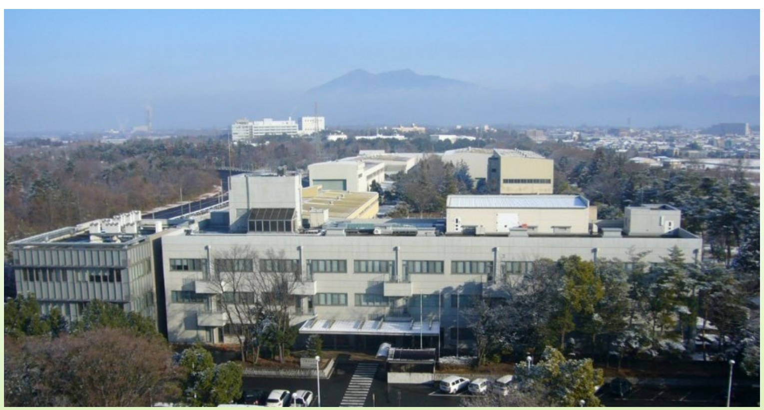
ICHARM / PWRI

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



United Nations
Educational, Scientific and
Cultural Organization

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

Public Works Research Institute,
National Research and Development
Agency, Japan

Organization & Budget

Public Works Research Institute (PWRI)

President

- Tsukuba Central Research Institute
- Civil Engineering Research Institute for Cold Region (CERI)
- Center for Advanced Engineering Structural Assessment and Research (CAESAR)
- Innovative Materials and Resources Research Center (iMaRRC)

International Centre for Water Hazard and Risk Management (ICHARM)
officially established March 2006

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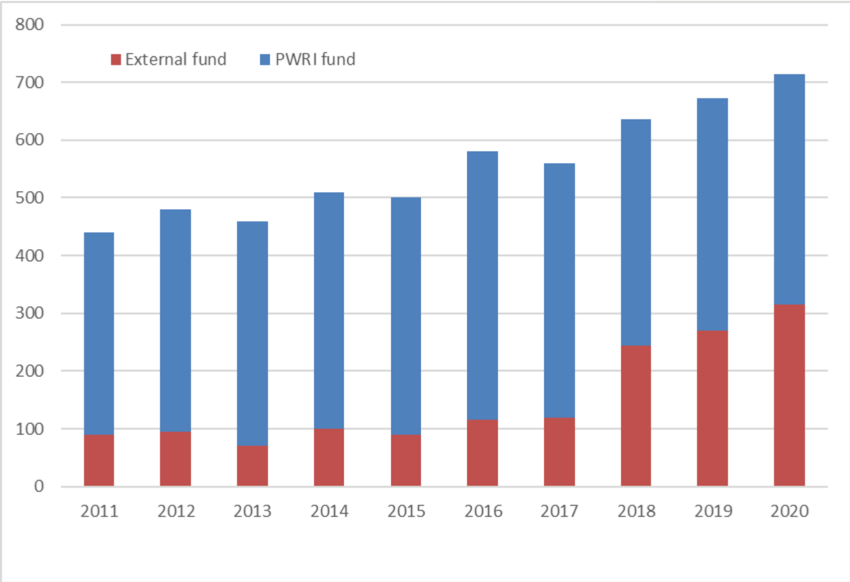
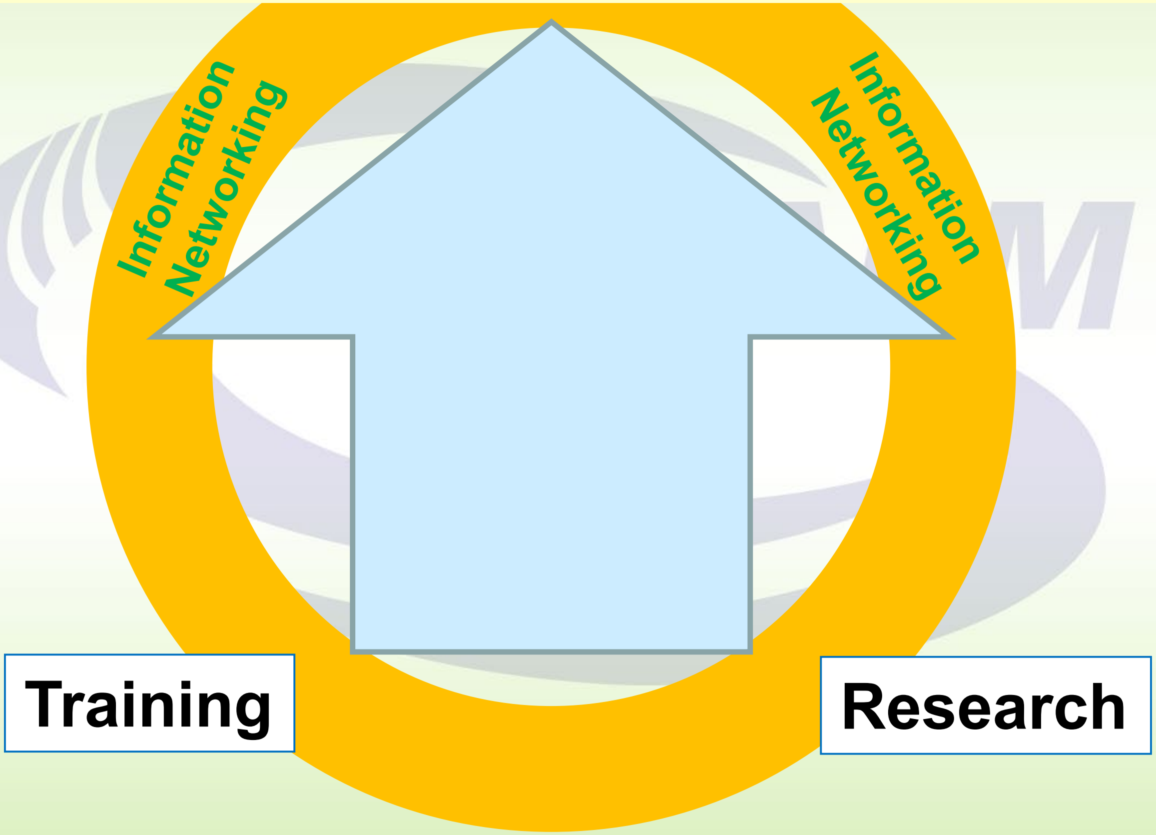
- **Executive Director** (1)
  - Deputy Director of ICHARM (Director of Water-related Hazard Research Group) (1)
  - Deputy Director of ICHARM (Director for Special Research) (1)
  - Training & Research Advisor (1)
    - Chief Researcher (Water-related Hazard) (1)
    - Chief Researcher* (Risk Management) (1)
    - Chief Researcher (Networking and PR) *serving concurrently
    - Chief Researcher (Training) (1)
      - Senior Researcher (7)
      - Research Specialist (11)
      - Researcher (2)
      - Research Assistant (1)
      - Administrative Staff (4)
      - Administrative Assistant (14)

Budget (million yen)



Working to achieve Localism

Delivering best available knowledge to local practices



Long Term Targets

Support in Sound Policy-making

- Analyzing and formulating policy ideas
- Visualizing values of preparedness and investment efficiency

Support in Community of Practice

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

Risk Assessment

- Developing integrated disaster risk assessment
- Identifying locality and commonality

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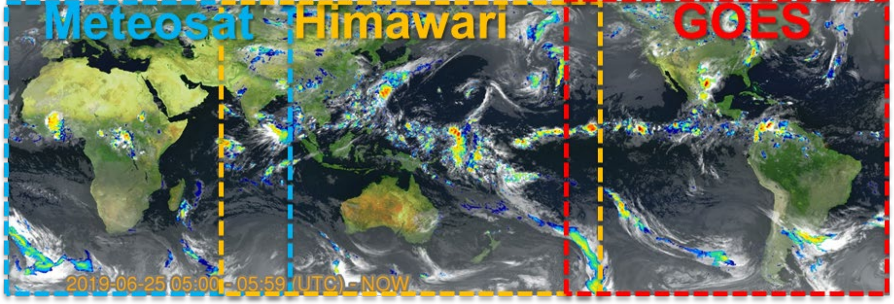
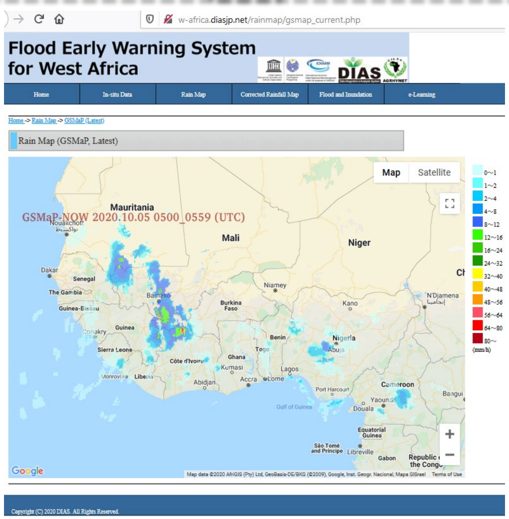
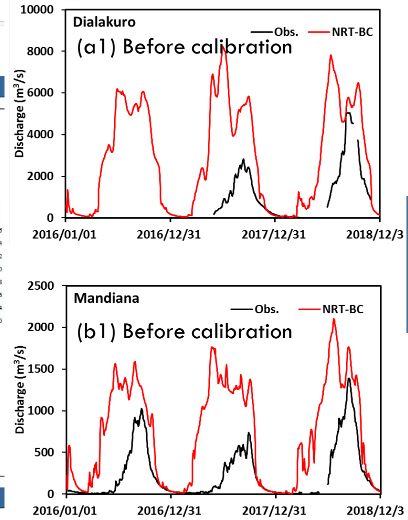


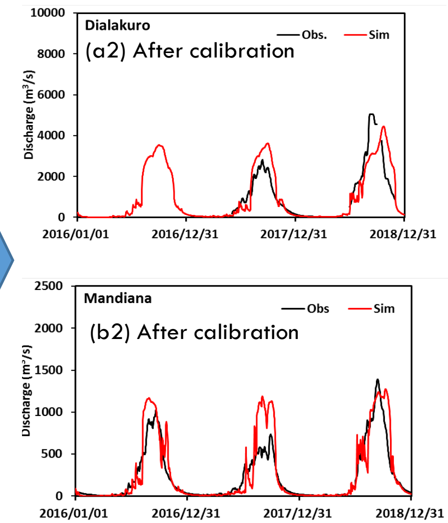
Effective Use of Satellite Products: GSMaP

NRT: near-real time precipitation available within 4 hours with hourly update.

NOW: quasi-real time precipitation with every 30 minutes update.







Bias Correction

E-M wave Characteristics

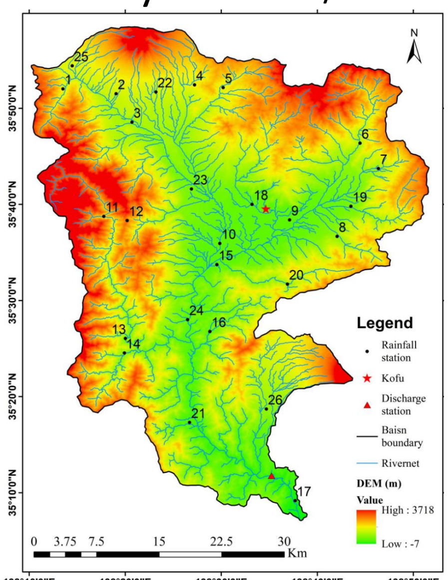
\+

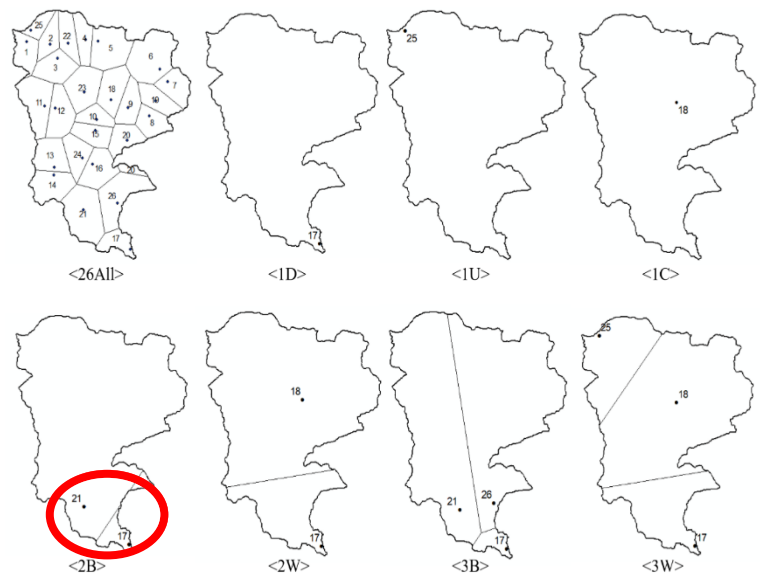
Statistical Bias Correction

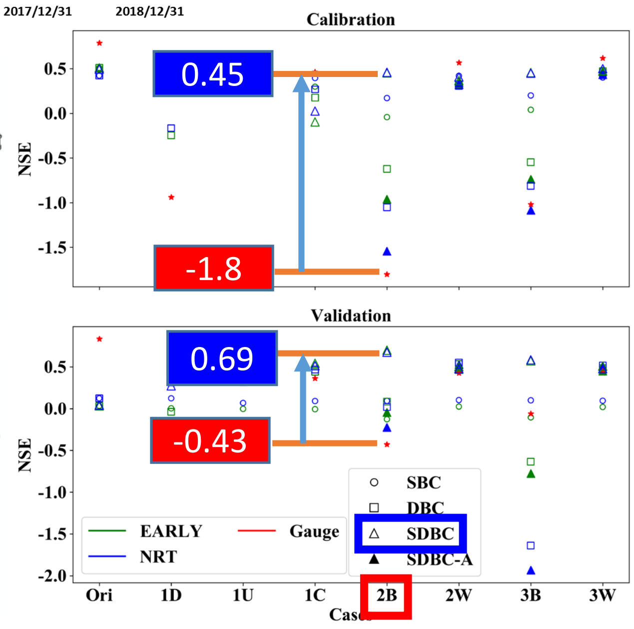
\+

Dynamical Bias Correction

Density: **137** km²/station







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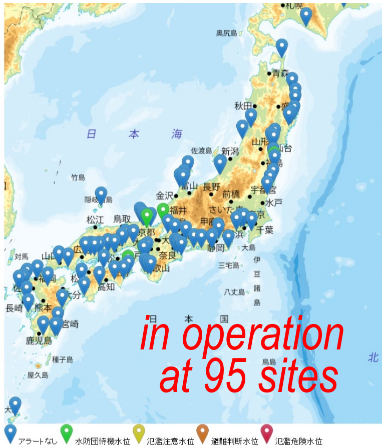
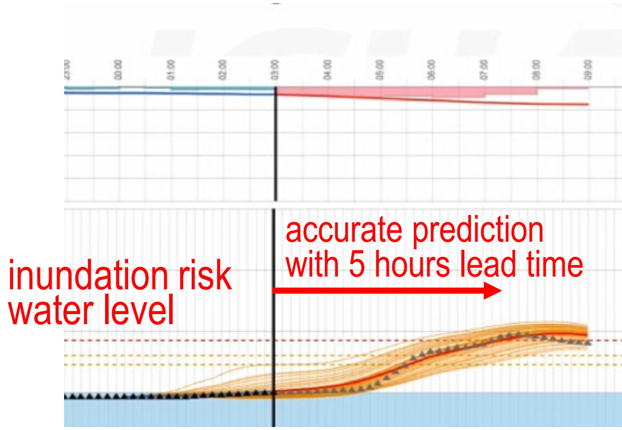
Flood early warning system for small & medium river basins

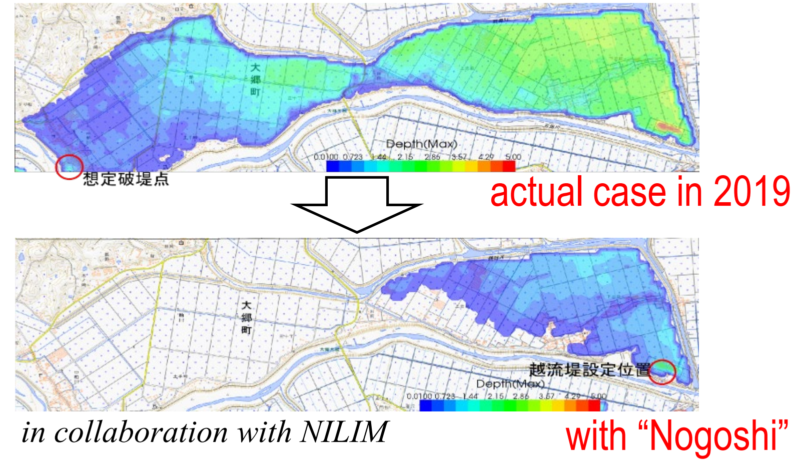
3L(low cost, long life, localized) Water Level Gauge + Data Assimilation + Rainfall Runoff Inundation (RRI) model





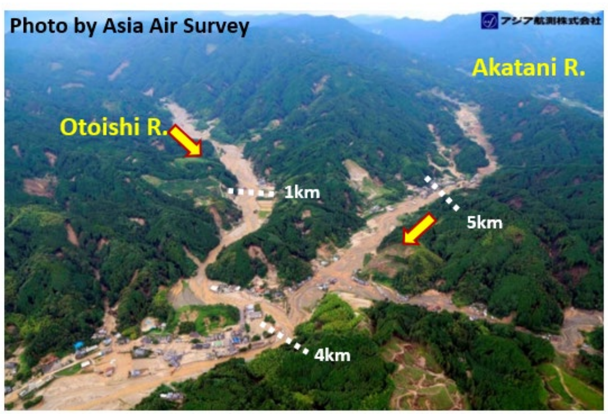
Traditional flood control with a new technology

Dramatical flood risk reduction by introducing "Nogoshi", a partial HWL Overflow Dyke, based on consensus building

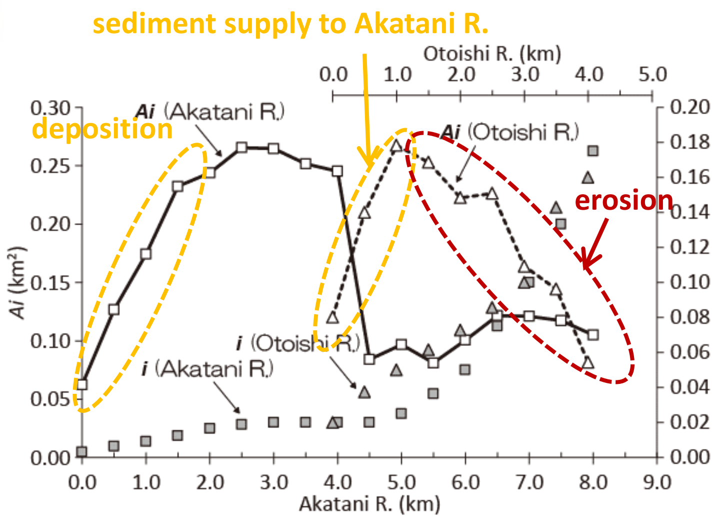


in collaboration with NILIM

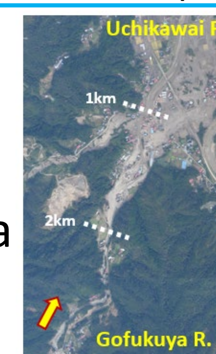
Ai is a parameter for sediment transport capacity. Increases in *Ai* indicate erosion while decreases in *Ai* indicate sediment deposition. *A*: Drainage area, *i* : energy slope or bed slope

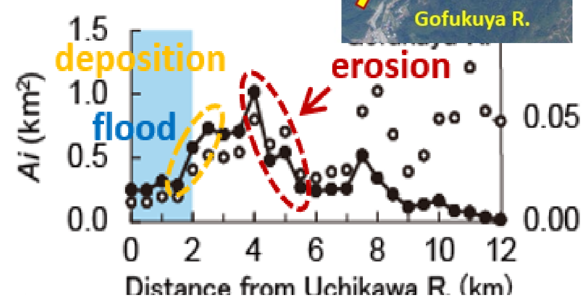


2017 flood disaster in the Akatani R. basin



2019 flood disaster in the Gohukuya R. basin





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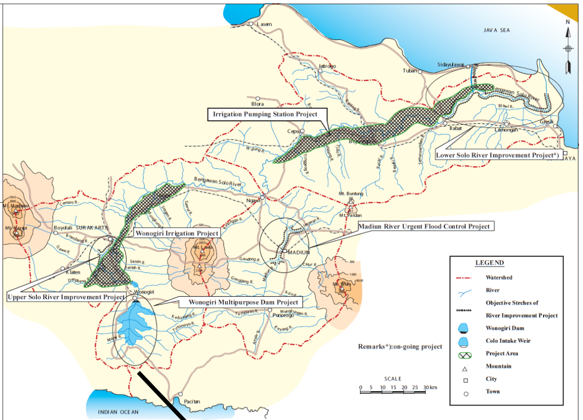
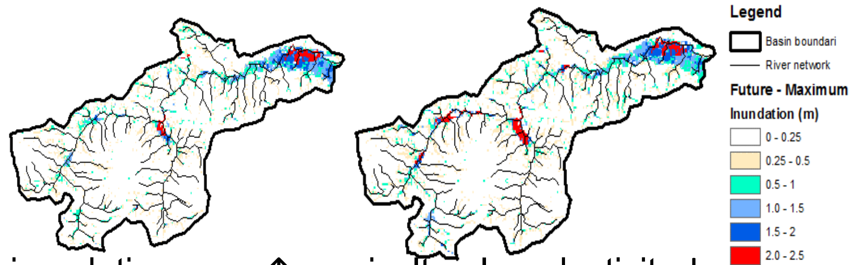
Climate Change Impact Assessment in the Solo River Basin, Indonesia



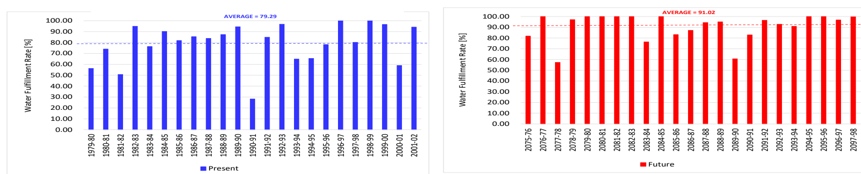
Wonogiri Dam
C.A.=1,350km^2



inundation area ↑: agricultural productivity ↓

irrigation water ↑: agricultural productivity ↑

Present: 79.3% Future: 91.0%



Average water fulfillment rate of the Wonogiri Dam

Input-Output Analysis

Direct effect of increasing paddy rice production:
237 billion rupiah
Induced production of other industries:
59.5 billion rupiah
Total economic effect:
296.5 billion rupiah
(2015 price)

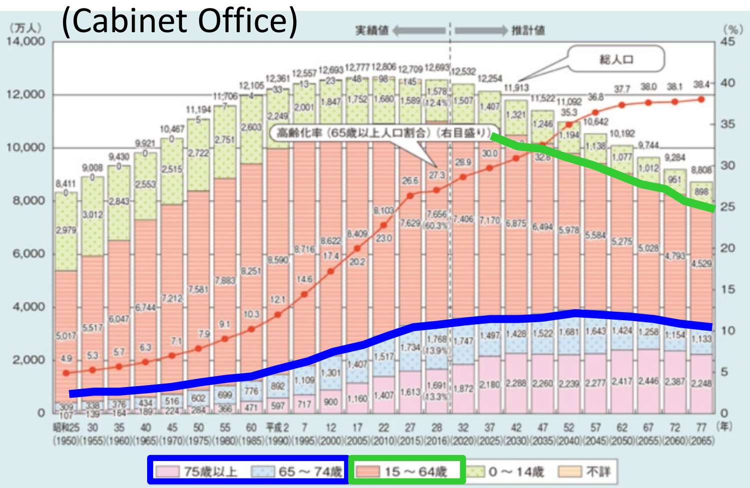
Ratio of productive population (15~64) to aged population (65~)

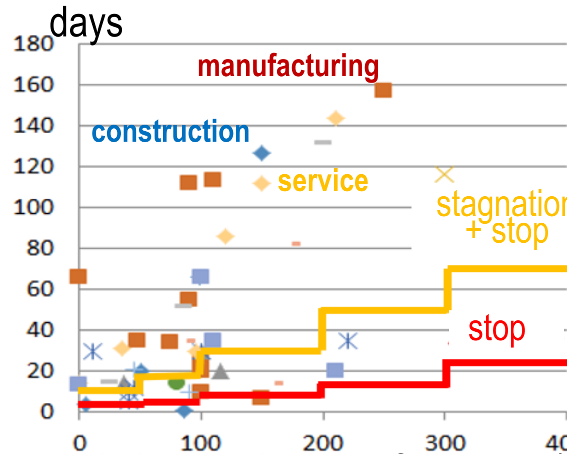
3.9 in 2000
2.3 in 2015
1.4 in 2065

⇨

Person Needing Support ↑
Person Offering Support ↓

(Cabinet Office)



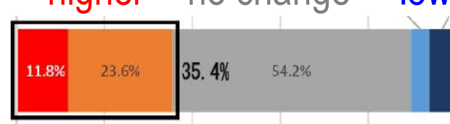


Inundation depth above floor level (cm)

Recent flood cases reveal that small and medium businesses need far more days to make a full recovery after the event, compared with the number of days (yellow and red lines) cited in the national survey manual.

higher no change lower

23 Wards of Tokyo



(Cabinet Office)

Under COVID-19, interest in migrating to local areas rises among twenties and thirties in Tokyo, Osaka and Nagoya.

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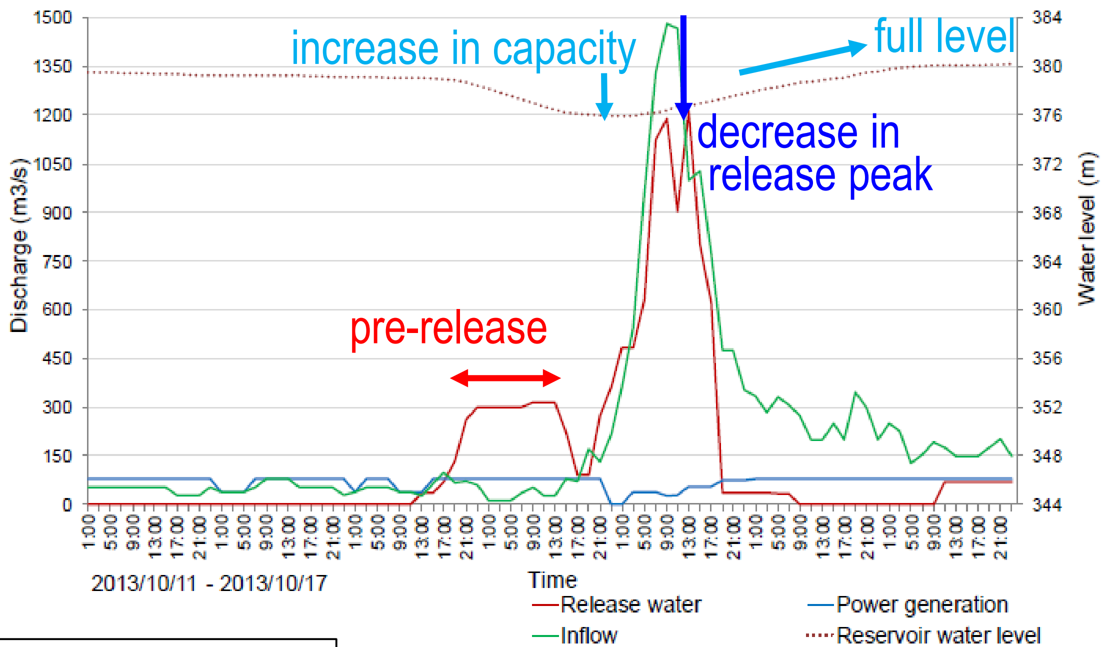
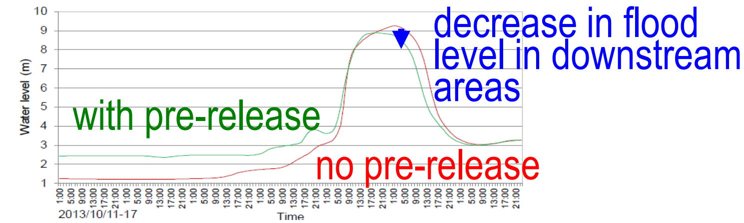
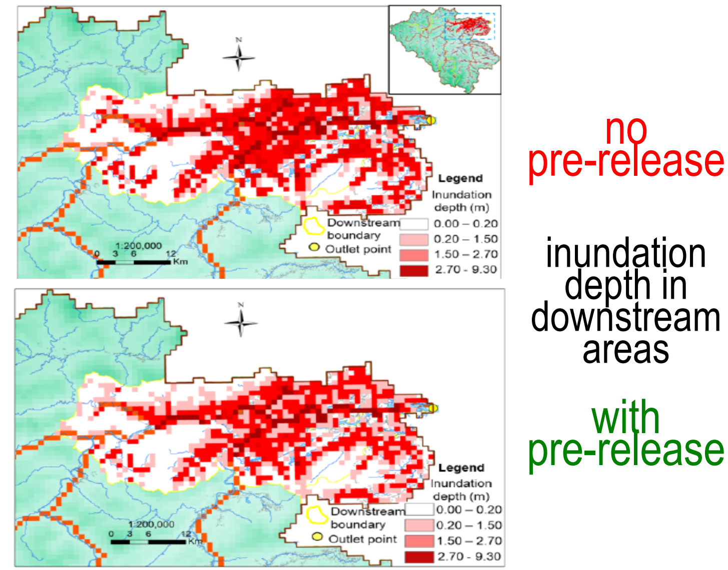
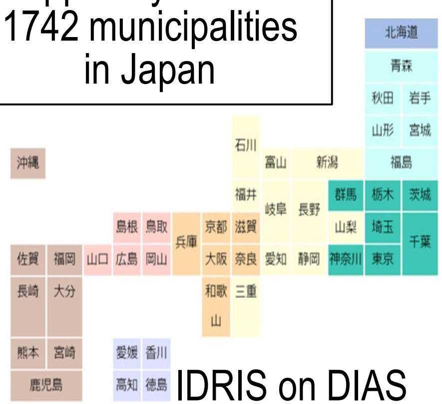
Evaluation of the effect of pre-release from a hydro-power generation dam on flood disaster risk reduction in downstream areas in central Vietnam.

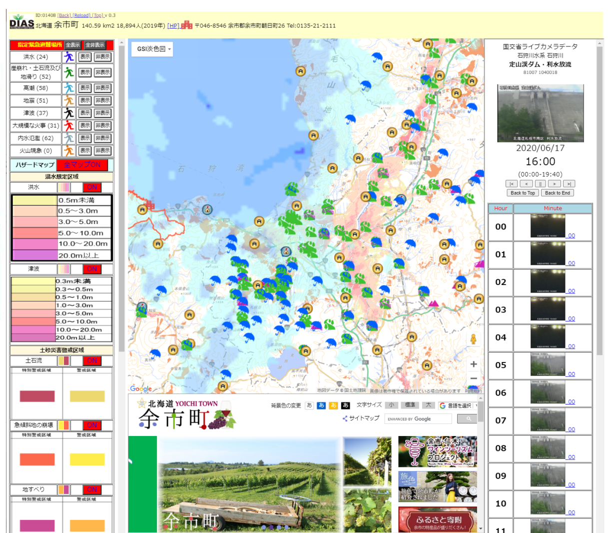






Flood management support system for 1742 municipalities in Japan





IDRIS on DIAS to share Integrated information by all

People's capacity building using virtual reality

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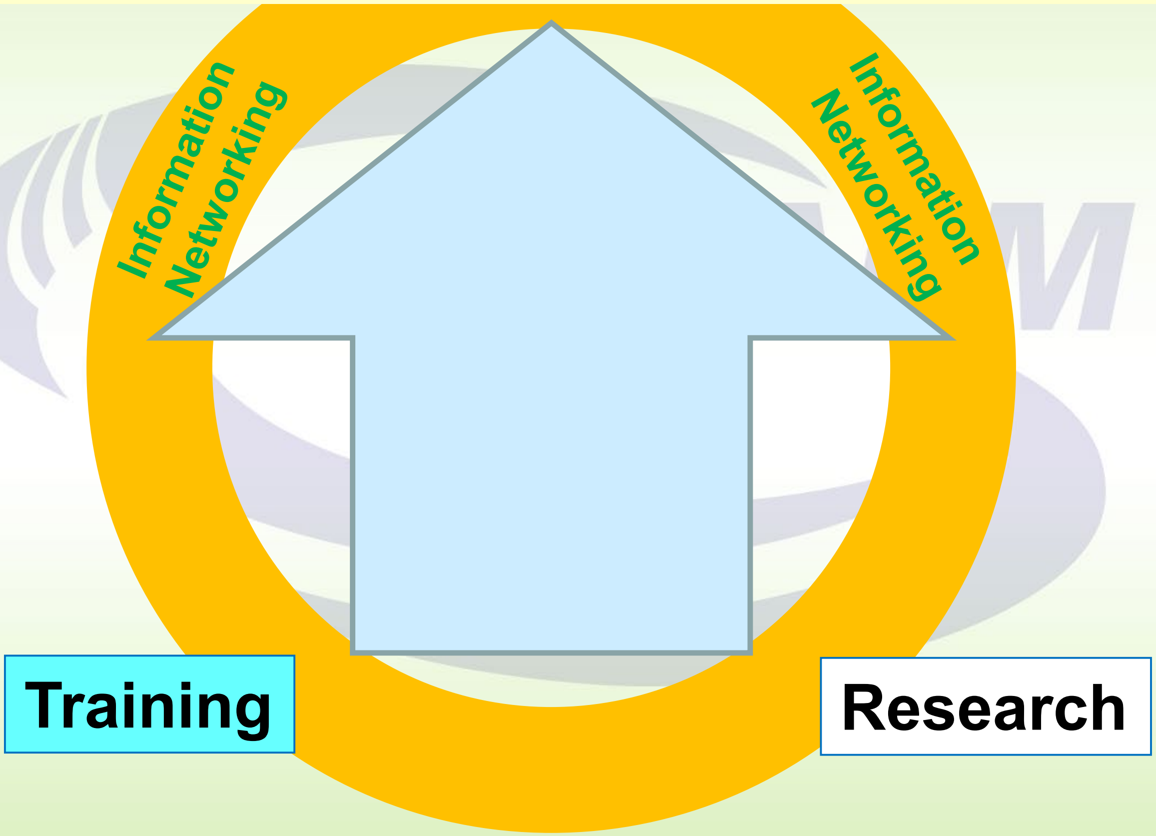

Thanks to the hard work on the learning side and the enthusiasm on the teaching side.

Online discussion with a supervisor

The 13th Closing Ceremony for JICA Knowledge Co-Creation Program on “Flood Disaster Risk Reduction”

Lecture using an electric whiteboard

Practicing social distancing

Students in a graduation gown at GRIPS

Hybrid hands-on training

Q: How do you feel about being caught in the COVID-19 pandemic during the training in Japan? And is there anything you have been doing to maintain your motivation to complete your master’s thesis under this gloomy circumstance?

<Student A> I’ve been keeping myself busy with different tasks so that I can avoid thinking too much about the terrible conditions all over the world.

<Student B> COVID-19 has spread all over the world, so we have to tackle this situation by taking some precautionary measures, which I have been doing.

<Student C> I feel lucky because the COVID-19 situation in my country is far worse than in Japan, and here I don’t have to practice as much confinement as my parents and colleagues do back home.

<Student D> I feel afraid of facing with COVID-19 because here in Japan, I have no family to take care of me. But on the other hand, Japan has better medical services than my country, and JICA and ICHARM have been taking really good care of us.

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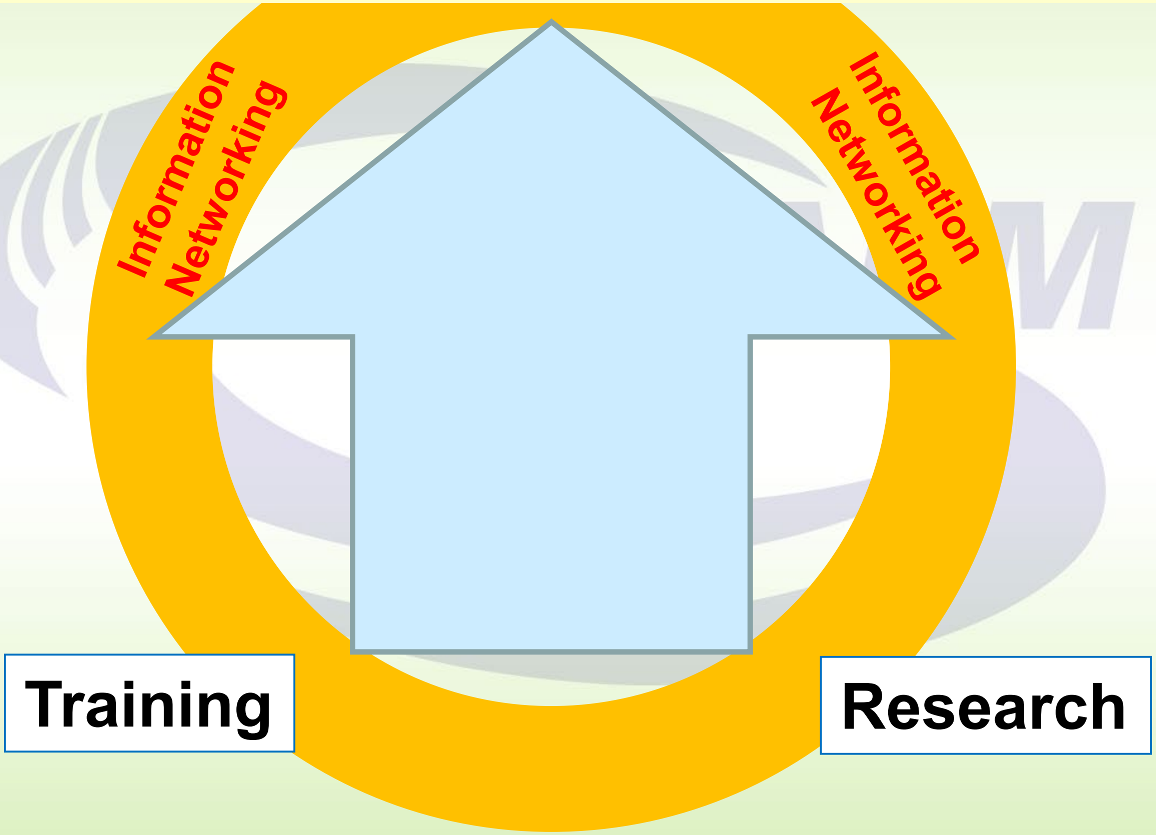
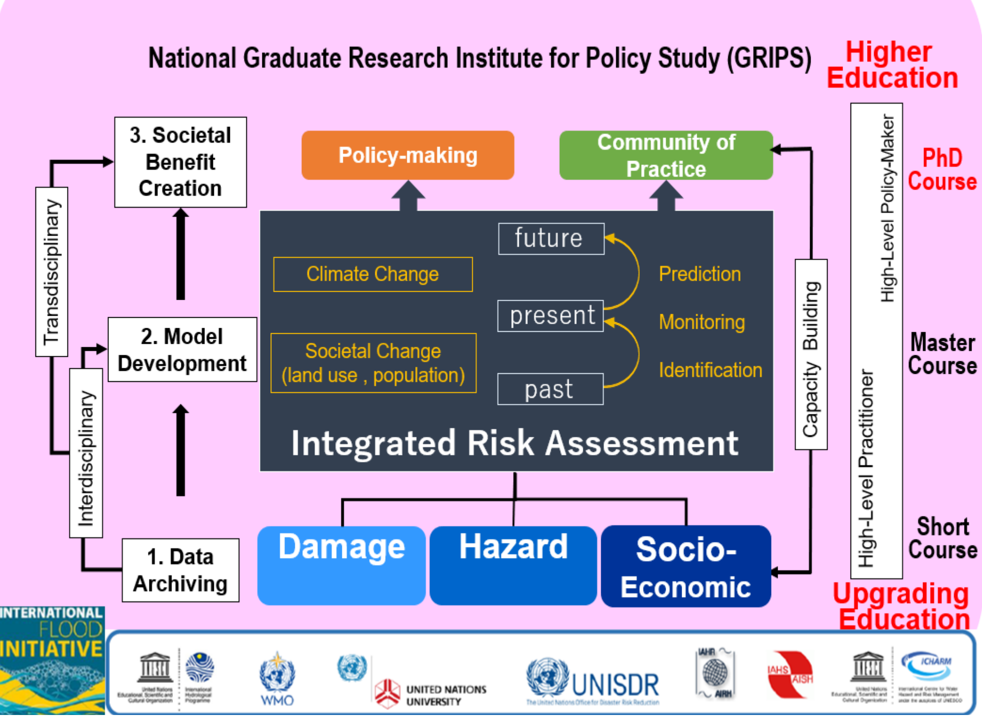
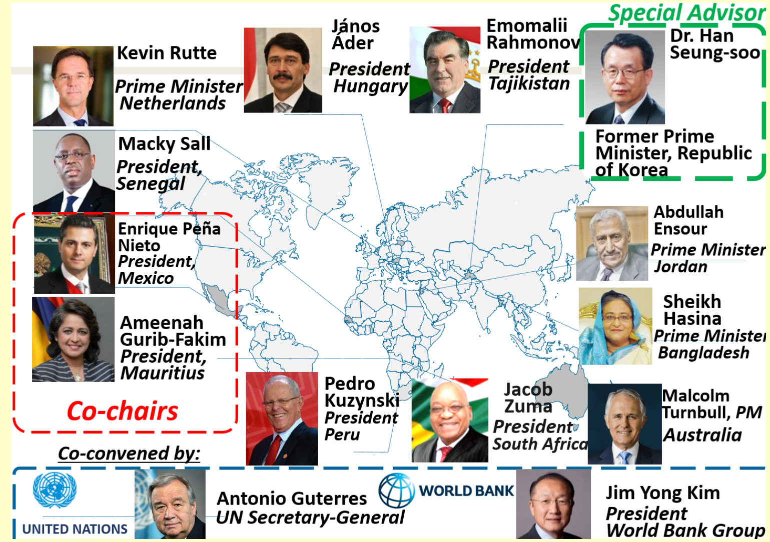


Platform on Water Resilience and Disasters

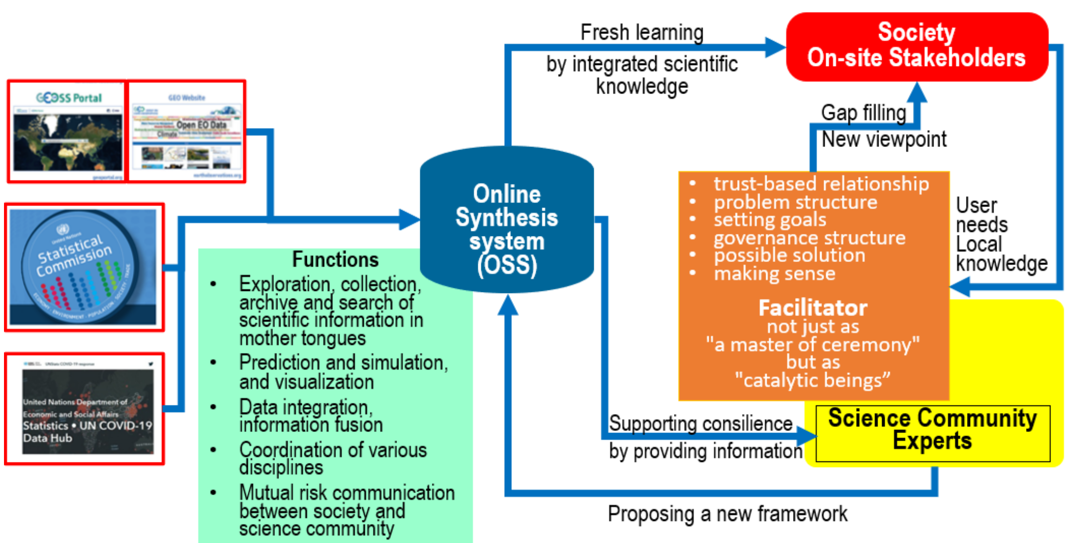


High Level Panel on Water (HLPW)



Platforms on Water Resilience and Disasters

all stakeholders should be formulated in countries to facilitate dialogue and scale up community-based practices.



Implementation Strategy: OSS and Facilitators

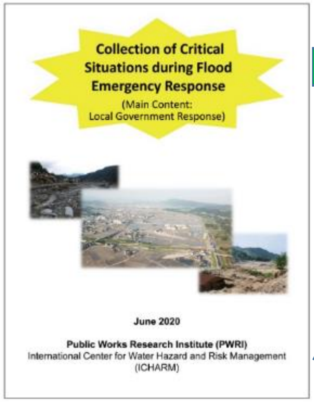
H.E. Dr. Basuki Hadimuljono, Minister, Public Works and Housing, Indonesia

Developing an "Online Synthesis System (OSS) and fostering "Facilitators" by making maximum use of e-Learning systems.

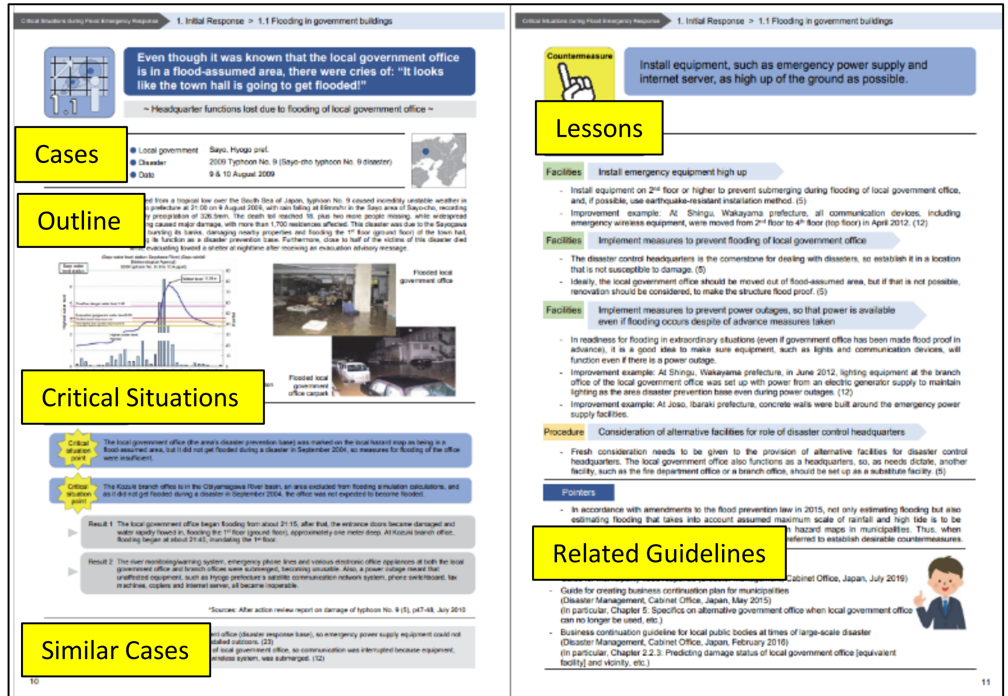
Collection of Critical Situations during Flood Emergency Response

ICHARM has published a booklet entitled “Collection of Critical Situations during Flood Emergency Response” in June, 2020.

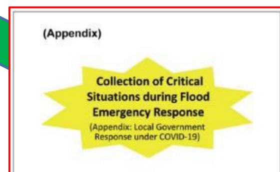
Main Content: local government response



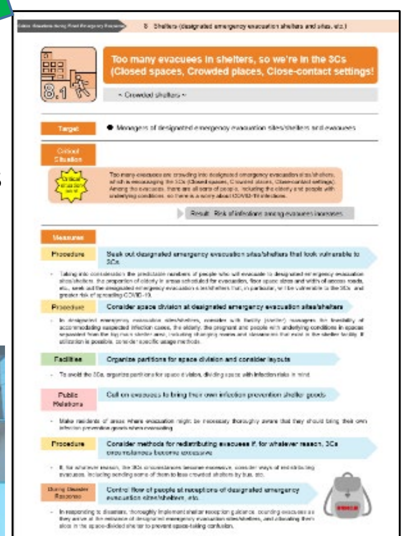
28 cases of critical situations from the review reports of past flood disasters.

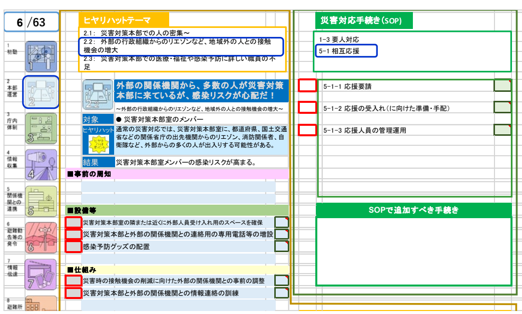


Appendix: local government response under COVID-19

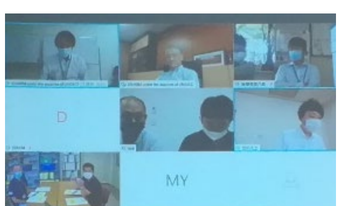


28 possible cases of critical situations considering several guidelines and manuals.





Support System for responsible sectors of municipalities in checking measures

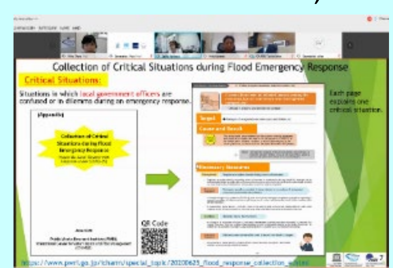


Capacity Building

Outreach Activities

- Training for local governments
- Presentations at conferences
- Distribution of booklets, etc.

Training at a local government (Aug.7, 2020)

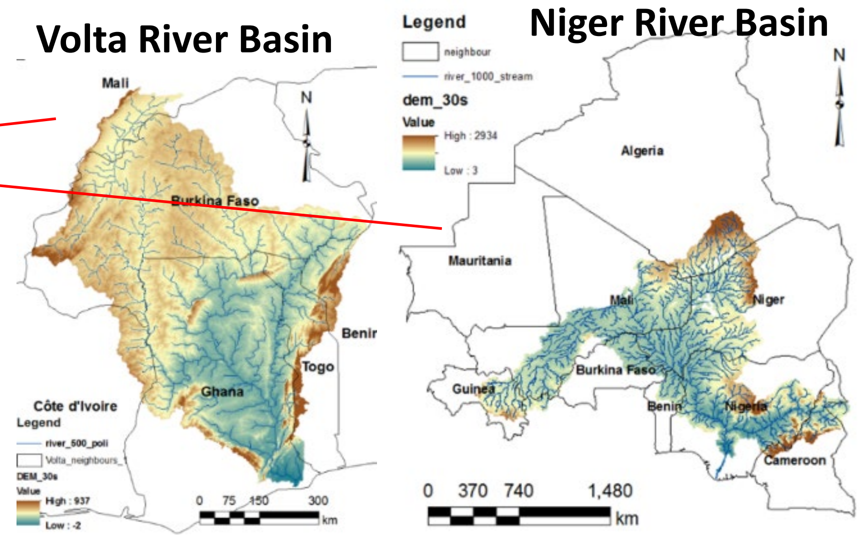


Online conference by High Level Experts and Leaders Panel on Water and Disasters (HELP) (Aug. 20, 2020), attended by their Majesties the Emperor and Empress of Japan together with 300 participants from 40 countries.

URL: https://www.pwri.go.jp/icharm/special_topic/20200625_flood_response_collection_e.html

Water Disaster Platform to Enhance Climate Resilience in Africa (WaDiRe-Africa)

WaDiRe-Africa is a collaborative project with the UNESCO Intergovernmental Hydrological Programme (IHP), and the AGRrometeorology, HYdrology, METeorology (AGRHYMET) , the Niger Basin Authority (NBA), the Volta Basin Authority (VBA), and the Ministry of Foreign Affairs of Japan.



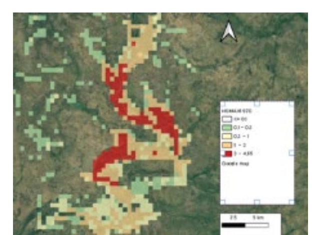
Kick-off Meeting in Lome, Togo, in June 2019

e-Learning Training Course

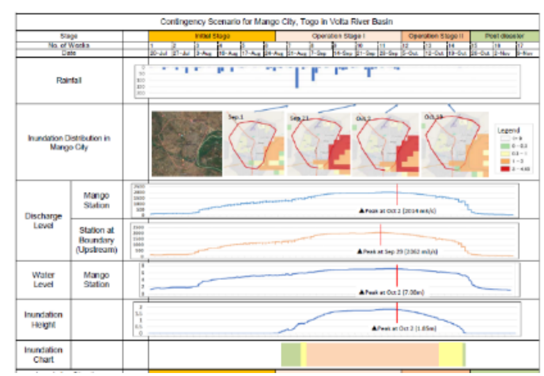
1.Training for Experts
- Lecture, Tutorials, Q&A Session
- 288 participants, 197 certificated

Tutorial of flood simulation

2.Training for Trainers
- Lecture, Q&A Session
- 44 participants, 30 certificated

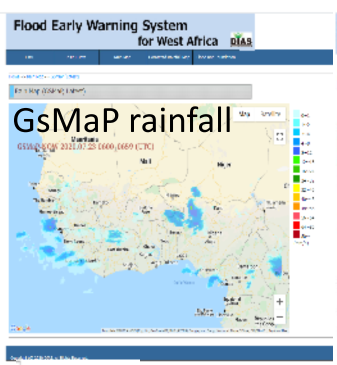


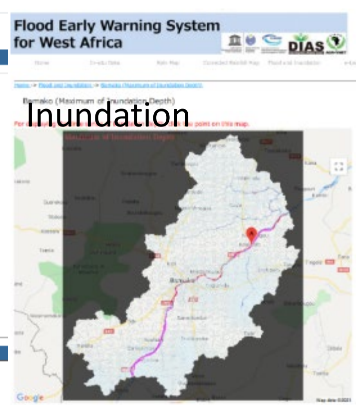
Tutorial of hazard mapping



Tutorial of Contingency Planning

Development of Flood Early Warning System for West Africa





Near real-time flood simulation by Water and Energy Budget Rainfall-Runoff-Inundation Model（WEB-RRI Model) on Data Integration and Analysis System (DIAS)

DIAS Data Integration & Analysis System

Image of 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

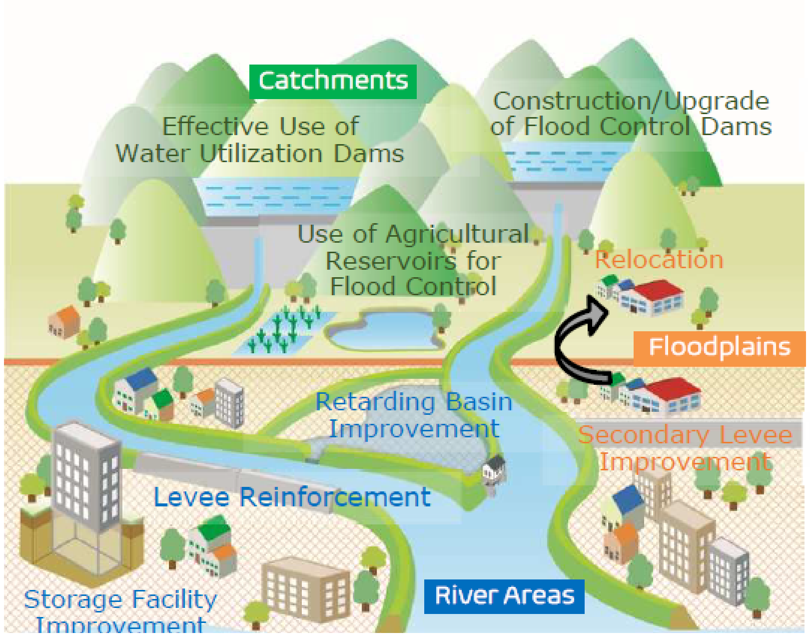
River Areas

- 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

Guiding Goal towards 2030: Inclusive and Knowledge-based Society

River Basin Disaster Resilience and Sustainability by All

Trust and Accountable Data and Information

Trust and Accountable Community and Personality

Objective

- Understanding and quantifying changes in climate, water cycle and sediment dynamics
- Contributing to achievement of SDGs water - food/energy/poverty
- Deepening the understanding of societal changes, reducing risks, and developing a smart society

- Highly reliable simulation technology for expressing and predicting various water-related disasters.
- Modeling, risk assessment and river channel design regarding flood and inundation phenomena in mountainous rivers involving sediment, driftwood, and channel change.
- Risk communication tools for sharing multifaceted and integrated water-related disaster risk information considering social and economic systems.
- Water disaster prevention facilitators capable of leading the solution of water-related problems on site.

Water-related disaster risks

Climate Change
serious flood and sediment disasters, large-scale droughts, large variability in water resources

Societal Changes in Japan
decreasing birthrate and aging population, frequent disaster impacts on urban areas, multi-functional roles of meso-mountainous regions, increasing maintenance cost

Societal Changes in the World
increasing risks associated with development and environmental changes, instability of international society

To design and implement research and maximize their effects based on the back-cast from 2030.

Appraisal of the ICHARM Work Plan

FY 2020 (2020.4 – 2021.3)

Appraisal of the ICHARM Work Plan adopted at Governing Board meeting on 2 June 2020

Category	Content	Activities and expected results in FY2020	Self-assessment of achievements S…Excellent, more than planned A…Good, as planned B…Satisfactory, less than planned C…Poor, far less than planned	FY2020 Achievements
(i) Innovative research				
(a) Technology for constantly monitoring, storing and using disaster information				
Methods will be proposed for disaster data collection and basic database development with their practical applications. This should eventually lead to data analysis using a Data Integration and Analysis System (DIAS). A data correction method will be also proposed to be used in the process of building a database using global data and near-real time data from satellites. The impact of disaster reduction will be assessed quantitatively by the disaster database including its use in model areas both in Japan and overseas.				
(i)-(a)-1. Research on simple methods for assessing the socio-economic impact of flood disasters	Develop a simple method for assessing the socio-economic impact of flood disasters	Continue economic impact assessment using a simple method developed by ADBI, based on the inundation depth and economic data collected in Joso City, flooded by the Kanto Tohoku torrential rainfall in 2015.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	In collaboration with GRIPS, continued the development of an assessment method for indirect flood damage that compares multiple macroeconomic indicators between Joso City, which was inundated in the Kanto-Tohoku heavy rain disaster in September 2015, and other municipalities, which did not suffer any damage in the same disaster and whose economic activities are similar to the ones of Joso City.
	Among the developed simple methods for assessing the socio-economic impact of flood disasters, test a globally applicable method by estimating such impact at national and global levels.	Test the applicability of the ADBI economic impact assessment using the flood damage data collected in Davao, Mindanao Island, the Philippines.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	While remaining unable to conduct scheduled activities in the Philippines due to the COVID-19 pandemic, started developing an Online Synthesis System (OSS) for local stakeholders to strengthen flood response capabilities under climate change through an e-learning program and prepared a series of online lectures related to the Davao River basin of the Philippines in March 2021.
(b) Support system for early warning capable of providing accurate information in a shorter period of time				
More advanced application of a regional atmospheric model (WRF) and further improvement of IFAS and RRI will be achieved. Using these advanced technologies, a method will be developed for more accurate real-time prediction of rainfall, runoff and inundation to ensure over 10 hours of lead time necessary for evacuation in a wide area and dam discharges prior to rainfall. The developed method will be tested for applicability to river basins both in Japan and overseas with different conditions of data availability, climate and topography, and eventually used to establish an early flood warning and system. A technology will be developed to evaluate water disaster hazards by using satellites and sediment hydraulic models.				
(i)-(b)-1. Research on technologies for more accurate real-time prediction of runoff and	Improve the accuracy of the flood inundation prediction model by upgrading the flood	By applying the parameter optimization method to water level prediction systems of small and medium scale river using RRI models and improve the prediction accuracy and eliminate unnecessary work.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance	Applied the SCE-UA method to the RRI model as the parameter optimization method. Applied this method to about 60 rivers in FY2020, confirmed its effectiveness, and sorted out the problems. The method reduced the workload required for parameter fitting.

inundation by complementing insufficient data availability	tracking method and introducing an automatic parameter optimization method.		[A] ④ Social significance [A] ⑤ Dissemination [A]	Studied the effect of changes in the optimization period and other factors to address the failure to obtain the desired effect due to problems related to the relationship between the flood scale and the optimizing period.
	Clarify the applicability of satellite rainfall data and develop a basin-specific data correction method.	Study correction technology of GSMaP in case real-time ground rain gauge data cannot be obtained. Examine the density of the ground rain gauge required to secure the accuracy of GSMaP.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [S] ⑤ Dissemination [A]	Applied GSMaP corrected with ground rain gauge data to obtain hourly precipitation for the Swa Chaung dam basin in Myanmar. Calculated the dam inflow using RRI model with the hourly precipitation data, compared the results with the observation data, and confirmed a good agreement between them. The series of achievements was highly evaluated by the World Bank. Established a system that automatically conducts GSMaP bias correction for the Niger and Volta river basins in West Africa by multiplying GSMap data obtained in real time by the correction coefficient calculated in advance using past ground rainfall observation data. Carried out runoff simulation for the Fuji river basin using the BTOP model and GSMaP, to which multiple correction methods were applied, and confirmed that, in terms of space, the correction by each GSMaP grid is more effective in producing accurate simulation results than the correction using the basin average rainfall and that, in terms of time, the correction using the 10-day average is more effective than the correction using the hourly or monthly average. The results were published in an international journal.
	Improve the accuracy of the WRF model for heavy rainfall prediction using X- and C-band MP radars and the Ensemble Kalman filter.	Evaluate the accuracy of heavy rain forecasting with a relatively long lead time, specializing in large-scale and important weather phenomena such as typhoons. Regarding localized torrential rain, examined a method to improve the accuracy of prediction by increasing the resolution of meteorological models.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Conducted ensemble forecasting by combining the WRF model and the Ensemble Kalman Filter and outflow prediction experiments using the RRI model for the 2019 Chikuma river flood caused by Typhoon Hagibis. The results confirmed that it is possible to accurately predict the time and scale of the flood peak from 5 days before the flood and suggested that the high accuracy of the JMA global weather forecasts used as the boundary condition is likely to be a major factor for obtaining highly accurate predictions. The results also suggested that it is possible to predict typhoon-induced floods with a relatively long lead time if accurate data and information are available. The results were published in the Annual Journal of Hydraulic Engineering of JSCE.
	Develop a method for real-time flood inundation forecasting using multiple rainfall forecasting approaches with prediction uncertainty.	Study effective dam operation rules using the prediction results obtained from the ensemble prediction with their distribution.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Established a Water and Energy based Rainfall-Runoff-Inundation (WEB-RRI) model for the Vu Gia Thu Bon river basin in Vietnam, considering the A Vuong dam and the Dak Mi 4 dam. Also established 33 ensemble models for 39 hour-ahead rainfall forecasting. Calibrated the models and studied effective dam operations by applying them to the historic flood event in October 2013. Calibrated the flow rate of WEB-RRI using on-site flow observation data and also calibrated the prediction of flooded area in the model using on-site inundation depth data and inundation area data estimated from synthetic aperture radar (SAR) mounted on the satellite Sentinel-1. Compared two scenarios with and without dam discharges prior to rainfall using inflow prediction information to examine the effect of the dam operation on flood control in the downstream area and confirmed that the dam operation can decrease inundation area and depth in the downstream area.

(i)-(b)-2. Development of technologies using satellites and sediment hydraulic models for assessing the impact of water disaster hazards	Estimate sediment transport and develop an estimation method of river channel topography change.	In order to evaluate the behavior of riverbed sediments composed of fine sediment, establish a new evaluation method for sediment transport using density flow theory. By introducing it into numerical calculation, develop a method for estimating the change in river channel topography applicable to a riverbed composed of fine sediment.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [A] ⑤ Dissemination [A]	Established a new method for estimating the sediment flow using the density current theory to predict the behavior of riverbed sediment composed of fine sediment. Introduced this method to numerical calculations and developed a method for estimating river channel topography changes, which is applicable to riverbeds composed of fine sediment. Conducted hydraulic experiments to examine the validity of this method and presented the results at a Conference on Hydraulic Engineering of JSCE and IAHR-APD CONGRESS 2020 to disseminate them.
	Develop a flood damage risk mapping method that takes sediment hydraulic phenomena into account.	Verify the results of sediment, driftwood and flood analysis based on sediment hydraulic model experiments and field survey results.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [A] ⑤ Dissemination [A]	Conducted sediment hydraulic model experiments and field surveys to verify the analysis results of sediment and floods. Also conducted close examinations on two specific cases: the 2019 disaster in Marumori Town, Miyagi Prefecture and the 2020 disaster in Hitoyoshi City, Kumamoto Prefecture. The results found that the sediment from the mountainous areas deposited on the river channels in the plains, reducing the cross-sectional areas of the rivers and increasing the likelihood of flooding. The results were published in a journal, "Advances in River Engineering" of JSCE.
	Develop a method for mapping flood inundation risk in mountainous rivers	Propose a method to evaluate the inflow of sediment containing fine sediment in mountainous rivers, and create flood inundation risk maps by numerical simulation.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [A] ⑤ Dissemination [A]	Developed a prototype of a model for estimating the sediment runoff of the entire basin during a heavy rainfall event by integrating the RRI model and a model that calculates the sediment dynamics of the entire basin. The developed model enabled inundation calculation and flood inundation risk mapping. The results were published in River Flow 2020 and made efforts for dissemination of them. Found that it is possible to formulate the process of sediment erosion, transport, and deposition during flooding in mountain rivers using the product of watershed area A and river bed gradient i as an index. Confirmed the usefulness of this approach to identify areas prone to flood events involving a large amount of sediment by testing it on actual cases in 2018 and 2019. Published the results in a journal "Geographical review of Japan" and made efforts for their wider dissemination.
(c) Assessment and planning technology for appropriate water resources management with insufficient information				
A long-term water balance simulation technology will be developed to support optimal planning of water resources management both in Japan and overseas. This technology will offer a variety of functions to support highly technical dam operation integrating flood control and water use, water demand settings, soil moisture content settings based on satellite observation technology, application to a wide range of climate categories, input of highly detailed topographical, geological and other data.				
(i)-(c)-1. Development of a simulation system to provide long-term support for integrated water resources management under different natural and topographical conditions	Improve technologies for integrated water resources management.	Evaluate on-site demonstration experiments jointly with the electric power companies and improve the system based on the evaluation results.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [A] ⑤ Dissemination [B]	Examined dam operation rules in cooperation with electric power companies for flood events in the warm seasons in the upper reaches of the Oi River (Chubu Electric Power Co., Inc.). Predicted the inflow to the dam and conducted simulations for downstream flood control and power generation increase for the year 2018 of Hatanagi Daiichi Dam by inputting 32 ensemble models of 39 hour-ahead rainfall forecasting to WEB-DHM. The results found that the current operation rules can reduce the dam discharges exceeding 600 m3/s by 63.5% and increase the power generation by 12.5% in terms of power generation index. The results also found that the modified

					operation rules can reduce the dam discharges by 100% and increase the power generation by 12.7%.
		Study soil moisture content based on satellite data.	Evaluate and improve the drought monitoring and forecasting system by CLVDAS applied to the state of Ceara, Brazil, based on operation. Reflect the results of soil moisture observation by microwave radiometer to the microwave observation algorithm.	① Overall evaluation [B] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	Achieved relatively good results from the verification of the drought monitoring and prediction system using CLVDAS for the state of Ceará, Brazil. However, unable to complete the evaluation and improvement of the system based on the test operation results due to the COVID-19 pandemic. Besides, applied the monitoring system to West Africa to verify its applicability to other regions and confirmed its proper operation. Improved the system for this application to evaluate the soil moisture profile up to a depth of 2 m in addition to that of the surface and rhizome layers. Also improved the microwave radiation transmission model, the core component for soil moisture estimation by microwaves, to reduce estimation uncertainties in the dry region and confirmed its effectiveness by verifying the results with the observation data obtained from experiments using a microwave radiometer.
		Improve the applicability of systems and models to rivers in Japan and overseas with different climate conditions.	By combining WEB-RRI and SIMRIW (Simulation Model for Rice-Weather Relations), the suitability of hydrological models to rice cultivation areas will be improved.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	Developed a combined model of WEB-RRI and SIMRIW (Simulation Model for Rice-Weather Relationships) and currently testing the program of the combined model. This new combined model makes it possible to predict rice crop damage and rice yields associated with floods and droughts under climate change.
	(i)-(c)-2. Integrated Research Program for advancing Climate Models (TOUGOU) (MEXT program)	Assess water disaster risk in Asia and create information on adaptation measures.	Calculate future water cycle phenomena both in the present and future using WEB-RRI. Conduct forecast calculation of the future hazard such as floods and droughts, and assess the risk based on the results of hazard calculations and land use in the basin.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Conducted simulations to predict future water cycle phenomena in the Solo and Davao River basins using WEB-RRI. Also conducted simulations of flood and drought hazards and assessments of future risks considering land use and other factors of the basins.
(d) Technology for assessing the impact on local communities of water related disasters in flood plains and for evaluating the effect of investments in disaster risk reduction					
	A disaster risk assessment method will be developed to evaluate “strength against fatal damage” and “resilience for speedy restoration”. Indices will be proposed to help policy makers in Japan and overseas easily recognize local disaster risks and holistically evaluate the effect of investments on disaster risk reduction so that they can make informed investment decisions. A method will be proposed for building disaster resilient communities in Japan and overseas by using the developed risk indices.				
	(i)-(d)-1. Research on a multifaceted water disaster risk assessment for worldwide use and a disaster-resilient community	Propose a highly accurate and advanced method for multifaceted evaluation of disaster risk	Study a method to evaluate the risks particular to disaster cases in which floods occur concurrently across a wide area by analyzing questionnaire survey results on the resilience of the businesses in Okayama and Hiroshima prefectures, affected by the heavy rainfall in July 2018.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A]	Analyzed survey responses regarding the resilience of local businesses in Hiroshima and Okayama prefectures after the heavy rain disaster in July 2018. Based on the analysis results, presently studying an assessment method for direct and indirect damage (losses from temporary closure, etc.) according to inundation depth, lifeline utility damage and other factors.

building method based on the assessment			⑤ Dissemination [B]	
	Propose risk indices to holistically evaluate the disaster risk reduction effect of disaster prevention measures and investments	Conduct risk assessment using the indicator developed to evaluate the level of damage at which a pre-disaster level of population and gross regional product can still be sustained after a disaster, based on the results of the questionnaire survey conducted in Iwaizumi Town, Iwate Prefecture, in the previous fiscal year.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	Based on the results of the investigation conducted in Iwaizumi Town, Iwate Prefecture, currently studying a method to estimate post-disaster population outflow rates according to the intention to build a new house by household type and house damage levels. Also studying the level of flood damage at which communities can maintain themselves even after a flood disaster.
	Propose a method for building disaster resilient communities in Japan and overseas by using the developed risk indices.	Propose a list of approaches to build resilient local communities, based on the risk assessment explained above.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	Studying approaches to build the resilience of local communities to possible hazards based on the estimation method that are being applied as mentioned right above.
(e) Technology for the effective use of water related disaster risk information to reduce disaster damage				
An information system, as well as communication tools such as disaster response timeline tables, will be developed to support disaster management efforts by administrators and local residents to prevent or mitigate flood and sediment disasters. The effective use of such a system and tools will be proposed.				
(i)-(e)-1. Research on a water disaster risk information delivery system to support local disaster management efforts in areas with insufficient water disaster information	Propose a method for identifying areas vulnerable to disasters (disaster hot spots) prior to disasters.	Review the method applied to Aga Town of Niigata Prefecture, Iwaizumi Town of Iwate Prefecture, and Calumpit of Bulacan Province, the Philippines. And improve the automatic risk-map creating tool using RRI-model output and revise the manual of this method.	① Overall evaluation [B] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [B]	Developed a flood risk assessment tool and tested its applicability in Iwaizumi Town in Iwate Prefecture.
	Propose a method for forecasting the possibility of a water-related disaster by community in real time.	Study the improvement of the Web-GIS information delivery system used to assess the possibility of water-related disasters at the community scale to achieve real-time prediction in the future.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Launched the ICHARM Disaster Risk Information System (IDRIS), proposed as a Web-GIS information delivery system in the previous year, at the experimental demonstration website of Aga Town, Niigata Prefecture, for the public use and presently preparing for a launch of IDRIS for Iwaizumi Town, Iwate Prefecture. Finalized the basic design of a smartphone application useful to provide information to residents on the possibility of flood disasters.
	Propose a Web-GIS water-related disaster risk information delivery system that helps accumulate and share various types of disaster	Analyze the technical issues that became apparent through the test operation of the WEB-GIS information delivery system for Aga Town and improve the system. Test the applicability of the system to other communities by applying it to Iwaizumi Town, Iwate Prefecture.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance	Analyzed the factors causing IDRIS to malfunction on the open website mentioned right above and confirmed that IDRIS can recover from malfunctioning by updating the functions of the e-community platform, which is IDRIS's base system, and updating the site link regularly. Also confirmed that it is possible to ensure the operational stability (versatility) of

		risk information and deliver evacuation information.		[A] ⑤ Dissemination [B]	IDRIS by including regular system updating as part of the maintenance procedure.
		Propose the effective use of the Web-GIS information delivery system to stakeholders of local administrative bodies in Japan and overseas.	Study the system specifications to disseminate the Web-GIS information delivery system.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Studied ways to promote the widespread use of IDRIS using a cloud service. Built an IDRIS server (an IDRIS base system) using a cloud service and currently developing and standardizing a way to customize the IDRIS base system according to the characteristics of users' websites. Developed IDRIS on DIAS in collaboration with the Institute of Industrial Science, the University of Tokyo, to deliver wide-area flood disaster information and studied ways to make the system available for the public.
	(i)-(e)-2 Development of risk communication systems to increase public awareness of water-related disasters and risk management	Develop a DIAS-based simulation system that can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.	Improve the DIAS-based simulation system for practical use. The system can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [S] ⑤ Dissemination [A]	Started the development of a flood disaster information delivery system covering both wide areas and nearby locations by coupling an IDRIS-based system, capable of reproducing, predicting and visualizing flood disaster information of specific locations in detail, with IDRIS on DIAS, capable of reproducing, predicting and visualizing real-time information of wide areas. Conducted a basic study with the Institute of Industrial Science, the University of Tokyo, for linking IDRIS with the System for Human-resource Input and Functional Team (SHIFT) and the Business Operation Support System (BOSS). In this study, a prototype was developed by combining a disaster response standardization method with the Collection of Critical Situations during Flood Emergency Response (Appendix: Local Government Response under COVID-19). Then the prototype was experimentally used by the disaster management sections of seven local governments across Japan.
		Develop a more effective risk communication system by incorporating psychological factors.	Develop a VR flood simulation app for Hita City, Ooita Prefecture, and Aga Town, Niigata Prefecture, to provide a system which can contribute to raising public awareness of safe evacuation from a flood by letting people experience evacuation in a virtual flood.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [S] ⑤ Dissemination [A]	Developed a high-end VR tool for Hita City, Oita Prefecture, which maximizes detailed numerical simulations of flood disasters and visual and auditory effects of VR technology. Also developed movies and a VR evacuation drill tool, through which people can virtually experience different flood situations according to the difference in time when they start evacuation. Conducted activities related to Aga Town, Niigata Prefecture: collected detailed spatial information by conducting surveys using drones and ground laser instruments; reproduced inundation events using the RRI and iRIC models; and integrated collected data and information using the Construction Information Modeling (CIM). Produced VR flood-experience contents based on the integrated information and developed a prototype of a VR evacuation drill tool using a cloud service, which allows several people to participate virtually.
		Collect and share important knowledge for flood disaster response	Collect and organize important knowledge for communities responsible for residents' lives and assets to take appropriate flood disaster response actions during a flood disaster, including safely leading residents to evacuation. Also create a list of key considerations regarding flood disaster response efforts under the COVID-19 pandemic.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [S] ⑤ Dissemination	Collect data and information from reports on disaster response efforts issued by local governments in the last 20 years and produced and published the "Collection of Critical Situations during Flood Emergency Response (Main Content: Local Government Response)." Also produced and published the "Collection of Critical Situations during Flood Emergency Response (Appendix: Local Government Response under COVID-19)" in a swift response to the COVID-19 pandemic.

			[S]	Published on June 25, 2020, the Japanese and English versions had 4,940 and 632 page views, respectively, by the end of December 2020, which indicates the worldwide use of the publications. They are also selected as one of the PWRI priority products for wide dissemination for FY2020 and distributed and advertised at technology exhibitions and other opportunities. They have been distributed to all 47 prefectures in Japan and even to all municipalities in some prefectures. Kawasaki City of Kanagawa Prefecture used the Japanese version at a training workshop for their crisis management officers on August 7, 2020. Presentations were also delivered online at meetings of HELP and the Asian Civil Engineering Coordinating Council (ACECC).
(i)-(e)-3. Local practice using research results	Continue supporting JST-JICA SATREPS, a project to develop an Area-BCM (Business Continuity Management) system to strengthen the disaster resilience of Thailand's industrial parks.	Complete a development of flood inundation analysis model for the entire Chao Phraya River basin. Examine to develop an industrial park-scale flood inundation analysis model which creates detailed spatio-temporal information on disaster risk using the results as boundary conditions provided by the basin scale model. By collecting time series data of the inundation depth at the time of the 2011 flood and comparing the calculation results to them, conduct calibration and reproducibility verification of the model.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Completed the development, calibration and verification of the flood inundation analysis model for the entire Chao Phraya River basin. Collected highly-reliable topographical data needed for developing an industrial park-scale model for the Rojana industrial park in cooperation with our Thai counterpart, Chulalongkorn University's Faculty of Engineering, although on-site surveys were impossible due to the COVID-19 pandemic. Currently continuing the development of an industrial-park-scale high-resolution flood inundation analysis model. Also conducted hydrologic statistical frequency analysis on the characteristics of long-term rainfall events over the Chao Phraya River basin with the National Research Institute for Earth Science and Disaster Prevention (NIED). The results were published in the Journal of Disaster Research.
	JST-JICA SATREPS, The Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in Philippines (new project)	Collect natural and social environment data, integrate hydrological and agricultural models for flood and drought risk assessment, and analyze local issues for the evaluation of water-related disaster resilience in the basins of the Pampanga River, the Pasig-Marikina River, and Lake Laguna in the Luzon Islands in the Philippines.	① Overall evaluation [A] ② Publication [B] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Continued the preparation for the project in cooperation with the organizations concerned in Japan and the Philippines, while remaining unable to make overseas trips due to the COVID-19 pandemic. For the project, scheduled to start in June 2021 as JICA's ODA project, one general meeting and seven group meetings were conducted with the Philippine counterparts as part of the preparation to have a common understanding among the participants. Developed a system to collect data on natural, social and other environments for the basins of the Pampanga, Pasig, Marikina and Lake Laguna in Luzon Island, the Philippines, and identified issues to solve for the realization of a flood disaster resilience assessment to be conducted for those basins. Currently merging source codes of hydraulic, hydrological and agricultural models to carry out flood and drought risk assessment and analyzing damage caused by Typhoon Ulysses (No.22) to Luzon Island when it landed there on November 12, 2020, using satellite and other data.
(ii) Effective Capacity Development				
(1) Train solution-oriented practitioners and Training-of-Trainers (TOT) instructors with solid theoretical and engineering competence who will contribute effectively to the planning and practice of disaster risk management at local and national levels.				
(ii)-(1)-1. Capacity development for professionals who can train and supervise local researchers	Doctoral Course "Disaster Management"	2-3 students (2020-2021)	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance	From April to May 2020, students were given remote access to ICHARM's computers and were instructed to write treatises remotely. In case the trainees were unable to leave Japan, a framework was established to accept the remaining trainees. In September 2020, one student from one country (one from Bangladesh) completed the course.

				[S] ⑤ Dissemination [A]	We adjusted the employment of research assistant when he/she cannot come to Japan or during the waiting period after coming to Japan. After arriving in Japan, we made adjustments regarding how to move during the waiting period and how to secure a waiting place. In October 2020, two students from two countries (one from Ethiopia and one from Bangladesh) were enrolled. Currently, 5 people from 5 countries (1 from Sri Lanka, 1 from Vietnam, 1 from Japan, 1 from Ethiopia, 1 from Bangladesh) are enrolled. Due to the delay in coming to Japan due to the spread of COVID-19 infection, the lectures from October to November were conducted online during stay in their country of origin. In addition, the introduction of electronic blackboard has made it possible to take online lectures as if the blackboard was in front of them. In face-to-face lectures after December, the podium was disinfected when the lecturer was changed, and partitions were set up in the lecture room and the ICHARM auditorium to prevent COVID-19 infection.
	(ii)-(1)-2. Capacity development for experts with practical solutions to local problems on water-related disasters	Master's Course "Water-related Disaster Management Course of Disaster Management Policy Program"	● 2020-2021: about 14 students from the candidate countries. ● Determine the candidate countries based on the results of a needs survey. ● Communicate closely with the candidate countries about the requirements for applicants, such as submission of a proof of English fluency.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [S] ④ Social significance [S] ⑤ Dissemination [A]	From April to May 2020, we conducted decentralized school attendance by academic advisor. And students were given remote access to ICHARM's computers and were instructed to write treatises remotely. We have put in place a framework for accepting residual trainees if they are unable to return to their countries. In September 2020, 11 people from 6 countries (2 from Bangladesh, 2 from Bhutan, 2 from Brazil, 2 from Myanmar, 2 from Nepal, 2 from Pakistan) completed the program. A treatise written by a trainee from Pakistan completed his master course program in September 2018, "Flood and Inundation Forecasting in the Sparsely Gauged Transboundary Chenab River Basin Using Satellite Rain and Coupling Meteorological and Hydrological Models," was published in the SCI Journal. In October 2020, 7 students from 6 countries (1 Bangladesh, 2 Bhutan, 1 Malaysia, 1 Mauritius, 1 Myanmar, 1 Tonga) were enrolled. Due to the delay in coming to Japan due to the spread of COVID-19 infection, the opening ceremony, inception report presentation, and lectures of October and November were held online from the time of staying in the country of origin. In addition, self-study using e-learning teaching materials was also conducted. Even now, we are giving lectures online to two people who cannot come to Japan yet. In addition, the introduction of electronic blackboards has made students possible to take online lectures as if the blackboard was in front of them. In face-to-face lectures after December, the podium was disinfected when the lecturer was changed, and partitions were set up in the lecture room and the ICHARM auditorium to prevent COVID-19 infection. Due to the re-spread of COVID-19 infection, lectures by outside lecturers were held remotely at home from January to March.

				In order to respond to the spread of COVID-19 infection, the location and schedule of field trips and the schedule of lectures are changed flexibly from time to time.
(ii)-(1)-3. Days- and weeks-long training to learn knowledge and technologies for water-related disaster risk management	Short-term training	Provide lectures and exercises in cooperation with the JICA Knowledge Co-Creation Program on “Water Related Disaster Management (Preparedness, Mitigation and Reconstruction)”.	① Overall evaluation [-] ② Publication [-] ③ Scientific significance [-] ④ Social significance [-] ⑤ Dissemination [-]	Due to the spread of COVID-19 infection, it will be implemented online in May 2021.
	Hold follow-up seminars for ICHARM master’s program graduates and others.	Hold a follow-up seminar in a country of graduates.	① Overall evaluation [-] ② Publication [-] ③ Scientific significance [-] ④ Social significance [-] ⑤ Dissemination [-]	Due to the spread of COVID-19 infection, priority was given to giving lectures on the current master's course, so the seminar was canceled.
(2) Build and strengthen a network of local experts and institutions involved in water-related disaster management by providing knowledge and skills accumulated from research and local practice for training in international projects and ICHARM’s educational and training programs.				
(ii)-(2)-1. Follow up and encouragement for ex-trainees	Hold workshops in ex-trainees’ countries.	● Create and update an alumni list. ● Continue strengthening the alumni network using the Internet and providing information on training programs. ● Organize follow-up seminars.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	We continuously created and updated the trainees list and built a network. The Facebook page was updated 10 times and continued to operate it.
(iii) Efficient Information Network				
(1) Collect, analyze and disseminate the records and experiences of major water-related disasters around the world as the comprehensive knowledge center for practitioners.				
(iii)-(1)-1. Collection and organization of disaster-related records and documents	Promote collaboration with other organizations and collect water disaster information.	Develop a framework for the efficient collection of water-related disaster information by assessing and evaluating the socio-economic impact of flood disasters using big data processed by DIAS of the University of Tokyo and promote the sharing and effective use of the collected information.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Promoted the integration and archiving of the hazard data of water-related disasters using DIAS. Continued to collect rainfall and other data in real time in the IFI implementing countries such as the Philippines and Sri Lanka and studied ways for the further utilization of such data for flood management.
(iii)-(1)-2. Collaboration with other organizations	Promote the collaboration with other organizations	Promote the collaboration for collecting abundant and reliable disaster information with international organizations (WMO,	① Overall evaluation [A] ② Publication	Actively participated in web meetings through which to track global trends and collect information on water-related disasters from other UNESCO

	and collect water disaster information.	UNDRR, etc.), the University of Tokyo and its DIAS project, and other UNESCO Centres and Chairs. Strengthen the collaboration with water-related disaster management agencies of each country through an IFI Platform on Water Resilience and Disasters.	[A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Centres and Chairs and international organizations, and strived to establish partnerships with these participating organizations. Established the partnership with WMO through the participation of ICHARM researchers in the Associated Programme on Flood Management and the Hydrological Advisers Forum for Regional Association II. Organized a webinar titled "ICHARM's efforts for addressing flood disasters considering the prevention of COVID-19 infection" on July 3, 2020, with over 60 participants from the IFI implementing countries, including high-level participants.
(2) Mainstream disaster risk reduction by disseminating knowledge and technology for water-related disaster risk management and building and maintaining a worldwide influential network such as IFI.				
(iii)-(2)-1. Collaboration with relevant organizations	Fulfill the duties as the IFI secretariat.	● Carry out the responsibilities as the IFI secretariat in collaboration with the participating organizations by reviewing the concept of IFI and other issues at the Advisory Committee meeting scheduled in August 2020 and holding periodical teleconferences as the Management Committee meeting. ● Continue efforts to disseminate IFI activities at various major international conferences such as ICFM8 and AOGEO and in collaboration with relevant organizations such as ADBI. Promote the partnership with the IFI implementing countries and relevant organizations.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Shared information with UNESCO and the other IFI member organizations by continuously organizing web meetings whereas most international conferences were cancelled or postponed due to the COVID-19 pandemic. Coordinated the postponement of the plenary and special sessions led by ICHARM at ICFM8, which has also been postponed until August 2021. Actively disseminated information on ICHARM's efforts by participating in a webinar organized by the ICFM secretariat. Co-published a policy brief with ADBI in August 2020 based on the ADBI-ICHARM Policy Dialogue held in January 2020. Organized the AWCI online session in February 2021 with the participation of the representatives from relevant organizations in the IFI implementing countries. They shared information and opinions on their activities, and the results were reported at the AOGEO plenary meeting. ICHARM Executive Director was presented with the GEO Individual Excellence Award 2020 for his considerable contribution to the establishment and expansion of GEO in November 2020.
	Support local efforts led by IFI.	Support the Philippines, Myanmar, Sri Lanka, and Indonesia in establishing the Platforms on Water Resilience and Disasters and promoting related activities. Continue efforts to expand IFI activities to other Asian countries, Africa and Latin America.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Documented the outcomes of the Platform activities, and discussed and developed the future plans of the activities in collaboration with the relevant organizations of the IFI implementing countries. Discussed plans for the implementation of e-learning training courses with those organizations.
	Play a leading role in Typhoon Committee (TC).	● Fulfill the duties as the chair of WGH and promote AOP7 "Platform on Water Resilience and Disasters under International Flood Initiative" in collaboration with the WGH members. ● In promoting AOP7, enhance collaborative activities with JMA as a WGM member and the IFI-relevant organizations of the Philippines. ● Organize the 9th WGH meeting in Kyusyu, Japan, coinciding with the 4th APWS in October 2020 and participate in the 15th IWS meeting and the 52nd and 53rd	① Overall evaluation [S] ② Publication [A] ③ Scientific significance [A] ④ Social significance [S] ⑤ Dissemination [A]	Organized the 9th WGH meeting online in October 2020, though the 4th Asia Pacific Water Summit was postponed until April 2022. An ICHARM researcher chaired the meeting, summarized the discussions, and reported the progress of WGH's AOP, "Platform of Water Resilience and Disasters under the IFI." Actively participated in the 15th IWS and the 52nd-53rd Annual Sessions, all of which were held online. An ICHARM researcher chaired the sessions and reported the discussions. Presented with the "Dr. Roman L. Kintanar Award 2020" at the 53rd Annual Session, together with JAXA and IDI, for the long-term contribution to the TC activities.

		Annual sessions as WGH chair. In collaboration with the Members, summarize discussions on typhoon-related disasters in the TC region and contribute to developing and applying effective measures.		
	Japanese Ministry of Foreign Affairs (MOFA) and the International Atomic Energy Agency (IAEA)/Regional Cooperative Agreement (RCA) RAS/7/030 Project on "Assessing Deep Groundwater Resources for Sustainable Management through Utilization of Isotopic Techniques"	Based upon MOFA requests for participation in the IAEA activities, ICHARM will send a researcher to: 1) Represent Japan in the First Coordination of the RAS/7/035 Project to be held in summer 2020 in China to promote the application of isotope techniques in Japan. 2) Participate in the 1st Regional Training Course of the IAEA/RCA RAS/7/035 Project to be held in Thailand in fall 2020 as the IAEA lecturer and expert to give training to participants from the RCA member countries and provide expert advice for the specific study areas of the RCA member countries.	① Overall evaluation [B] ② Publication [B] ③ Scientific significance [A] ④ Social significance [B] ⑤ Dissemination [A]	1) Participated in the IAEA/RCA First Coordination Meeting of the project RAS/7/035, held on September 10-11, 2020, as co-representative on behalf of Japan with Professor Maki Tsujimura of the University of Tsukuba, together with representatives of 15 countries including Japan, and shared the proposed plan of isotope hydrology research in the Tokyo Metropolitan Area that ICHARM was engaged in the preparation. 2) All IAEA/RCA regional and national training courses were canceled due to the spread of COVID-19 infection, but coordination was made for next year's implementation.
(iii)-(2)-2. Synergy effects enhanced by alumni networking	Alumni networking	● Continue updating the alumni list. ● Continue using SNS to network ICHARM alumni and facilitate the interaction among the alumni, as well as between ICHARM and the alumni. ● Keep in close touch with alumni by sending newsletters and other means.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Updated the ICHARM alumni list and used it when ICHARM researchers went on overseas business trips. Used Facebook to network ICHARM alumni and facilitated the interaction among them, as well as between ICHARM and the alumni. Started including articles contributed by graduates from ICHARM training and educational programs in ICHARM Newsletters.
(iii)-(2)-3. Public relations	Maintain the ICHARM website.	● Actively disseminate the latest activities on research, training and international networking, and other information and announcements by posting them on the website in a timely manner. ● Continue to improve the contents based on the viewers' feedback. ● Reply to comments and inquiries from the viewers quickly and appropriately.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Updated the website with the latest information, including newsletters and event notices. Updated event-related information and articles as soon as possible, especially when they were about ICHARM-led activities. Created an inquiry/comment section for the viewers and replied to them as soon as possible.
	Publish the ICHARM newsletter.	● Publish the newsletter four times a year (January, April, July and October), and include various articles about ICHARM activities that are current and informative. ● Enrich and diversify the contents by promoting activities on research, training and international networking and collecting contributions from partner organizations and graduates, including feedback from the subscribers. ● Diversify and increase the subscribers by promoting various networking activities inside and outside Japan.	① Overall evaluation [A] ② Publication [A] ③ Scientific significance [A] ④ Social significance [A] ⑤ Dissemination [A]	Continued to be active in public relations by publishing quarterly newsletters, which update over 5,000 subscribers on a wide range of activities of ICHARM. Tried to enrich and diversify the contents of the newsletters by including contributions from ICHARM's partners and training program alumni despite the limitations to outreach activities due to the COVID-19 pandemic.