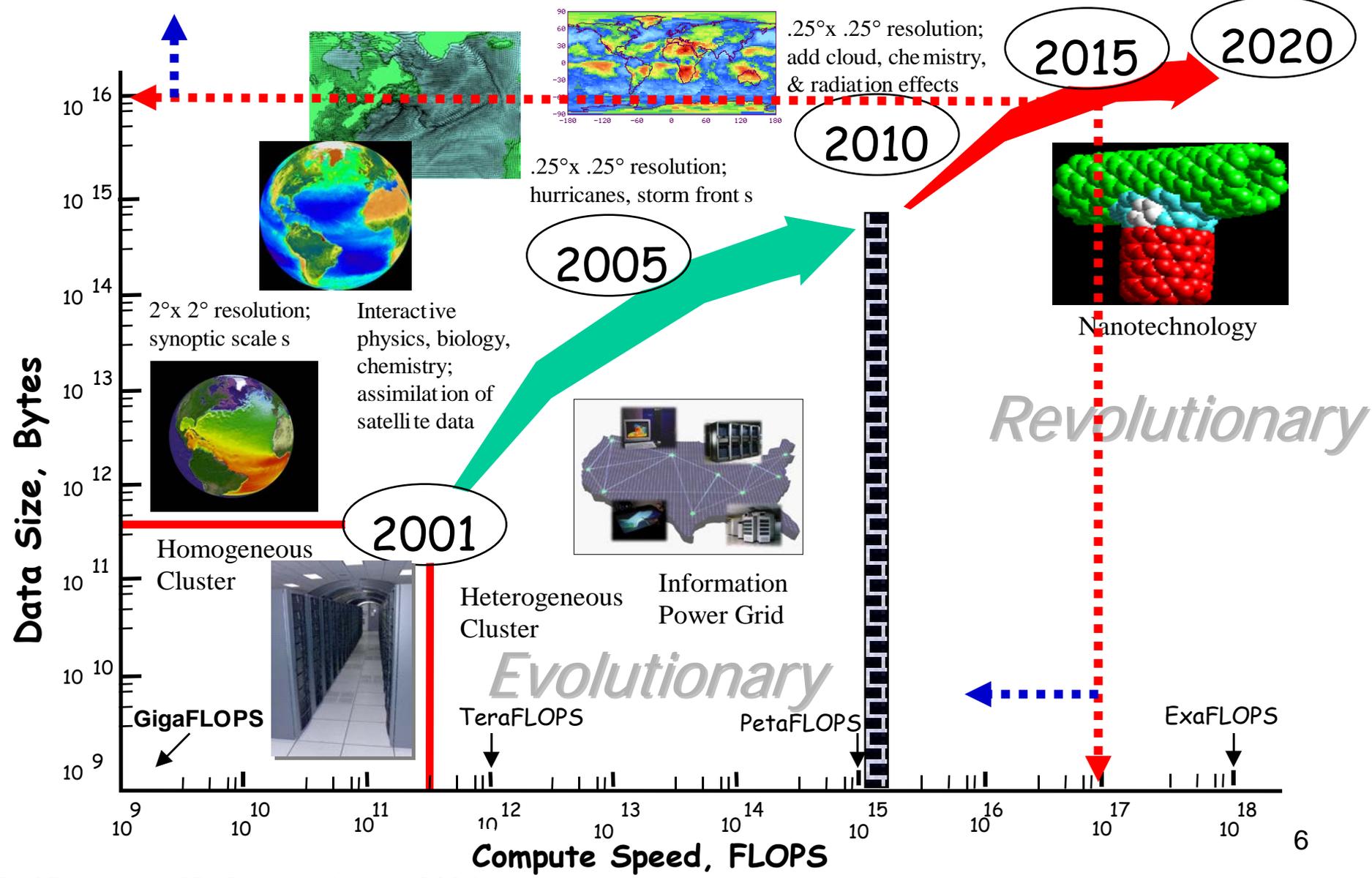
System for Inter-linkage

Opportunity



Computational Modeling in Two Stages; Driving Evolution & Enabling Revolution

Fully interactive (biology, chemistry, physics)
ensemble simulations in an operational mode

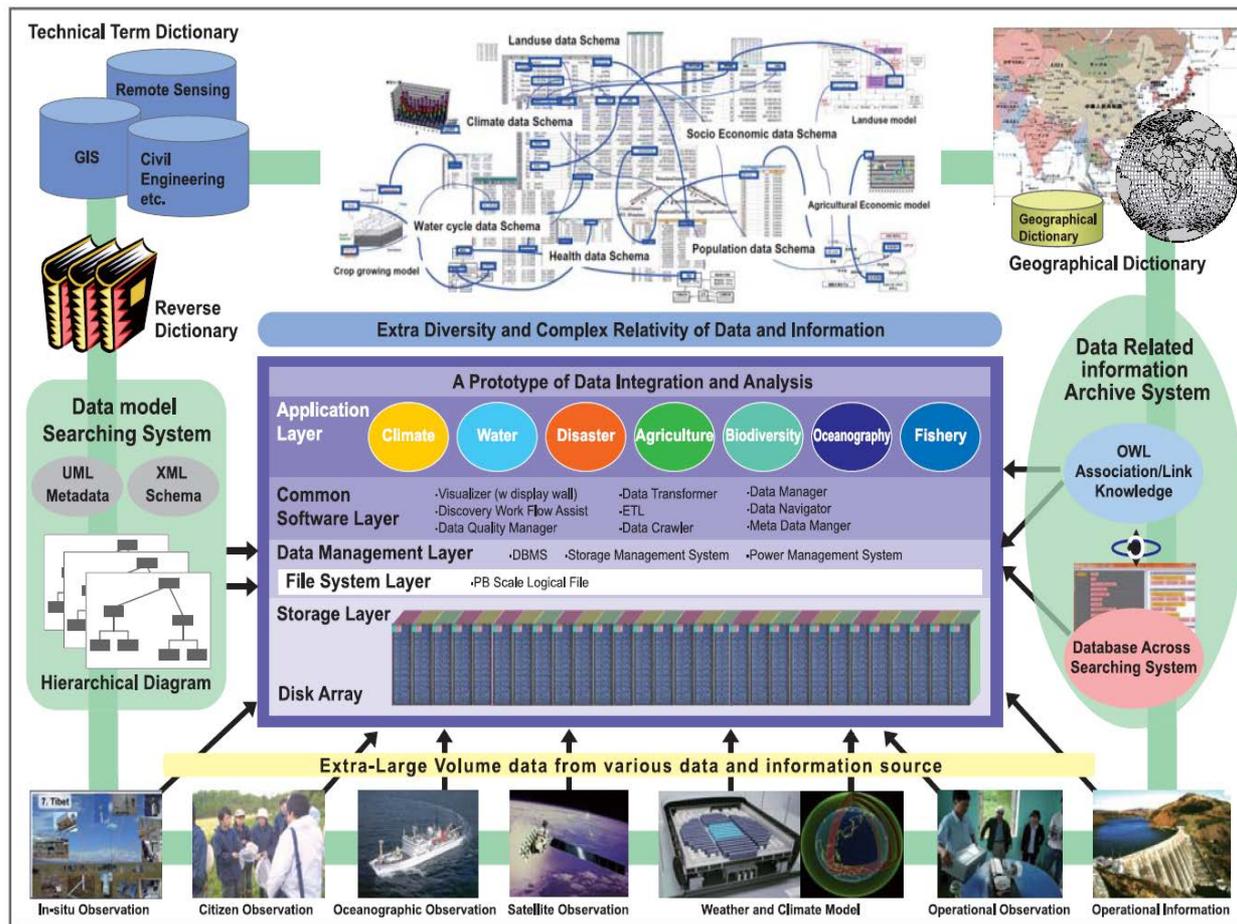



Real Demonstrated Performance doing useful Science

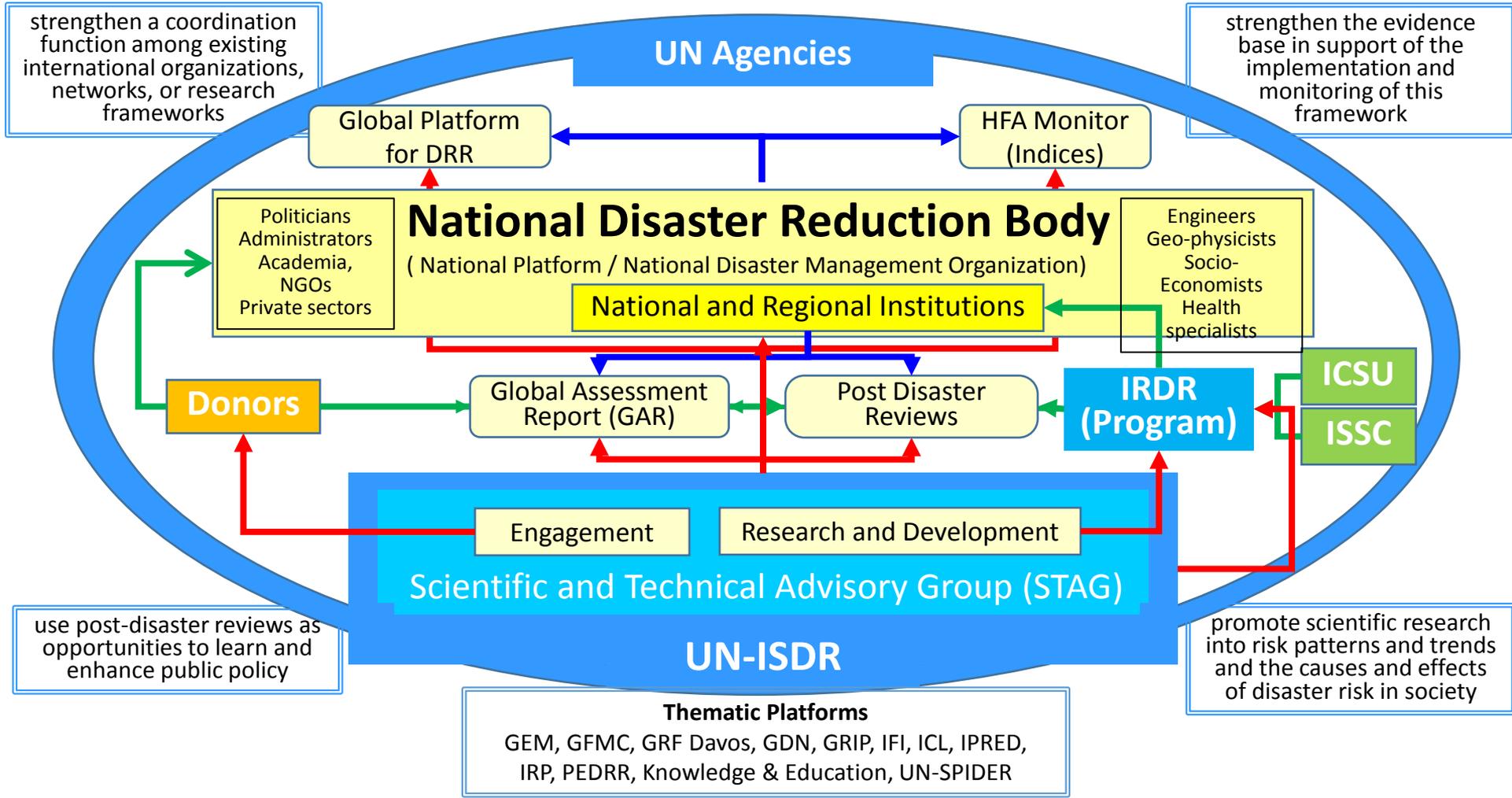
Data Integration and Analysis System

a legacy for Japan's contributions to GEOSS

To create knowledge enabling us to reduce disaster risk, solve the Earth environment problems, and generate socio-economic benefits.



inter-disciplinary & trans-disciplinary



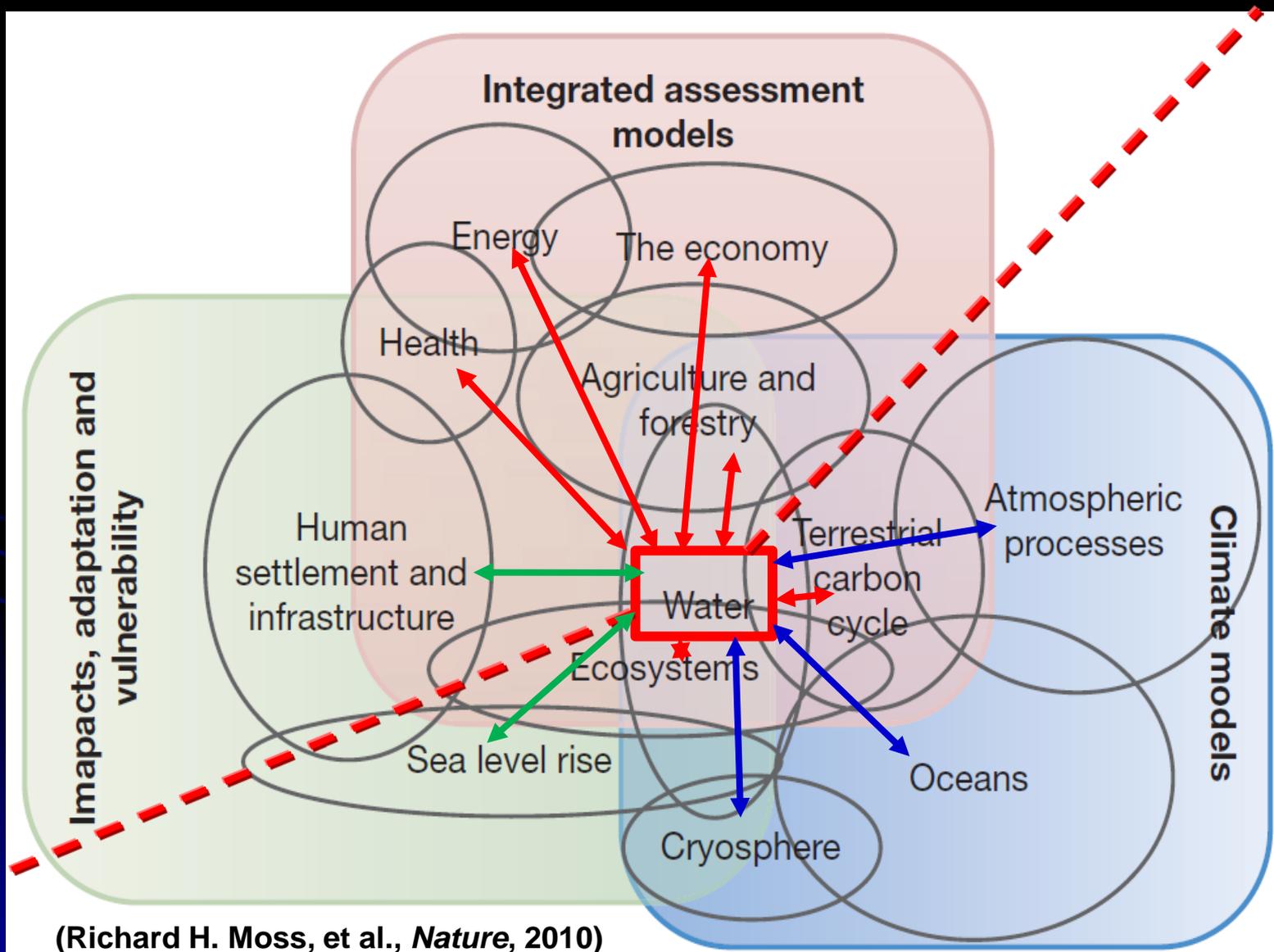
New Approach to Empower National Platforms and their Decision-making on DRR

Data

System for Inter-linkage

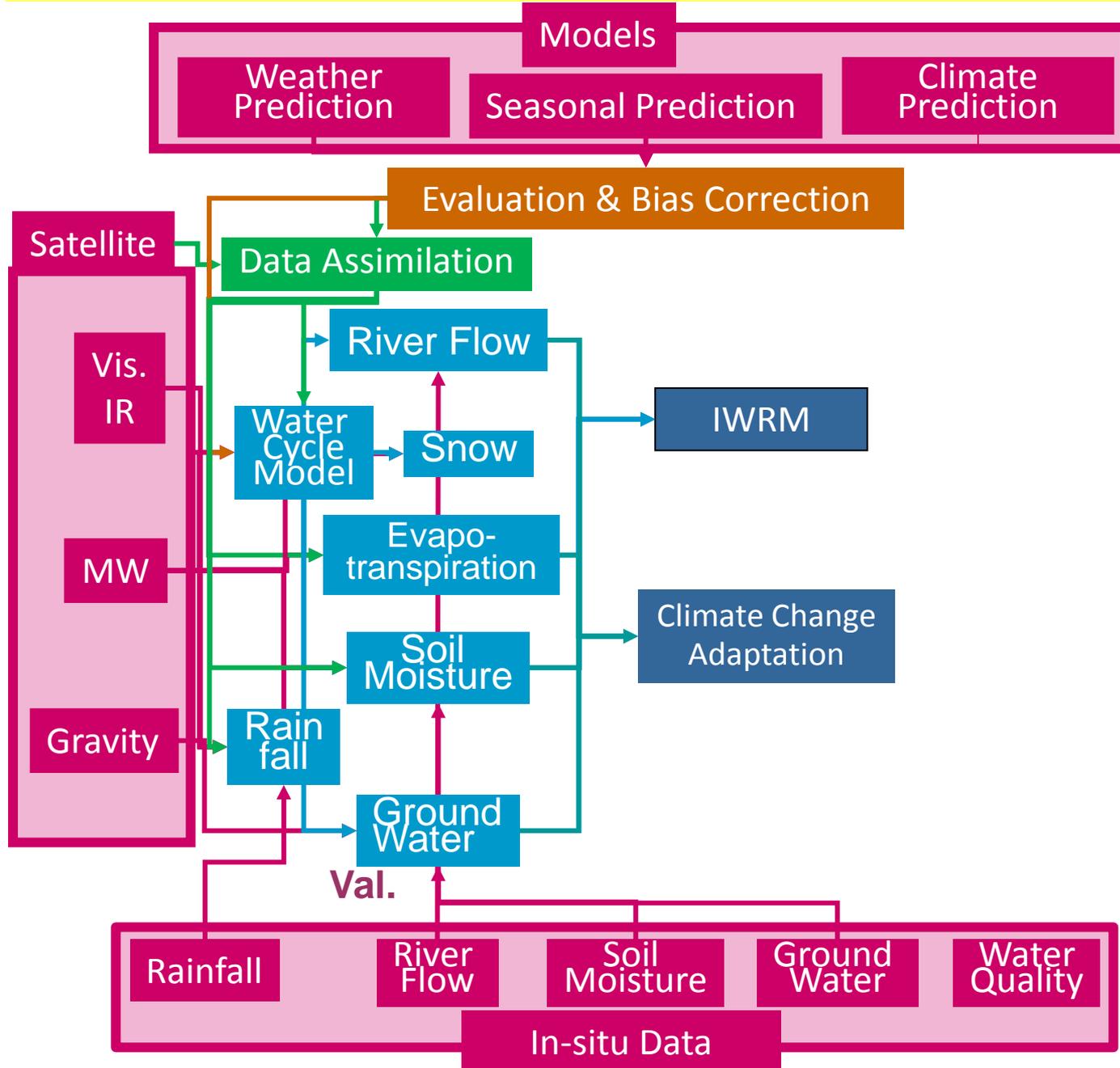
Opportunity

Water is a Key bridging between climate processes and societal benefits.

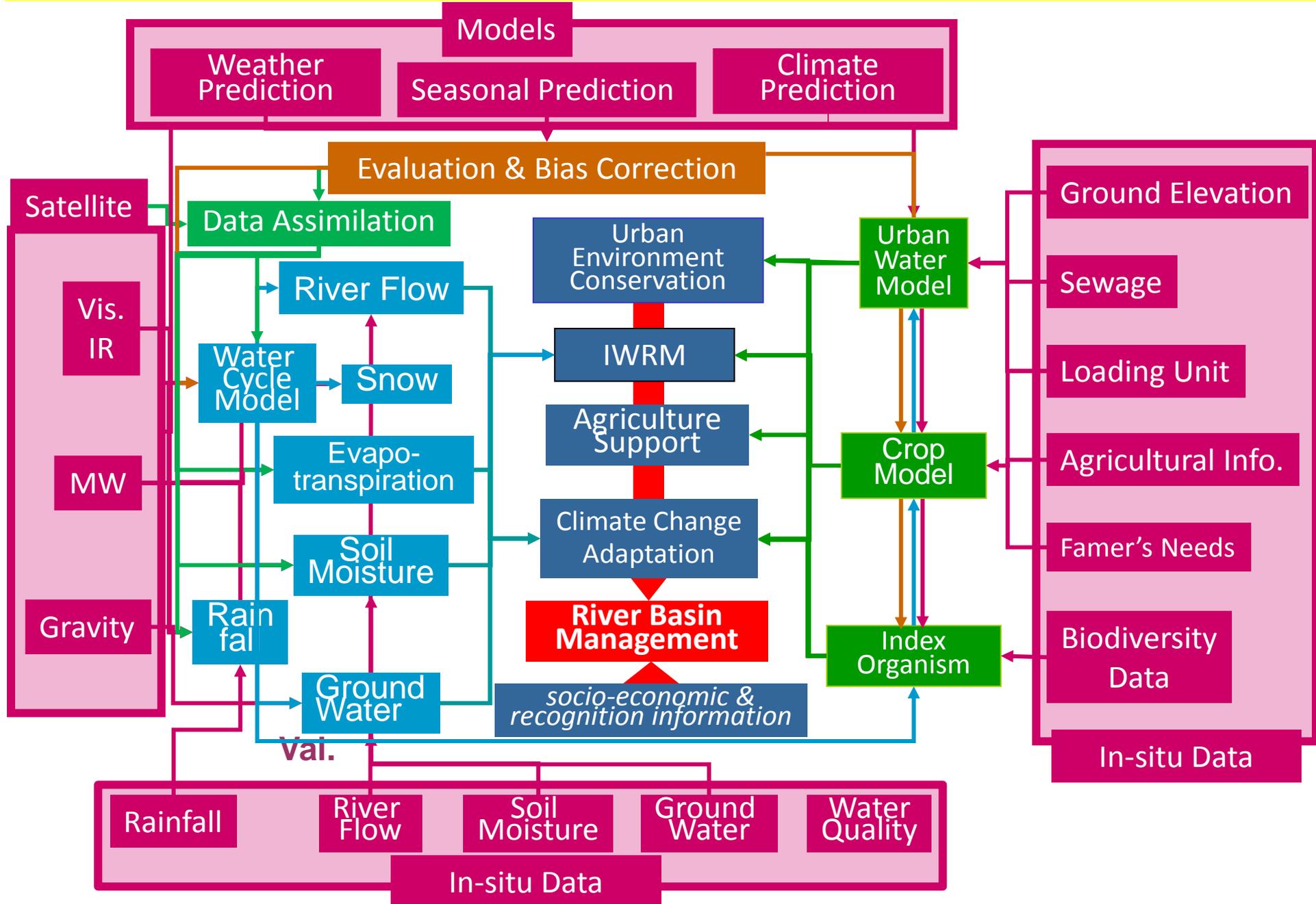


(Richard H. Moss, et al., *Nature*, 2010)

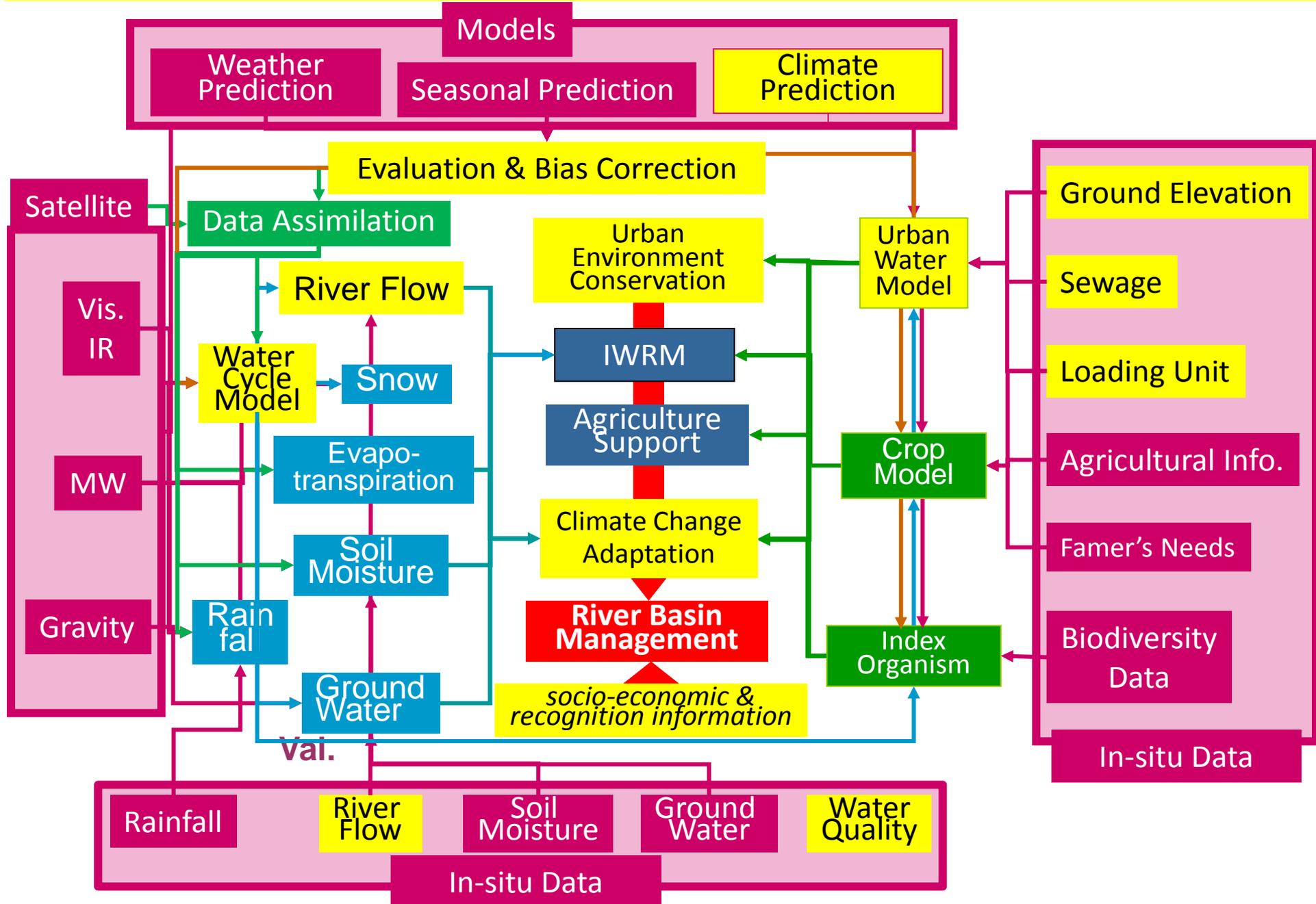
Water Cycle Integrator



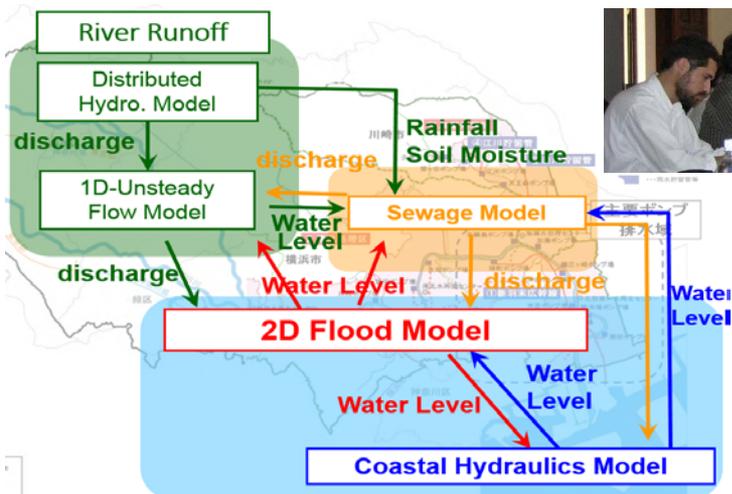
Water Cycle Integrator



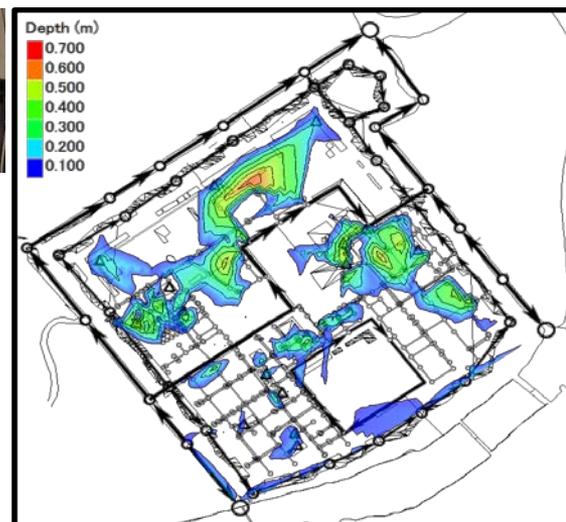
Water Cycle Integrator



Integration of River-Sewage-Public Health in Hue, Viet Nam



Stakeholder Meeting for Co-design



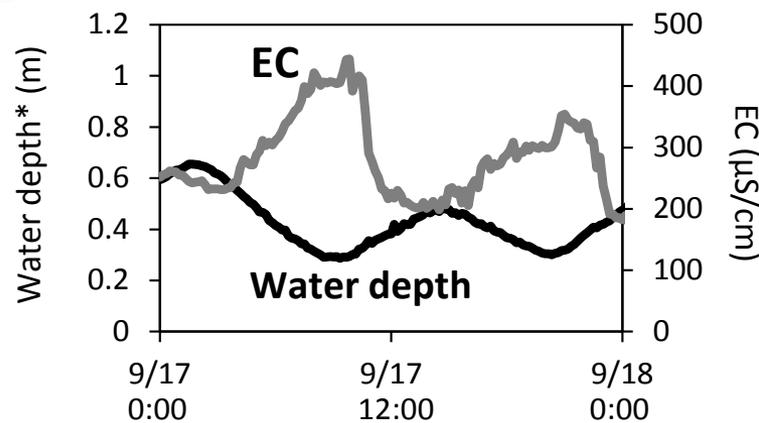
inundation affected by river flood and sea tide.

risks of infection from exposure to pathogens

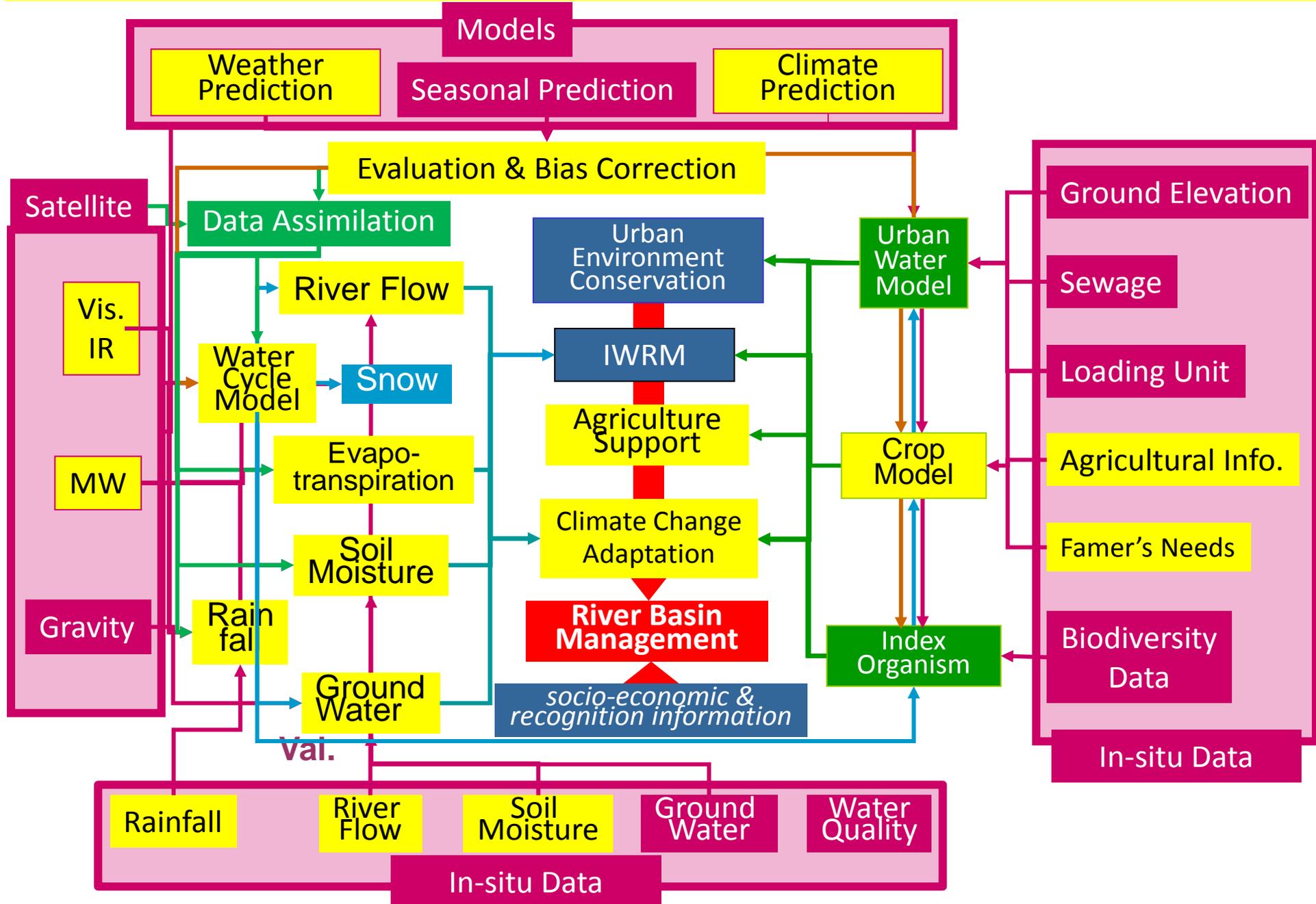


water quality: stagnant or diluted by river water.

Inundation depth (cm)	Non-adults		Adults	
	Exposure Pathway	Exposure Duration	Exposure Pathway	Exposure Duration
10 - 50	Indirect ingestion	< 20% of time outdoor spent in contact with water	Indirect ingestion	< 25% of time outdoor spent in contact with water
50 - 100	Direct ingestion	< 40% of time outdoor spent in contact with water	Indirect ingestion	< 50% of time outdoor spent in contact with water
100 - 200	Direct ingestion	< 60% of time outdoor spent in contact with water	Direct ingestion	< 75% of time outdoor spent in contact with water
> 200	Direct ingestion	< 80% of time outdoor spent in contact with water	Direct ingestion	< 100% of time outdoor spent in contact with water



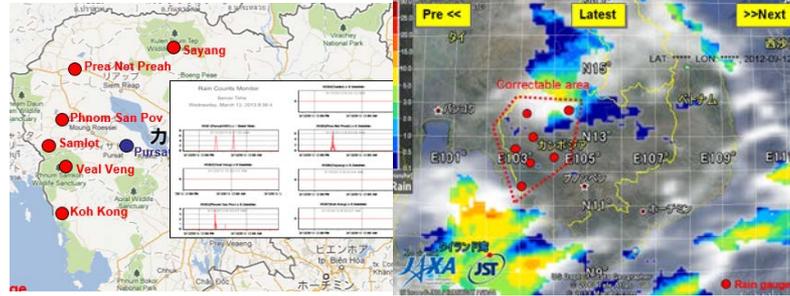
Water Cycle Integrator



Water-Climate-Agriculture Workbench in Cambodia



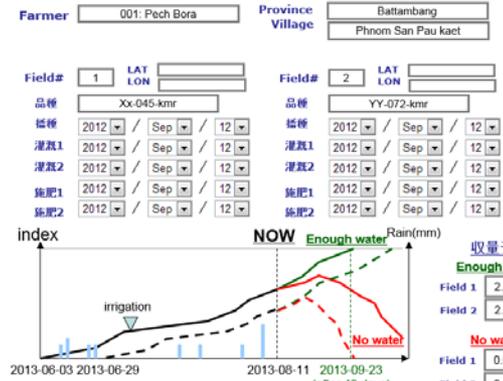
Stakeholder Meeting



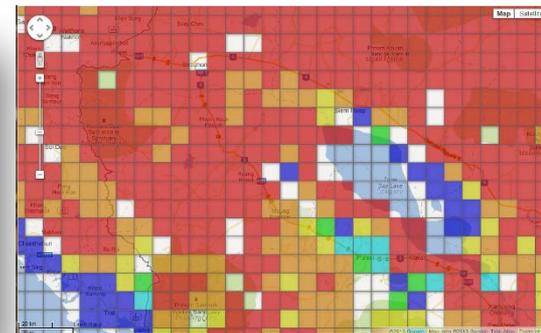
Real-time Rain Gauge → Satellite Data Correction → Wide Data Dissemination



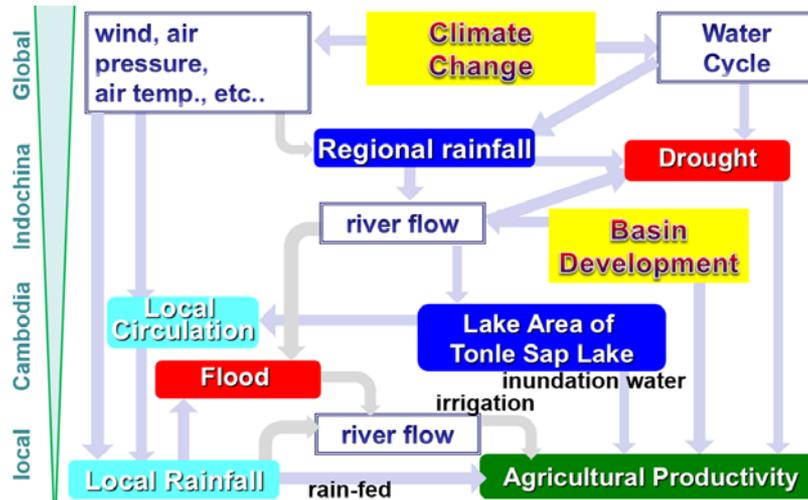
Farmers' Needs & Experiences



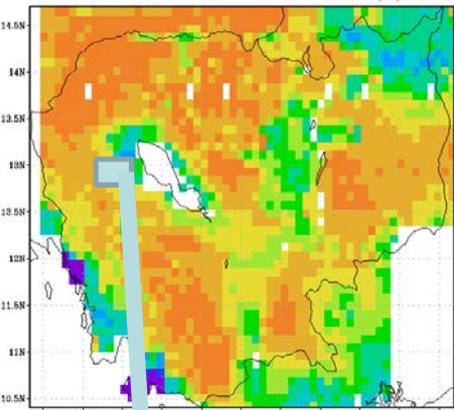
Water Cycle-Rice Production Coupled Model



Rice Production Monitoring



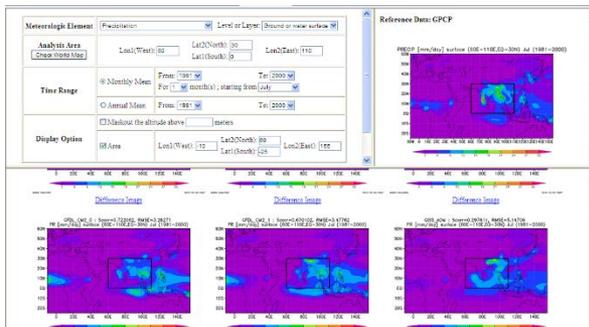
Holistic View of Water-Climate-Agriculture Problems



Nation-wide Daily Soil Moisture from Satellite



Local Information

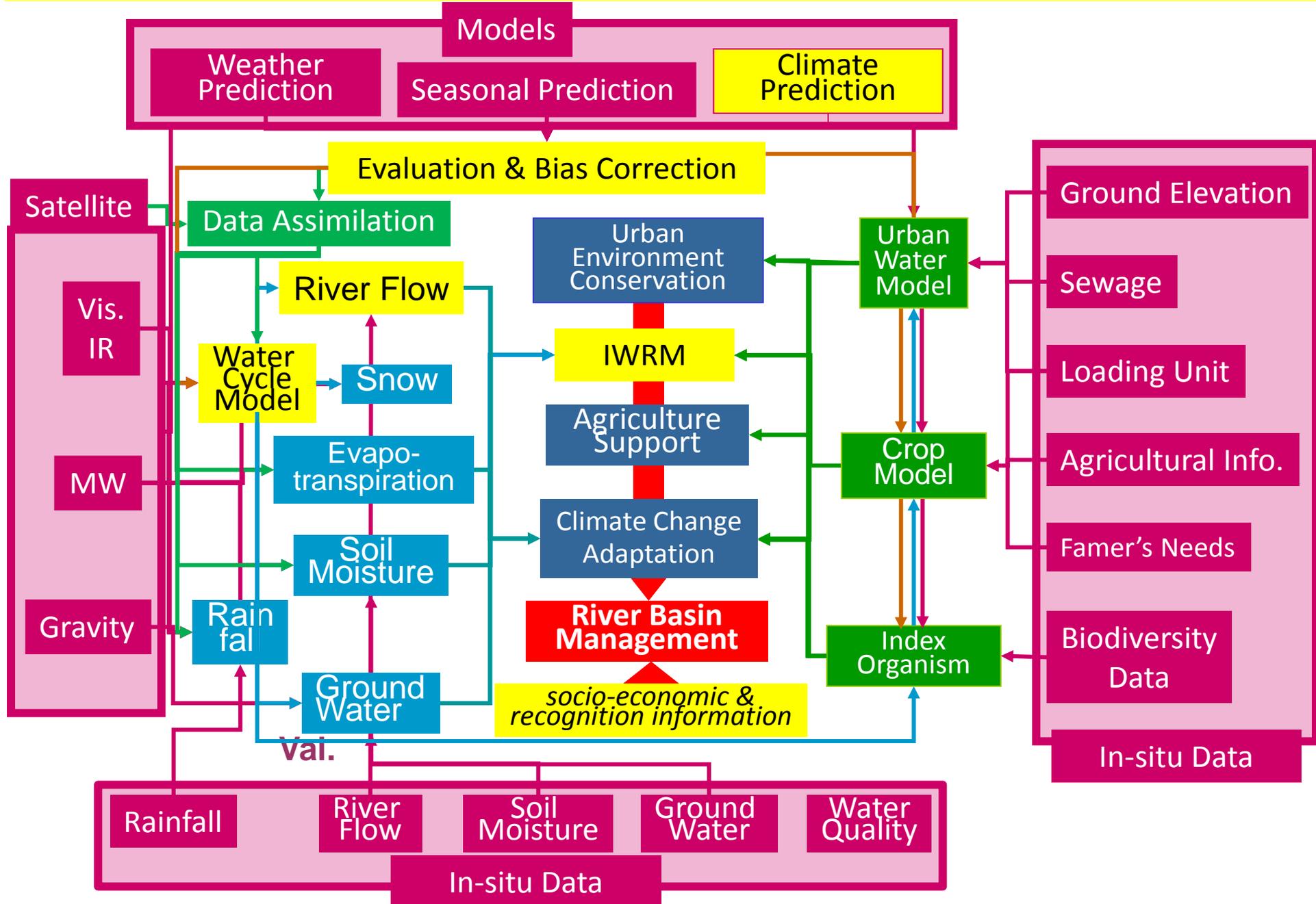


Climate Change Analysis Tools



OJT for Local Practitioners

Water Cycle Integrator



How much investment for disaster damage reduction?

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

Flood simulation

1. Develop of flood models to reproduce actual flood damage.

2. Demonstrate counter measure effects for reducing damage.

3. Translate flood model outputs into economic model inputs

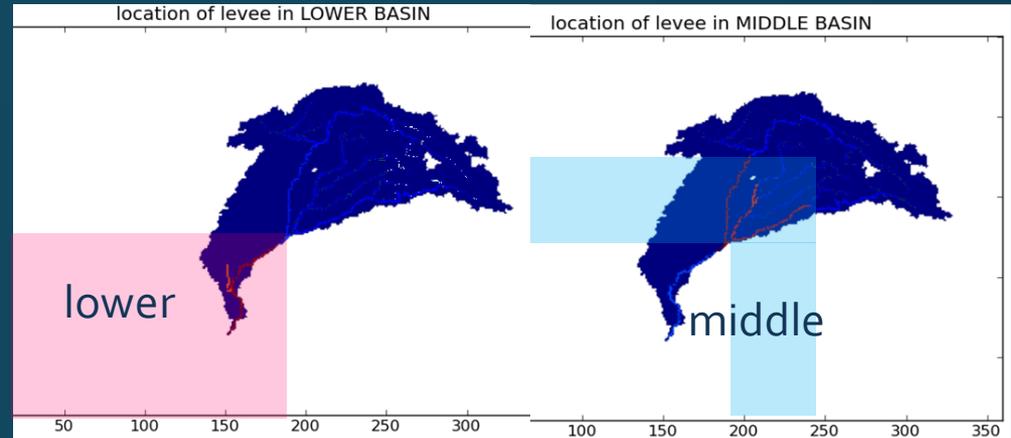
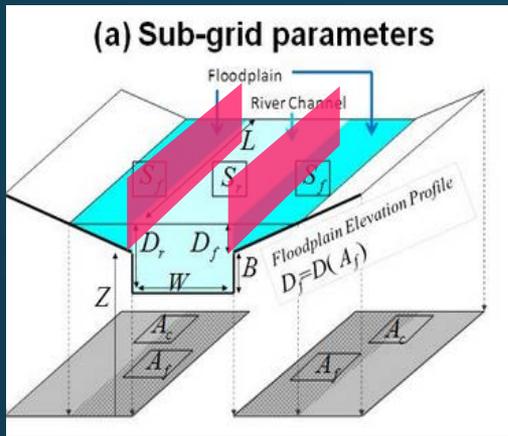
Economic simulation

4. Develop economic models to reproduce actual economic parameters.

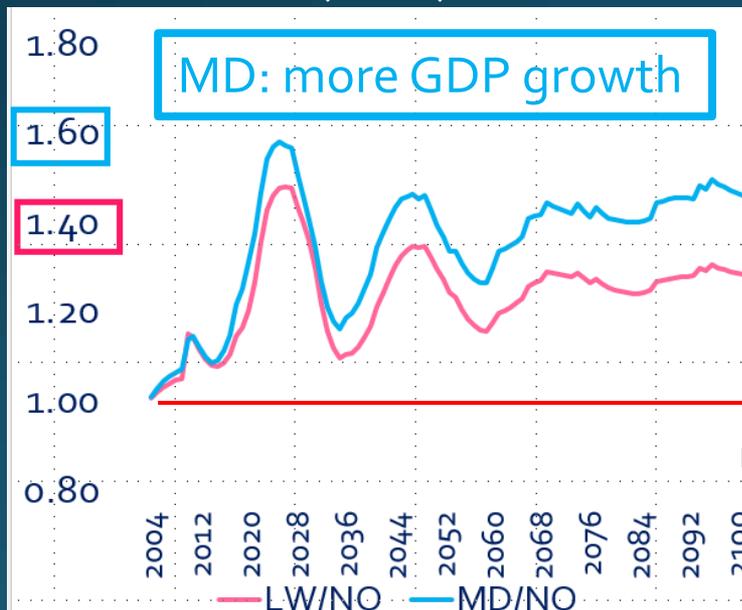
5. Simulate effect of the counter measures on economy and society with several scenarios.

(Disaster Risk Reduction investment Accounts for Development, Yokomatsu, 2013)

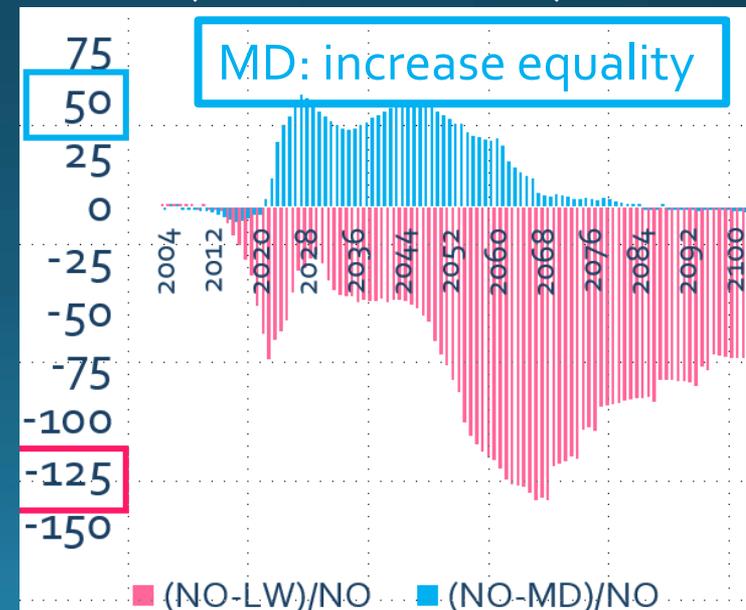
Effects of Construction of **LEVEE** as **Disaster Prevention** on Economy and Society



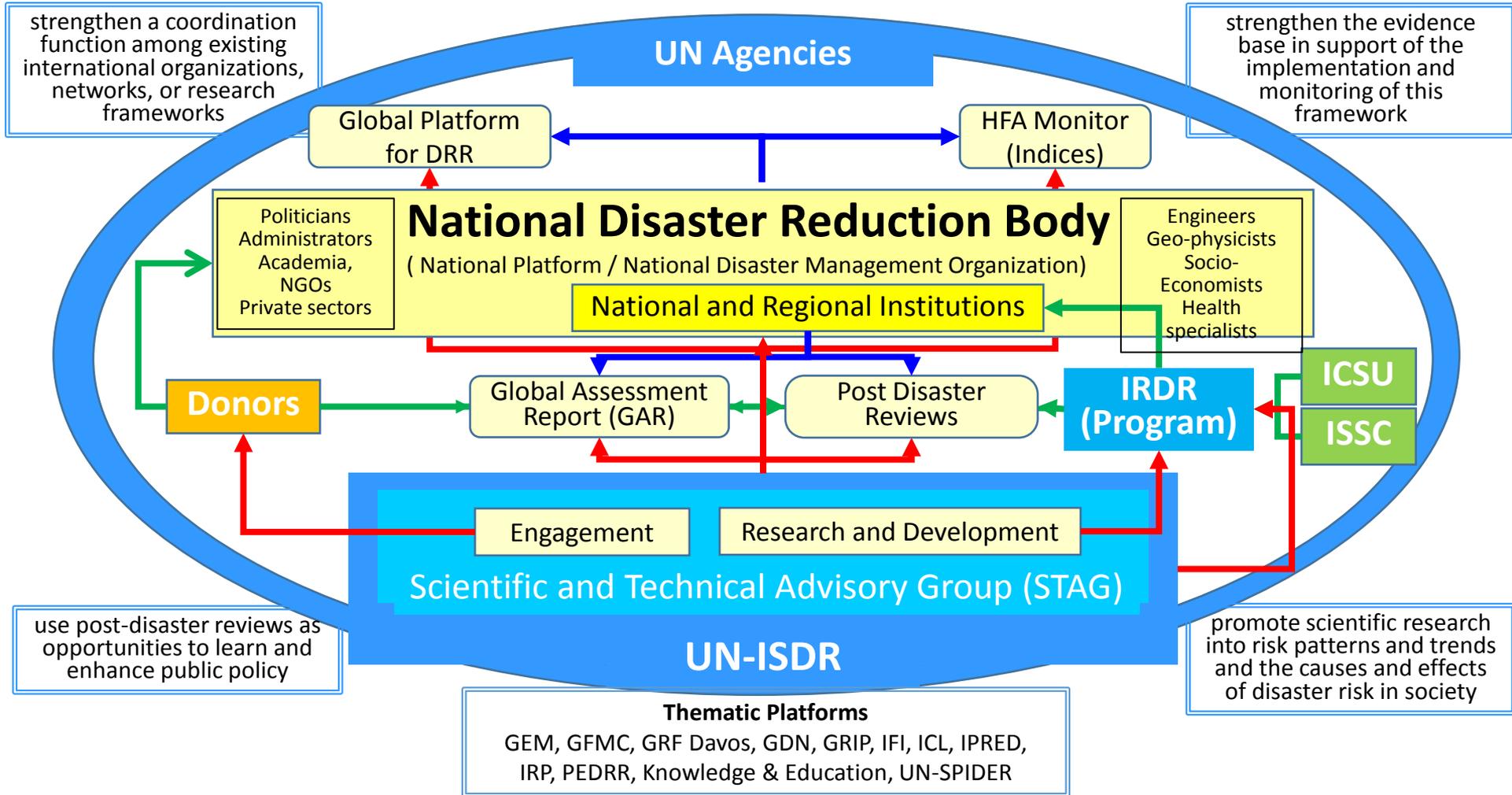
Impact on Economic Growth (GDP)



Impact on Social Equality (Gini Coefficient)



inter-disciplinary & trans-disciplinary



New Approach to Empower National Platforms and their Decision-making on DRR

Data

System for Inter-linkage

Opportunity

Sustainable
Development

Management of Disaster & Environmental Risks

Preventing
Future Risk

Reducing
Current Risk

Building
Resilience

Science and Technology

inter-disciplinary & trans-disciplinary

