

*A Pre-session for 2021 IRDR Conference*

**Promoting Coherence among Disaster Risk Reduction,  
Climate Change Adaptation, and Sustainable Development  
by **Establishing an “Online Synthesis System (OSS)”**  
and Fostering “Facilitators” using OSS**

May 20, 2021

hosted by

IRDR Japan National Committee

**KOIKE Toshio**

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

Council Member, Science Council of Japan, Cabinet Office of Japan

Chair, River Council of Japan, Ministry of Land, Infrastructure,

Transport and Tourism (MLIT)



# Background 1: International Discussions

## Disaster Resilience

International Decade for Natural Disaster Reduction (IDNDR): 1990s

UN World Conference

1<sup>st</sup> : Yokohama, 1994

2<sup>nd</sup> : Kobe, 2005 → HFA

3<sup>rd</sup> : Sendai, 2015 → Sendai Framework

*"National governments have the primary responsibility for DRR."*

## Sustainable Development

UN Conference:

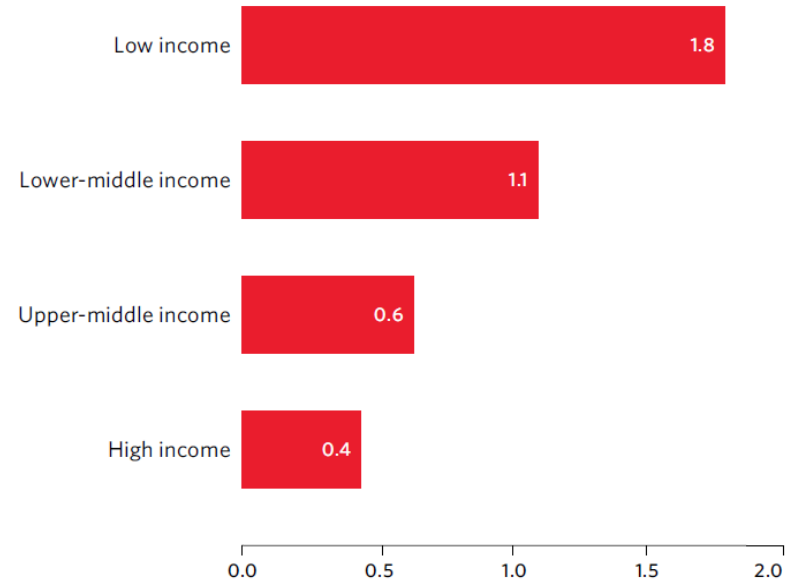
- Stockholm in 1972:  
*North-South Problems*  
Brundtland Commission, 1987  
→ *Sustainable Development*
- Rio de Janeiro, 1992
- Johannesburg, 2002
- Rio de Janeiro, 2012
- UNGA 2015

## The Sustainable Development Goals Report 2019



End poverty in all its forms everywhere

Economic losses (relative to GDP) caused by climate-related disasters, 1998–2017 (percentage)



"higher ratio of economic loss caused by disasters in the poorest countries is an obstacle to eradicate poverty"

## Background 2: Scientific Discussions

*Both "Disaster Resilience" and "Sustainability" consist of a set of issues that can be explored as scientific questions, yet cannot be answered only scientifically in the end.*

2000-2003

"**cognizing science**" to recognize phenomena  
"**designing science**" to produce and improve phenomena

2008-2011

"**science for discovery of social wish**" to discover issues for social problem resolution

- promote these three types sciences as "**consilience**", so that science could contribute to resolve social problems as well as develop sustainably for science
- If 'consilience' → Science could provide information required to prevent or get over the complex catastrophe on March 11.
- develop "**consilience knowledge base**" as a basis of consilience and cultivate and increase **human resources** who can promote consilience.

Tokyo Conference on International Study for Disaster Risk Reduction and Resilience  
"*Tokyo Statement 2015*" (January 2015)

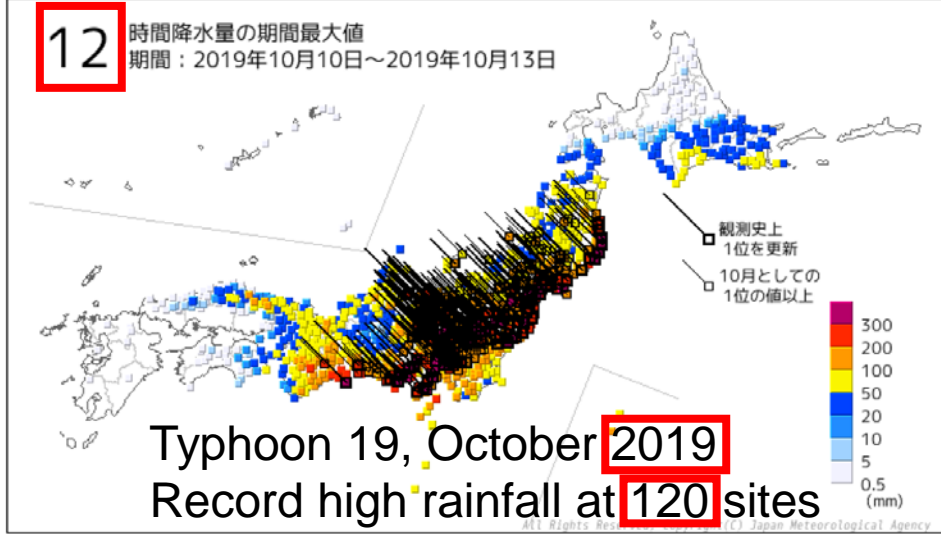
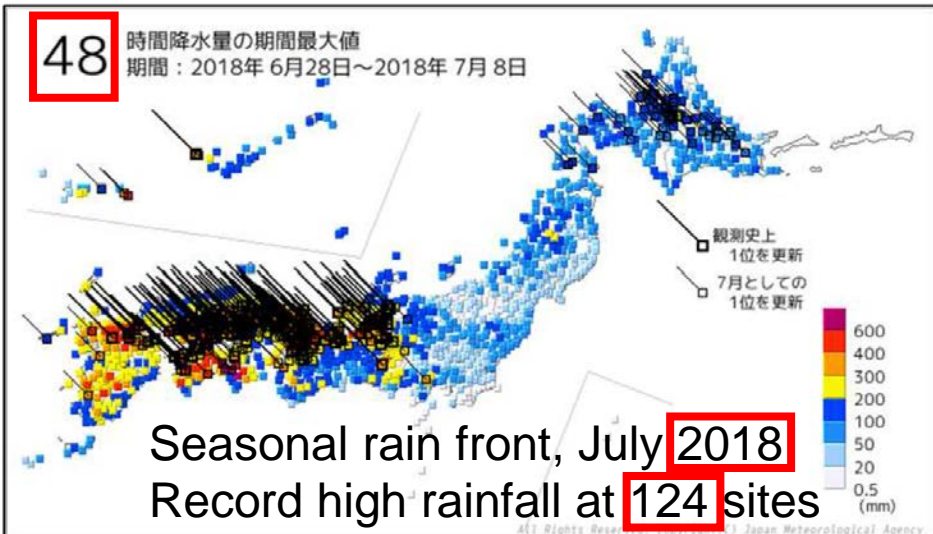
Recommendation by SCJ  
"*Disaster Risk Reduction and Promotion of International Research on Disaster Prevention and Mitigation*" (February 2016)

G-Science Academies Joint Statement  
"*Strengthening Disaster Resilience is Essential to Sustainable Development*" (April 2016)

InterAcademy Partnership (IAP) Statement  
"*Science and Technology for Disaster Risk Reduction*" (November 2017)

Tokyo Resilience Forum  
"*Tokyo Statement 2017*" (November 2017)

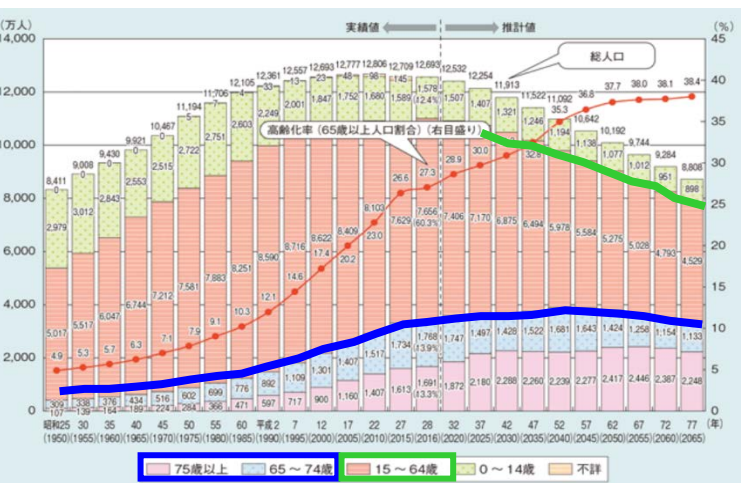
# Background 3: Changes in Japan



2,581  
18,010  
27  
7,173  
245

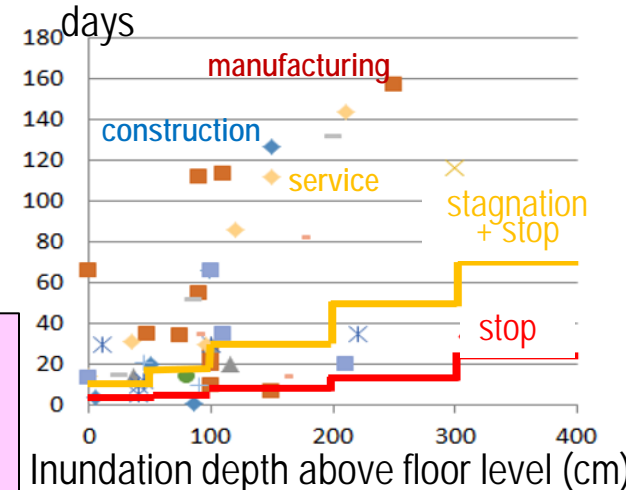
Sediment Disasters  
Houses Completely or Partially Collapsed  
Banks Breached  
Houses Inundated above the First Floor Level  
Missing or Dead

952  
33,332  
142  
8,129  
107



Ratio of  
productive population (15~64)  
to aged population (65~)

Small and medium businesses  
need far more days to make a full  
recovery compared with the number  
cited in the national survey manual.



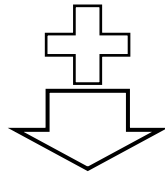
# Actions in Japan

## River Council of Japan, Panel on Infrastructure Development Committee on Water-related Disaster Risk Reduction under Climate Change



The Kick-off Meeting with the Minister, Nov. 13, 2019

“Rebuilding Flood-Conscious Societies”  
since 2015



“Flood design by coupling with climate  
models” → design rainfall X1.1  
“River Basin Disaster Resilience and  
Sustainability by All”

Strengthening  
water-related disaster  
resilience  
and  
enabling  
sustainable development  
through inclusive ways



A new basin-wide flood management policy  
was proposed to the Minister

July 9, 2020

# “River Basin Disaster Resilience and Sustainability by All”

- Transition to River Basin Disaster Resilience and Sustainability by All, a new concept of flood management with the cooperation of all the stakeholders around basins
- Upgrade flood management plans with consideration for climate change impacts
- Promote the following integrated and multilayered measures: 1) Flood Prevention, 2) Exposure Reduction, and 3) Disaster Resilience

## 1) Flood Prevention

### Catchments

- Improve rainwater storage functions

### River Areas

- Store flowing water through construction/upgrades/effective use of dams, etc.
- Ensure and improve the discharge capacity of river channels
- Reduce overflow

## 2) Exposure Reduction

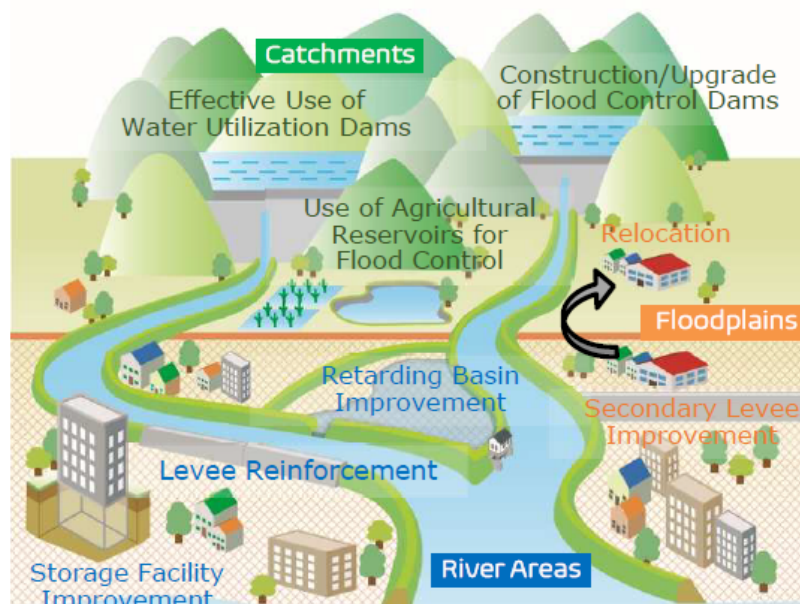
### Floodplains

- Guide residents to lower risk areas
- Promote safer ways of living
- Localize inundation areas

## 3) Disaster Resilience

### Floodplains

- Improve land risk information
- Reinforce evacuation systems
- Minimize economic damages
- Promote safer ways of living
- Improve support systems for affected local governments
- Eliminate inundation promptly



- The Cabinet approved a special budget, US\$140 billion, for the next five years.
- The National Diet approved the amendments of the nine related acts unanimously. 6

# Building a sustainable global society by strengthening disaster resilience

## RECOMMENDATION

Building a sustainable global society by strengthening disaster resilience:

- Developing an "Online Synthesis System (OSS)" and fostering "Facilitators" to realize consilience -



September 18, 2020

Science Council of Japan  
Committee on International Cooperation  
for Promoting Science-Based Disaster Risk Reduction

1. The scientific community should develop the Online Synthesis System (OSS) to promote DRR and Sustainable Development.
2. The scientific community should foster Facilitators.
3. On-site stakeholders, in cooperation with Facilitators and effectively taking advantage of the OSS, should develop integrated scenarios for DRR and Environment/Development and execute concrete measures toward enhancement of disaster resilience and achievement of SDGs.
4. International scientific organizations, UN/international agencies and international aid agencies should support the development of the OSS, Facilitators and integrated scenarios for each country and region to take actions.

**Society On-site Stakeholders**

Fresh learning by integrated scientific knowledge

User needs and local data and knowledge

Filling Gap

- trust-based relationship
- causes and structure of on-site problem
- local implications of data and information
- goals, possible solutions, and governance
- on-site stakeholders' responsibilities
- convincing

**Facilitator**  
not just as  
"a master of ceremony"  
but as  
"catalytic beings"

New perspective

**Science Community**

Supporting consilience by providing information

Proposing a new framework

Maximum Use

**Online Synthesis system (OSS)**

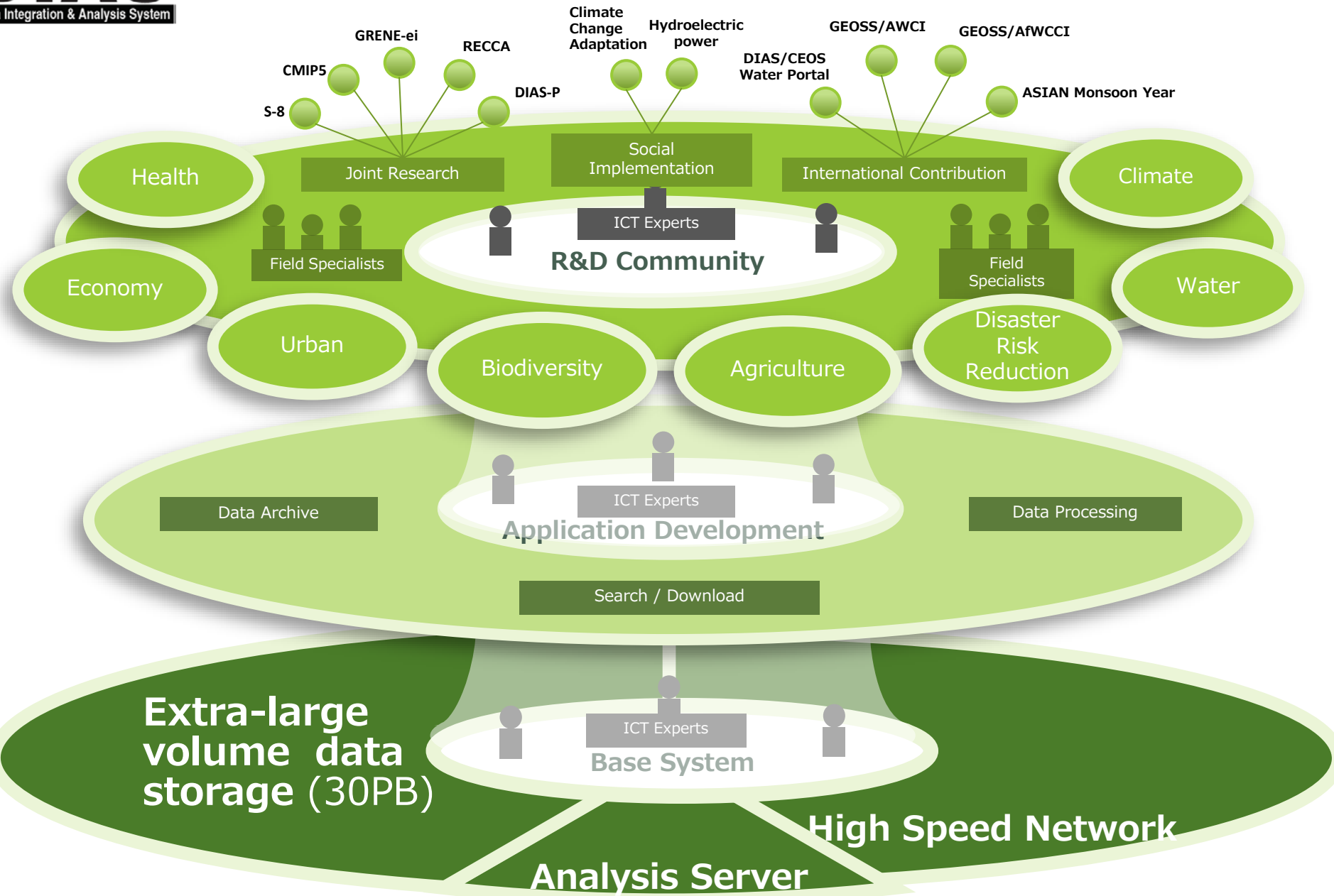
**Functions**

- Exploration, collection, archive and search of scientific information in mother tongues
- Prediction and simulation, and visualization
- Data integration, information fusion
- Coordination of various disciplines
- **Mutual risk communication between society and science community**





# Challenges to variety, volume, velocity and veracity.



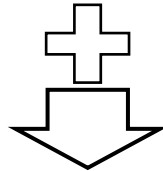
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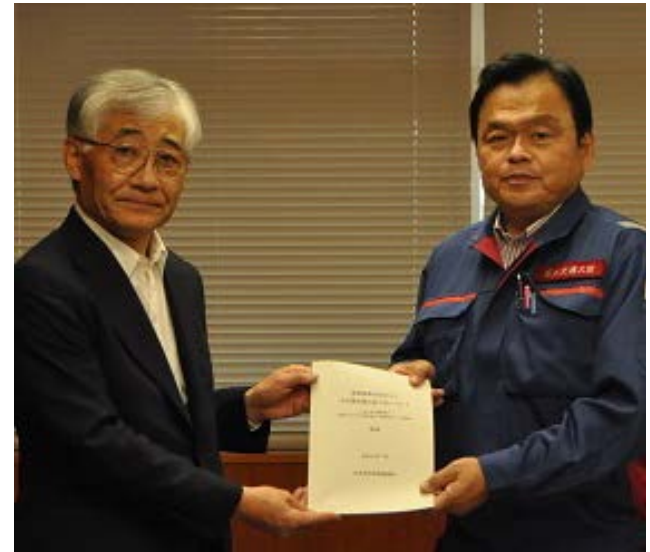
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# “Flood design by coupling with climate models”

Climate Change Projection by MEXT, JMA, and ME



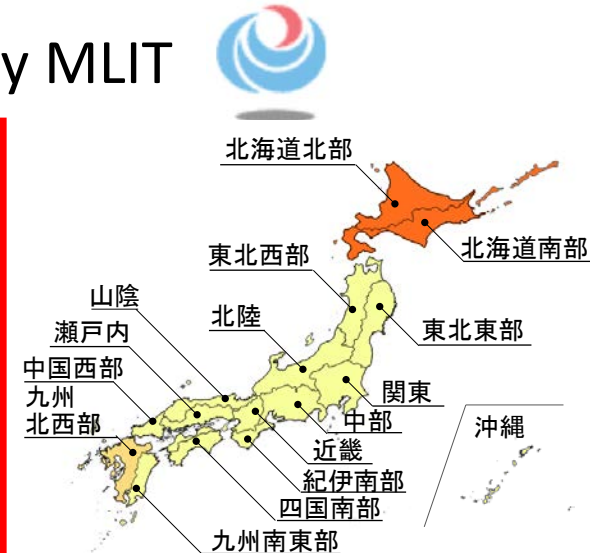
	scenarios	resolution	ensemble	Targeted Area	Product Name
ME, JMA	RCP 2.6~8.5	20km		nationwide	NHRCM20
MEXT	RCP8.5	20km	○	nationwide	d4PDF(20km)
		5km		nationwide	NHRCM05
		2km		nationwide	NHRCM02
MEXT	RCP2.6	5km		nationwide	NHRCM05
		2km		nationwide	NHRCM02
MEXT	RCP8.5	5km	○	nationwide	d4PDF (5km,SI-CAT)
		5km	○	Hokkaido Kyushu	d4PDF (5km,yamada)
	RCP8.5 (2d increase)	20km	○	nationwide	d2PDF(20km,SI-CAT)



Flood Management Plan Revised by MLIT



	2degree increase	4degree increase	Short event
Hokkaido	1.15	1.4	1.5
The Other	1.1	1.2	1.3
National Average	1.1	1.3	1.4



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