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ICHARM

Activity Report

FY2025

10th ICHARM Governing Board Meeting
June 16, 2026

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

unesco
Centre
Under the auspices
of UNESCO

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

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

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Abbreviation

ADB	Asian Development Bank
AOGEO	Asia Oceania GEO
AOP	Annual Operating Plan
APWF	Asia-Pacific Water Forum
Area-BCM	Area-Business Continuity Management
AWCI	Asian Water Cycle Initiative
AWDO	Asian Water Development Outlook
BCM	Business Continuity Management
BCP	Business Continuity Plan
BRIDGE	Programs for Bridging the gap between R&D and the IDeal society (Society 5.0) and Generating Economic and social value
C2C	Category 2 Centre
CALDAS	Coupled Atmosphere and Land Data Assimilation System
CLVDAS	Couple Land and Vegetation Data Assimilation System
d4PDF	database for Policy Decision making for Future climate change
DHM	Distributed Hydrological Model
DIAS	Data Integration and Analysis System
DENR	Department of Environment and Natural Resources, Republic of the Philippines
DOST	Department of Science and Technology, Republic of the Philippines
DPWH	Department of Public Works and Highways, Republic of the Philippines
DRR	Disaster Risk Reduction
DSSC	Davao del Sur State College, Republic of the Philippines
EW4All	Early Warnings for All
GCM	General Circulation Model
GEO	Group on Earth Observations
GRIPS	National Graduate Institute for Policy Studies
GSMaP	Global Satellite Mapping of Precipitation
GUI	Graphical User Interface
GWP	Global Water Partnership
HELP	High-level Experts and Leaders Panel on Water and Disasters
HyDEPP	Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines
ICFM	International Conference on Flood Management
ICHARM	International Centre for Water Hazard and Risk Management
IDR4M	Integrated-System of Disaster Reduction 4(for) Municipalities

IFI	International Flood Initiative
IFM	Integrated Flood Management
IISEE	International Institute of Seismology and Earthquake Engineering, Building Research Institute
IRDR	Integrated Research on Disaster Risk
IWHR	China Institute of Water Resources and Hydropower Research
IWRM	Integrated Water Resources Management
JAXA	Japan Aerospace Exploration Agency
JCC	Joint Coordinating Committee
JHoP	Japan Hub of Disaster Resilience Partners
JICA	Japan International Cooperation Agency
JMA	Japan Meteorological Agency
JST	Japan Science and Technology Agency
JWA	Japan Water Agency
LETKF	Local Ensemble Transform Kalman Filter
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MOFA	Ministry of Foreign Affairs
MoU	Memorandum of Understanding
NEDO	New Energy and Industrial Technology Development Organization
NILIM	National Institute for Land and Infrastructure Management
OSS-SR	Online Synthesis System for Sustainability and Resilience
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PMP	Probable Maximum Precipitation
RID	Royal Irrigation Department, Thailand
PWRI	Public Works Research Institute
RRI	Rainfall-Runoff-Inundation
RSR model	Rainfall-Sediment-Runoff model
RSC-AP	UNESCO-IHP Asia-Pacific Regional Steering Committee
SAR	Synthetic Aperture Radar
SATREPS	Science and Technology Research Partnership for Sustainable Development
SDGs	Sustainable Development Goals
SIP	Cross-ministerial Strategic Innovation Promotion Program
SIMRIW	Simulation Model for Rice-Weather Relationships
SPI	Standardized Precipitation Index
TC	Typhoon Committee
TCFD	Task Force on Climate-related Financial Disclosures
UNDRR	United Nations Office for Disaster Risk Reduction

UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IHP	UNESCO Intergovernmental Hydrological Programme
UNSTSWD	United Nations Special Thematic Session on Water and Disasters
UPLB	University of the Philippines Los Baños
VFES	Virtual Flood Experience System
VNMHA	Vietnam Meteorological and Hydrological Administration, Ministry of Natural Resources and Environment
VR	Virtual Reality
WCI	Water Cycle Integrator
WEB-DHM	Water and Energy Budget-based Distributed Hydrological Model
WEB-RRI	Water and Energy Balance-based Rainfall Runoff Inundation Model
WGH	Working Group on Hydrology
WMO	World Meteorological Organization
WRF model	Weather Research and Forecasting model
WWC	World Water Council
WWF	World Water Forum

1. Summary

This Activity Report summarizes the main activities carried out by ICHARM in FY2025 (April 2025 to March 2026), the 20th year since ICHARM's establishment.

FY2025 marks the fourth year of both the 5th Medium- and Long-Term Plan (2022-2027) of PWRI, to which ICHARM belongs, and UNESCO IHP-IX (2022-2029).

In FY2025, the fourth year of the revised ICHARM Programme, we conducted a broad range of activities covering research, capacity building, and information networking.

In the area of research, ICHARM implemented various studies and projects in Japan and overseas using an end-to-end approach – from data acquisition through the analysis, evaluation, and prediction of natural phenomena to the assessment of their socioeconomic impacts. These activities were funded by operating grants from MLIT and external funds from MEXT, the Cabinet Office, JICA, the World Bank, UNESCO, and other organizations.

Regarding capacity building, we continued to offer a doctoral program, "Disaster Management Program," and a master's program, "Water-related Disaster Management Course of Disaster Management Policy Program," as in FY2024. We also held four Alumni Webinars.

For information networking, we, as the IFI secretariat, continued to support the establishment and implementation of "Platforms on Water Resilience and Disasters" in several countries. As part of this platform initiative, we introduced the concept of the Water Cycle Integrator (WCI) created by ICHARM and worked to put it into practice through various activities.

We also demonstrated the presence of Japan and ICHARM to the participating countries through the activities of the Typhoon Committee's Working Group of Hydrology in cooperation with MLIT. Moreover, we made consistent contributions to UNESCO IHP. Executive Director KOIKE Toshio chairs one of the cross-cutting working themes of UNESCO IHP-IX, and ICHARM supported the hosting of a symposium in Paris to commemorate the 50th anniversary of UNESCO IHP and the 60th anniversary of the International Hydrological Decade.

In public relations activities, the ICHARM executive director and other staff delivered lectures and presentations at domestic and international conferences. In addition, we carried out community contribution activities targeting youth. The latest information on these and other activities was widely disseminated domestically and internationally through our website and quarterly newsletters.

Details of each activity are explained on the following pages.

2. Special topics

2.1 Improving the reproducibility of heavy rainfall simulations and verifying accuracy

To promote the Japanese government's disaster management policy, "River Basin Disaster Resilience and Sustainability by All," ICHARM is developing an ensemble rainfall forecasting model based on the WRF-LETKF (weather research and forecasting model-local ensemble transform Kalman filter) with the aim of optimizing the pre-release of dam water in advance of a flood. In FY2025, we obtained four years of the Japan Meteorological Agency's Meso-Ensemble Prediction System (MEPS) data and used them to evaluate the accuracy of our ensemble forecasting results produced primarily for the Kanto-Koshin region in Japan. MEPS is a set of 5-km-resolution forecasts generated by assimilating a large amount of observational data into a regional model. In contrast, ours are 3-km-resolution forecasts from assimilating a limited amount of observational data. The evaluation showed that higher resolution offers advantages, such as improved precipitation forecasts in mountainous watersheds.

2.2 Flume experiments on backwater effects and sediment deposition process caused by driftwood blockage at bridges

The research team has been conducting flume experiments since FY2024 to evaluate the complex inundation phenomena caused by flood flows containing large volumes of sediment and driftwood discharged from mountainous areas during heavy rains. In FY2025, the team carried out experiments to examine the impact of bridge clogging on flood and sediment inundation using a custom-designed model, the Clogging Rate Adjustable Model. These experiments were conducted under various conditions with varying slopes, flow rates, and clogging rates. Highly precise data, including longitudinal water surface profiles, vertical sediment concentrations, and grain size distributions, were collected to clarify the formation of backwater zones and the sediment deposition processes associated with bridge clogging. Moving forward, these unique experimental data, including changes in bed elevation before and after flow measured with a 3D laser scanner, will be used to further improve and verify the proposed analytical methods.

The clogging rate adjustable model

Water-level measurement and water sampling at multiple locations along the flume

A device for water sampling at different water depths

Photo 2-1 Custom-designed experimental apparatus and measurement methods designed to obtain precise experimental data

2. 3 Enhancing disaster preparedness using the Virtual Flood Experience System (VFES) in middle school project-based learning

ICHARM has been actively participating in the "Development of a Resilient Smart Network System against Natural Disasters," a project initiated under the Cross-ministerial Strategic Innovation Promotion Program (SIP) led by the Cabinet Office of Japan. As part of this initiative, we are conducting research and development focused on one of its sub-themes: "Promotion of Disaster Prevention Actions Based on Risk Information." This research specifically focuses on visualizing water disaster risks in an area and examines how this visualization influences residents' behavior. More broadly, it aims to raise public awareness of disaster management by encouraging individuals to view disaster-related issues as personal concerns, even during normal times.

Photo 2-2 Senior Researcher Denda (far in the back, beside the screen) guiding students through a project-based learning session.

Since FY2024, the research team has been developing a virtual townscape of the Kurashiki area in western Japan using the Unity-based game engine version of VFES. In FY2025, the team conducted operational verification by using the device in various events and educational settings, and largely established its basic system configuration for research and educational purposes, including flood simulation and methods for reproducing urban spaces. Additionally, as a public environment with an eye toward social implementation, the team developed a WebGL-based distribution environment, creating a system where the virtual space can be experienced through a web browser without the use of dedicated software.

In parallel with the development of this technological infrastructure, the team also improved the educational software version of VFES using Minecraft Education, aimed at educational use. Specifically, the system was equipped with new functions to express the temporal spread of flooding and to obtain participants' behavior logs, creating an environment for observing and analyzing their evacuation behavior within the virtual space. Through use in educational settings, the team confirmed that the effectiveness of dynamic flood representation in understanding flood progression and evacuation timing.

Furthermore, the team accelerated efforts to promote the use of VFES in schools by establishing a cooperative framework with domestic educational entities, particularly with the Nagano Prefectural Board of Education through collaboration with the Faculty of Engineering and the Faculty of Education at Shinshu University. In cooperation with schools via the board of education, the team conducted classes using VFES at several schools, including Toyono Junior High School in Nagano City. The Toyono case is particularly meaningful as it demonstrates the implementation of educational practices in flood-affected areas. In step with these efforts, the team advanced the standardization of disaster prevention education content using VFES and began to formulate a concrete model for social

implementation to promote understanding of water-related disaster risks through VFES. See Section 3.5.2 for details.

2.4 New courses added to the doctoral program

With the significant cooperation of PWRI and GRIPS, three new courses have been added to ICHARM's doctoral program, and classes began on March 2, 2026.

Photo 2-3 Water and Poverty - Classroom Scene on March 2, 2026

In addition to "Water Disasters," three new courses – "Water and Sanitation," "Water and Poverty," and "Water and Peace" – have been added, focusing respectively on water disaster risk reduction, climate resilience, and sustainable development. The aim is to cultivate fundamental knowledge of development and international cooperation, and to train leaders who can take a comprehensive approach to formulating and implementing policies for water disaster risk reduction and sustainable development at the national, regional, and global levels. With the updated doctoral program, ICHARM will promote international awareness campaigns to share with the international community the importance of integrating water disaster risk reduction with sustainable development, as well as the experiences gained from this approach.

2.5 Project implementation and capacity building in Africa (South Sudan, Kenya, Ghana)

With funding from the World Bank and UNESCO, ICHARM developed monitoring and forecasting systems for floods and droughts for South Sudan, Kenya, and Ghana, and supported capacity development for relevant government officials.

Regarding South Sudan, ICHARM received a discretionary contract from the World Bank for the "Knowledge Exchange on Flood and Drought Management between South Sudan and Japan" project, spanning the period from February 5 to August 31, 2025. During this period, we provided technical support for monitoring, forecasting, and early warning to South Sudanese agencies related to floods and droughts, including the Ministry of Water Resources and Irrigation (MWRI), conducted trial hydrological forecasting, and provided recommendations for developing a flood and drought early warning system. From August 25 to 29, we organized site visits and workshops in Japan aimed at staff capacity development, inviting 19 participants from South Sudan, its four neighboring countries, and international organizations. They observed flood control and irrigation facilities such as the Kusaki Dam, the Watarase Retarding Basin, and the Yoshida River Basin, and received training on operating a flood and drought forecasting system at ICHARM. See Section 3.6.4 for details.

Regarding Kenya, under a contract period from June 2025 to April 2026, ICHARM was commissioned by UNESCO to undertake "Enhancing Flood Resilience in Kenya," developing flood

forecasting and early warning systems in Kenya, creating flood-affected area maps, identifying flood disaster hotspots, and conducting capacity-building training for local practitioners in both Japan and Kenya. We conducted facilitator training in collaboration with the University of Tokyo for about two weeks from October to November 2025. Furthermore, in December, we conducted a development meeting and on-site training regarding the flood early warning system implemented for Kenya. See Section 3.6.6 for details of the implementation.

Regarding Ghana, ICHARM engaged in the UNESCO-commissioned research project "Development of an Integrated Early Warning System for Water-Related Disasters in Ghana" from July 24, 2025 to February 9, 2026. We developed an integrated early warning system for water-related disasters in Ghana and conducted capacity-building training for local practitioners. The developed early warning system operates on the Data Integration and Analysis System (DIAS), managed by the University of Tokyo, visualizing rainfall maps and forecast information, as well as flood and drought monitoring and forecast information, in real time, and providing this information on the web. In November 2025, training using this system was conducted in Accra, the capital of Ghana, with 20 participants, including government officials and researchers from meteorological, hydrological, and disaster response agencies. See Section 3.6.7 for details.

2.6 Contribution to the Asian Water Development Outlook 2025

The Asian Development Bank (ADB) has published a series of the Asian Water Development Outlook (AWDO) since 2007 in cooperation with the Asia-Pacific Water Forum (APWF). In December 2025, ADB published the fifth edition of AWDO. AWDO aims to track the region's water security status and highlight important water management issues in the Asia-Pacific region. ICHARM made a contract with ADB to draft the AWDO 2025 edition, developing a climate change model for Key Dimension 5 "Water-Related Disaster Security." In cooperation with IHE Delft, which is responsible for updating previous indicators, ICHARM calculated new climate change indicators. The future change in rainfall is used as hydrological hazard, the future change in Standardized Precipitation Index (SPI) as climatic hazard, and the future change in coastal flooding area as meteorological hazard. The average values of these indicators for each country were calculated for comparison. During the preparation of the report, ICHARM participated in workshops held in March, May and August, 2025, to exchange views with ADB experts. Furthermore, ICHARM prepared visual images on a GIS system based on the output of heavy rainfall and drought analysis in 50 economies. See Section 3.6.8 for details.

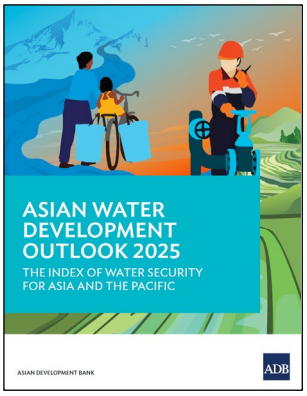


Figure 2-1 Asian Water Development Outlook 2025

2.7 Emergency response to flood disasters in Sri Lanka

In November 2025, the Mahaweli River in Sri Lanka experienced significant flooding during the Cyclone Ditwah event due to extremely heavy rainfall across the basin. The intense precipitation increased river discharge rapidly, causing water levels to rise and overflow into surrounding low-lying areas. As a result, nearby communities, agricultural lands, and infrastructure were inundated, leading to displacement of residents and disruption of transportation and irrigation activities. The event highlighted the vulnerability of settlements along the Mahaweli River and emphasized the need for improved flood forecasting, river basin management, and early warning systems. The director general of the Majhaweli Authority requested ICHARM in writing for a technical collaboration on early warning and forecasting systems for the Mahaweli River basin. This request aims to enhance flood-forecasting and early-warning capabilities through technical cooperation, knowledge exchange, and capacity building in collaboration between the Mahaweli Authority and ICHARM. In response, ICHARM, with the help of the DIAS team of the University of Tokyo, developed the Mahaweli River early warning system incorporating river-flow and inundation monitoring and forecasting. River flow monitoring reflects the past 24 hours, while inundation monitoring data covers the period from 12 a.m. UTC of the previous day to the present. Forecasts are updated daily with a lead time of six days. Although ensemble forecasting is possible, it requires additional preparation time; therefore, single-member forecasting is currently used. Neither the monitoring nor the forecasting considers the effects of dams. In the future, it would be beneficial to add a subsystem that combines real-time dam state data with dam operation functionality. This updated system would mitigate disaster risks during extreme events and enhance water use efficiency during normal times. The director general greatly appreciated ICHARM's services, particularly its leadership and quick response in providing critical information during the recovery period.

2.8 IFI local platform in Davao City, the Philippines

ICHARM has continued to support IFI, as its secretariat, in the establishment and implementation of "Platforms on Water Resilience and Disasters" in various countries, including the Philippines, Indonesia, Thailand, and Sri Lanka, in collaboration with their governments and other relevant organizations. In this platform initiative, we have assisted these countries in various activities while considering local needs and conditions, based on the concept of the Water Cycle Integrator (WCI), which is included in the UN Water Conference's agenda for water actions.

ICHARM organized a workshop in Davao City, the Philippines, and developed an action plan to strengthen the local application of OSS-SR, for example, by creating a Micro-OSS for a specific region with an additional function to predict sediment disasters and collaborating with indigenous communities. See Section 5.1.1for details.

3. Research

ICHARM has been conducting “R&D Program 1: Development of technologies to promote basin-wide flood control against severe water-related disasters” under “R&D Theme 1: Contribution to national land development to protect lives and livelihoods from natural disasters” in PWRI's 5th Medium- and Long-term Plan (2022-2027).

Specifically, our research focuses on the following four areas to address increasingly severe water-related disasters in consideration of climate change impacts by developing technologies to support basin-wide flood control, thereby contributing to national land development that protects lives and livelihoods from natural disasters.

1. Predict water-related disaster hazards accurately.
   ・Develop and improve technology to predict future water-related disaster hazards.
2. Minimize inundation as much as possible.
   ・Develop a method to accurately evaluate and implement projects planned to achieve the new flood management policy, “River Basin Disaster Resilience and Sustainability by All.”
3. Reduce exposure to water hazards.
   ・Develop an accurate flood inundation risk assessment method.
4. Strengthen society’s disaster preparedness and resilience
   ・Develop technology to help strengthen society’s disaster preparedness and resilience against water disasters.

In addition, the ICHARM Programme, which was revised based on PWRI's 5th Medium- and Long-term Plan, stipulates the following policy for research activities:

ICHARM will step up innovative research by taking the end-to-end approach, which covers the entire research process from data collection to the analysis, assessment and prediction of natural phenomena to their socio-economic impact assessment, thereby creating a scientific knowledge base, which helps increase communities’ water-related disaster resilience and sustainability. We will conduct more advanced research by collecting data on both water hazards and disaster risks, assessing and predicting risks and their changes, including those related to socio-economy, and establishing methods and applications to support policy studies and implementations. We will promote interdisciplinarity by collaborating with a broad range of areas, including water use, public health, climate science, urban planning, ecology, biodiversity, agriculture, energy, and infectious disease control, as well as by considering new lifestyles and national land development.

In these contexts, ICHARM has been conducting research on the following five themes using an end-to-end approach:

1. Data collection, storage, sharing, and statistics on water-related disasters
2. Risk assessment on water-related disasters
3. Monitoring and prediction of changes in water-related disaster risk
4. Proposal, evaluation, and application of policy ideas for water-related risk reduction
5. Support in improving the applicability of water-related disaster management

The following sections describe the main research activities and achievements.

3.1 Collection, storage, sharing, and statistical analysis of water-related disaster data

ICHARM will conduct research on technologies to collect and store data and information regarding hazards, exposure and vulnerability and share them among stakeholders. We will also actively support nations and communities in data collection, storage, and sharing by developing and helping them implement technologies to collect damage data that can be operated by themselves. Technical assistance will also be provided for nations to compile highly reliable statistical data. (Source: ICHARM Mid-term Programme)

3.1.1 Support for risk and damage analysis using global observation data

a) Development of a system for the integrated management of water resources and disasters in poorly gauged basins

Near-real-time rainfall data with adequate resolutions are a prerequisite for effective water-resources and disaster management. However, in many river basins in the world, near-real-time rainfall data are rarely available due to insufficient ground observation networks.

ICHARM continuously collaborates with JAXA to maximize near-real-time freely-available global satellite precipitation products (SPPs) for effective water-resources and disaster management in poorly gauged basins (Figure 3-1). We are also studying methods for efficiently bias-correcting SPPs by incorporating ground observation data and methods for designing optimal ground observation networks.

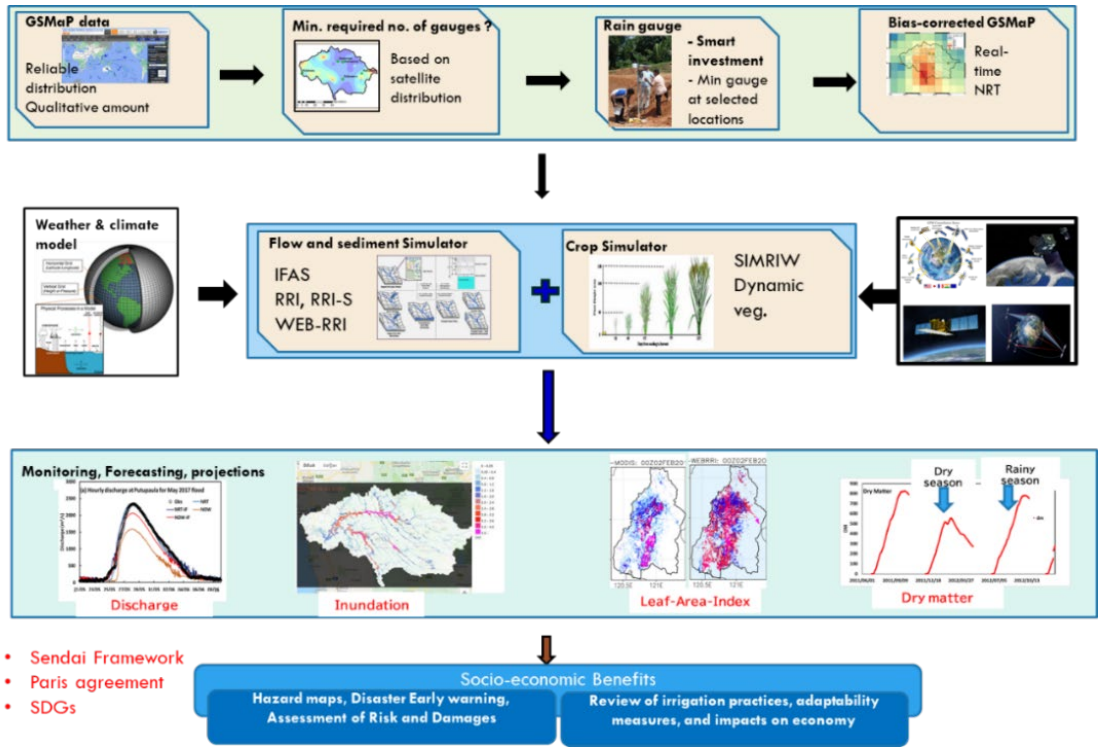


Figure 3-1 A conceptual image of a system for the integrated management of water resources and disasters in poorly gauged basins

3.1.2 Improvement of soil moisture observation resolution using global observation data

The research team was able to confirm to some extent the effectiveness of increasing soil-moisture observation resolution using outputs from both the data assimilation system incorporating a dynamic vegetation model and the WEB-RRI model for the case of Ghana. The team also obtained district-scale agricultural information in Ghana and developed a district-scale crop-yield estimation method using vegetation biomass to provide agricultural support information.

3.1.3 Developing information infrastructure used on digital twins

As mentioned in Section 2.3, ICHARM is implementing a project "Promotion of Disaster Prevention Actions Based on Risk Information" as part of the Cabinet Office Strategic Innovation Promotion Program (SIP) "Development of a Resilient Smart Network System against Natural Disasters." In this project, we are developing the Virtual Flood Experience System (VFES), which creates virtual flood situations that prompt users to intuitively understand water-related disaster risks and take voluntary pre-disaster actions. As SIP emphasizes not only research and development but also the establishment of a technological foundation for social implementation, in FY2025, the research team placed particular emphasis on completing VFES functions and improving its accessibility for the general public.

Since FY2024, using the Unity-based game-engine version of VFES, the team has been constructing virtual spaces and flood representations for areas such as the Kurashiki district in western

Japan. In FY2025, through repeated use in various events and educational settings, it was able to establish the basic system configuration for research and educational purposes, including methods for representing floods and reproducing urban spaces. This system incorporates flood analysis results from Hokkaido University, our SIP joint-research partner, by managing them internally and reflecting them directly in the virtual environment. This collaboration enables flexible construction of virtual spaces while ensuring the reproduction accuracy of flood depth, inundation extent, and other key factors.

In addition, to create a highly accessible environment for general users, the team developed a cloud- and internet-based application execution environment (Platform as a Service: PaaS) and a WebGL (Web Graphics Library) delivery environment, which uses a JavaScript API that operates in web browsers without requiring any plugins. As a result, users can access the virtual space from multi-device web browsers without dedicated applications or other specialized software, allowing access from smartphones and tablets widely used by the general public. On the other hand, the team confirmed that performance can be unstable on mobile devices such as smartphones, which do not have the same processing capabilities as personal computers. To ensure stable public use, further optimization, such as data-size reduction, is necessary.

Through the use of the Unity-based VFES in various occasions and collaboration with other research institutions, the research team came to recognize the importance of "dynamic flood representation" for improving public understanding of flood risk. Conventional hazard maps play an important role in disaster management by statically presenting the maximum possible flood depth, thereby indicating the largest class of expected damage. However, due to their static nature, they do not convey how flooding progresses over time, making it difficult for users to grasp the temporal development and spatial expansion of inundation. In some situations, this limitation may hinder realistic consideration of appropriate actions. In contrast, dynamic flood representations that incorporate temporal changes allow users to understand how flooding evolves and how affected areas expand. These features can help people form appropriate risk awareness, enabling them to clearly recognize available response options and appropriate evacuation timing under different flood onset and development patterns, ultimately supporting appropriate decision-making.

Building on these insights, in FY2025, the team improved the educational-software version of VFES using Minecraft Education by adding a dynamic flood representation function capable of expressing temporal changes, as well as a function for recording user action logs. These improvements established a foundation for observing evacuation behavior in the virtual space in chronological order and analyzing what actions users take as rainfall and flooding conditions change. In conventional disaster education, it has been difficult to directly observe how the presentation of disaster risk information influences learners' cognitive processes; however, VFES makes these processes observable by recording users’ actions in the virtual space, demonstrating the potential to capture and analyze them empirically.

Furthermore, the research team also explored methods for constructing virtual spaces. In general, creating high-precision urban models requires significant cost for municipalities where digital twin data are not yet available. However, in FY2025, when creating a 3D terrain model of the Matsushiro area in central Japan for VFES, the team attempted to reproduce the block layout by combining digital elevation models with existing building assets. As a result, it found that even without precisely reproducing individual buildings, it is possible to construct a virtual space that users perceive as sufficiently close to real townscape by representing the block layout and overall spatial atmosphere. This approach is considered effective as a low-cost method for spatial construction and promising for future nationwide deployment.

3. 2 Assessment of water-related disaster risks

ICHARM will develop and verify a method to combine water-related disaster assessment models with other models. We will also develop an index that can holistically indicate the basin-wide impact of water hazards. Case studies on the risk assessment of water-related disasters will be conducted at multiple locations both in and outside Japan while taking local conditions into account. Necessary assistance will be provided for local communities to perform risk assessments based on their needs and circumstances using the findings of the case studies, thereby achieving disaster risk reduction. (Source: ICHARM Mid-term Programme)

3.2.1 Improvement of future climate prediction technology using multiple models and downscaling of GCMs and evaluation of its regional applicability

[Downscaling]

In order to generate climate data that can be used to evaluate the impact of global warming on small basins of 100 km^2 or less, the research team analyzed the sensitivity of the high-resolution dynamic downscaling method developed by them. From downscaling calculations of reanalysis data for the upper Tone River basin, the team observed almost no dependence from 5 km to 1 km resolutions for typhoon cases when the spectral nudging method, which gives low wavenumber components from the boundary, was used. This result is considered due to the significant effect of the low wavenumber component controlling the total synoptic scale phenomena, such as typhoons.

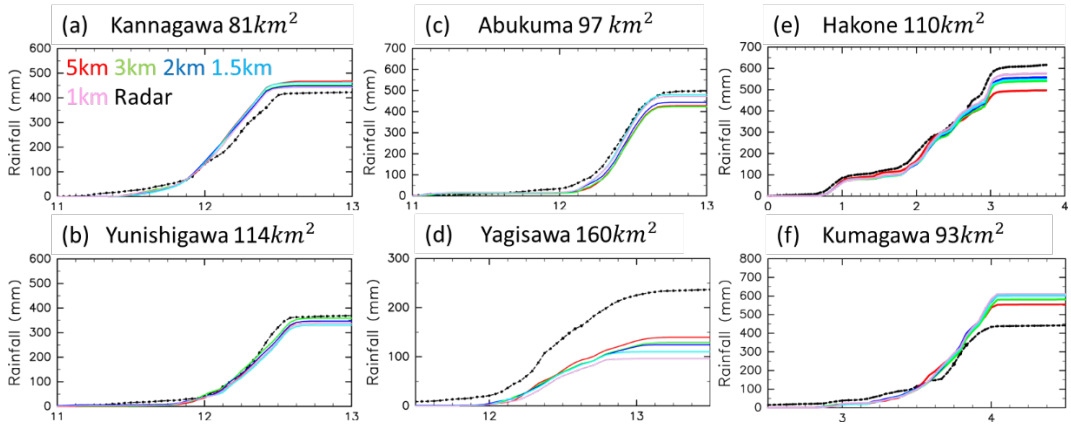


Figure 3-2 Cumulative basin-average precipitation by model resolution. The line colors indicate model resolutions of 5 km (red), 3 km (green), 2 km (blue), 1.5 km (light blue), and 1 km (pink). The black dashed line represents observed values based on the Japan Meteorological Agency's analyzed rainfall. The horizontal axis represents the number of days. Panel titles (a) through (f) indicate the name and area of each basin.

[Depth-Area-Duration (DAD) analysis]

In Depth-Area-Duration (DAD) analysis, the team assessed how climate change affects probable maximum precipitation (PMP) using 5-km hourly rainfall data from d4PDF ensemble dataset. PMP was estimated through the DAD analysis under historical, +2K, and +4K warming scenarios for Southeast and Northwest Kyushu, Japan. The PMP estimation followed five steps: aggregating rainfall

data (2–72 hours), selecting annual maximum rainfall, deriving depth-area curves via the Flexible Element Method (FEM), enveloping maximum curves across 720 events, and calculating PMP and change factors. Change factors were computed for durations (1–72 hours) and rain areas (100, 1000, 10000 km²). Figure 3-3 shows 24-hour PMP change factors, with results indicating PMP increases up to 1.22 (+2K) and 1.37 (+4K) in Northwest Kyushu, and up to 1.13 (+2K) and 1.26 (+4K) in Southeast Kyushu. PMP increases with warming, especially under +4K, across all rain areas. The results support updating PMP estimates to improve flood risk management and infrastructure resilience. The study was submitted to *Hydrological Research Letters*.

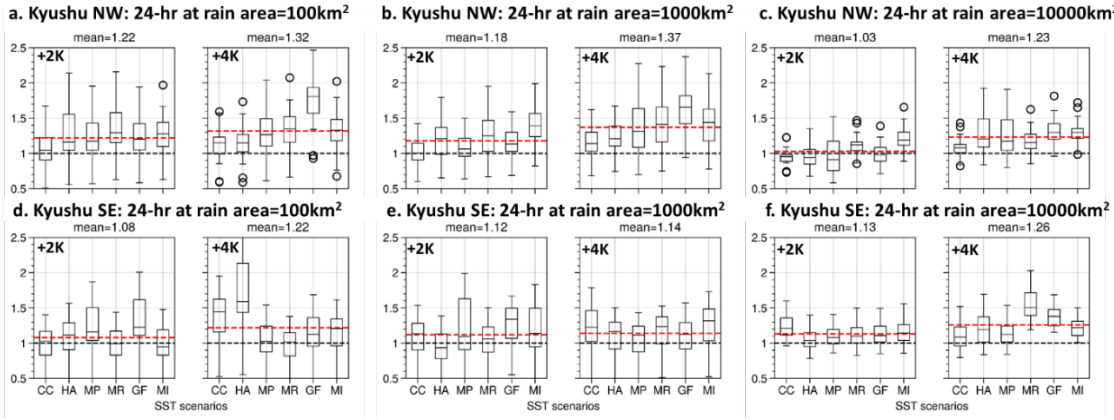


Figure 3-3 PMP change factors for 24-hr rainfall for three rain-area sizes (a: 100 km², b: 1000 km², and c: 10000 km²) under +2K and +4K future SST scenarios for Southeast Kyushu (Kyushu SE) and Northwest Kyushu (Kyushu NW)

3.2.2 Construction of a water cycle model considering basin characteristics and visualization of the effects of basin-wide flood control measures designed by basin stakeholders

Various flood control measures have been studied to achieve basin-wide flood management in an integrated manner. To establish concrete methods for promoting basin-wide flood control, the research team conducted a study in the Pampanga River in the Philippines on reducing flood discharge by developing flood retention basins as a measure to prevent and mitigate flood damage. In this study, the team examined the pump station capacity required to drain floodwaters from the retention basins by considering damage rates associated with different inundation depts and durations according to the growth stages of rice plants within the basins. The team also visualized both the reduction effect on downstream peak flood discharge and the impact of inundation on crops within the basins.

3.2.3 Development and improvement of an evaluation method for sediment and driftwood laden flood hazards and its application to domestic and overseas cases

In FY2025, the research team applied its proposed rainfall-sediment runoff model (RSR-model) combined with simplified field observations to analyze the flood and sediment-runoff characteristics of catchments where observational data are limited, and to use the results to formulate effective river and sediment management strategies in data-scarce regions. The analyses were conducted on the Santa

Maria and Pagsanjan Rivers, which are major sediment sources for Laguna Lake in the Philippines.

The results suggested that while some sediment supplied from mountainous areas is deposited as bedload in meandering sections, most is transported as suspended load through the plains to Laguna Lake. In the plain reaches of both rivers, extensive river improvement works have been implemented. These works have increased shear stress during floods, suppressed suspended sediment deposition, and created conditions in which fine sediment is more easily conveyed downstream, likely contributing to increased sediment inflow to Laguna Lake. The simulation results also indicated that in the Santa Maria River, major inundation occurs in lowland paddy fields, primarily caused by overflow from abandoned river channels and flooding at the confluence of major western tributaries. Significant deposition is predicted in two major meandering sections in the plains, identifying these as new hazardous reaches where reduced flow capacity and increased future flood risk are of concern.

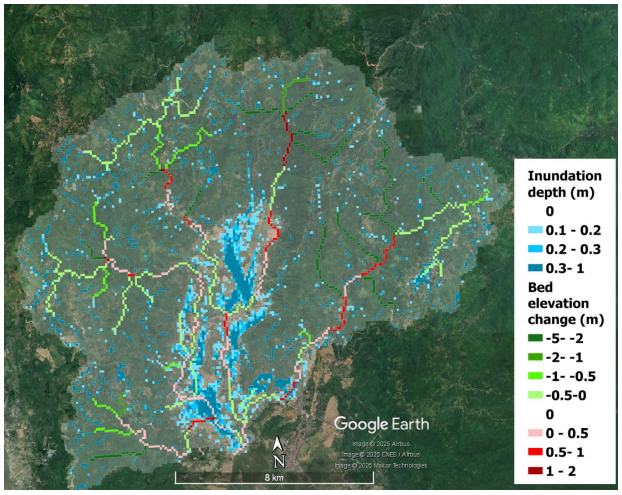


Figure 3-4 Spatial distribution of inundation-depth and bed-elevation changes in the Santa Maria River at the peak flow during Typhoon Kristine in October 2024

3.2.4 Evaluation method for flood and sediment inundation induced by driftwood accumulation at bridges

In FY2025, building on the previous year's experimental results, the research team identified the calibration coefficients for the proposed driftwood advection and storage evaluation formula, and the findings were published in a peer-reviewed academic journal. The team also conducted experiments to clarify the impact of driftwood clogging at bridges on flood and sediment inundation hazards. To analyze the sediment deposition processes in backwater zones in detail, custom-designed experimental apparatuses were introduced to acquire highly precise data. These experiments successfully expanded the high-fidelity datasets essential for validating numerical simulations, supporting the refinement and verification of the analytical framework developed for estimating flood and sediment inundation hazards.

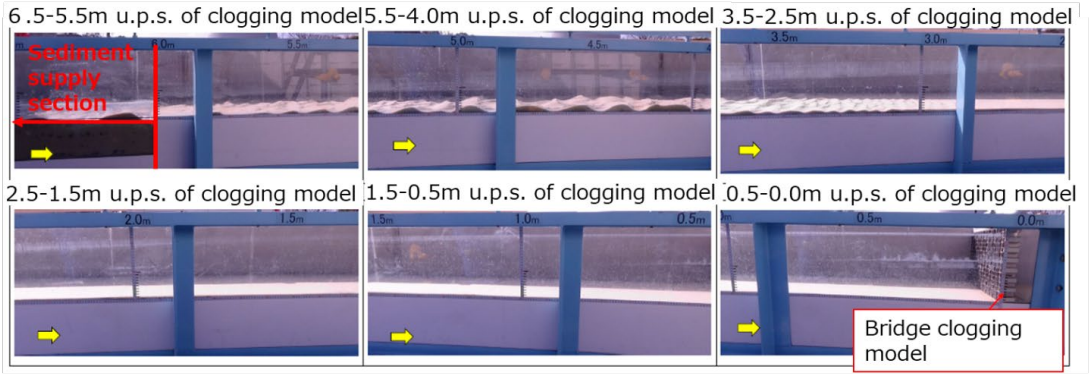


Photo 3-1 Sediment deposition on the flume bed after flow

3.2.5 Study on adaptation measures using an integrated risk assessment method

In Indonesia and Sri Lanka, we could not apply the WEB-RRI-SIMRIW because the crop-related data required to run SIMRIW were not available. Instead, we simulated the hydrological responses of the target basins under various climate change scenarios using the WEB-RRI model and investigated the resulting impacts on water-related disasters.

We also developed a WEB-RRI-SIMRIW model for the Philippines and calibrated and validated both hydrological responses and crop-related parameters using available paddy yield data. The calibrated model was then applied to investigate climate change impacts under RCP 8.5 and RCP 2.6 scenarios of the MRI-3.2S and MRI-3.2H models. In addition, we quantified flood and drought impacts on crop yields, as well as evaluated flood adaptation options (e.g., paddy dams) to reduce downstream flooding. We published three scientific papers based on the results, conducted several policy meetings in the Philippines, and shared the findings with the scientific community through the Advanced Study of Climate Change Project (SENTAN).

3.2.6 Development of a methodological framework for flood risk assessment under climate change and social change

Recently flood disasters have worsened due to the intensifying impacts of climate change, such as more frequent extreme events, and rising social vulnerability driven by urbanization, population growth, and inadequate infrastructure. These combined factors lead to more destructive floods that threaten lives and cause significant economic losses, particularly in the flood-prone areas of developing countries where resources for flood management are limited. Moreover, understanding how flood damage may change in the future under the combined effects of climate change and social change is also crucial for improving future flood risk management. Therefore, it is essential to develop a quantitative flood risk assessment method that evaluates future risks while accounting for the impacts of climate and social changes, thereby supporting flood-prone areas in implementing effective preventive and adaptation measures, including land use regulations. In this context, the following introduces a newly developed methodological framework for the quantitative assessment of flood risk

under changing climate and social conditions (land use, land cover, and population), and presents a case study in the Solo River basin of Indonesia.

In this research, the research team developed a methodological framework by coupling outputs from a water and energy budget-based rainfall-runoff-inundation model with a flood-loss model (see Figure 3-5). The team also developed flood damage curves for agricultural crops and for residential buildings and contents to quantify flood damage. It then calibrated and validated the parameters of the hydrologic-hydraulic model by comparing calculated discharges with observed discharges for past flood events. In addition, it validated the calculated flood extent using satellite-based flood-extent observations.

Then, the team assessed flood exposure and damage under different climate and social change scenarios, focusing on the Solo River basin of Indonesia, using MRI-AGCM climate model outputs for the past (1979–2002) and far-future (2075–2098) periods. To incorporate future changes in paddy-field area when assessing agricultural flood damage, land-use and land-cover changes (LULC) were analyzed using historical land-cover maps. Future LULC changes were projected based on the learning process using historical maps and static variables. The effects of future population growth and development on residential flood damage were evaluated using shared socio-economic pathways (SSPs) while considering population projections.

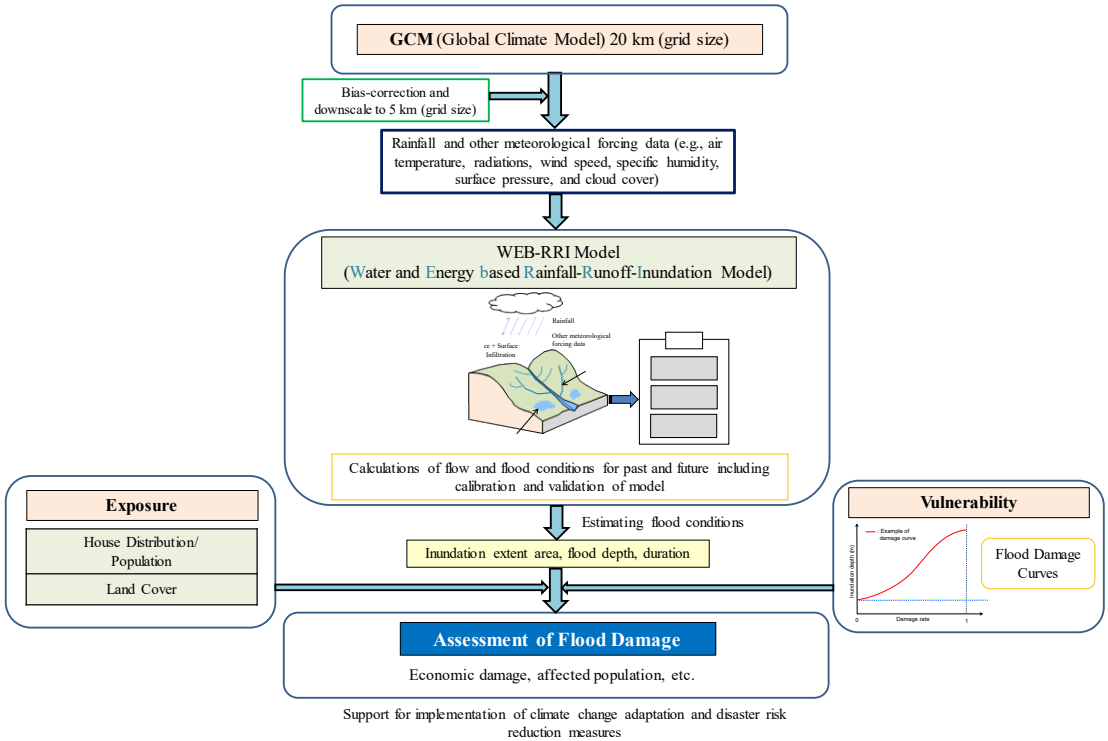


Figure 3-5 Overview of methodology for assessing flood damage quantitatively

Figure 3-6 shows the calculated flood damage to rice crops and residential houses in the past and future periods. The results indicate that the average annual damage to rice crops in the study area may

increase by 93.7% in the future due to climate change impacts alone, assuming no future changes in paddy-field area. When both climate change impacts and future changes in paddy-field area are considered, the average annual damage to rice crops is projected to increase by more than 50%. This reduction in percentage increase is due to a future decrease in paddy-field area. The findings also show that rice production may decrease in the future not only due to climate change impacts but also due to reductions in paddy-field area. A future decrease in paddy-field area alone may lead to a 24.6% decline in rice production.

The results also show that future increases in household damage vary widely depending on future population scenarios. The estimated building and content damage for the future period are relatively higher in all population scenarios than in the past period with the base-year population. The average annual household damage may increase by 146% in the future in the case of the base-year population. For SSP1, SSP2, SSP3, SSP4, and SSP5, the projected increases in average annual household damage compared with the past climate period were 150%, 193%, 259%, 121%, and 146%, respectively. Among these scenarios, the flood damage to residential households is projected to be the most severe under the SSP3 population scenario.

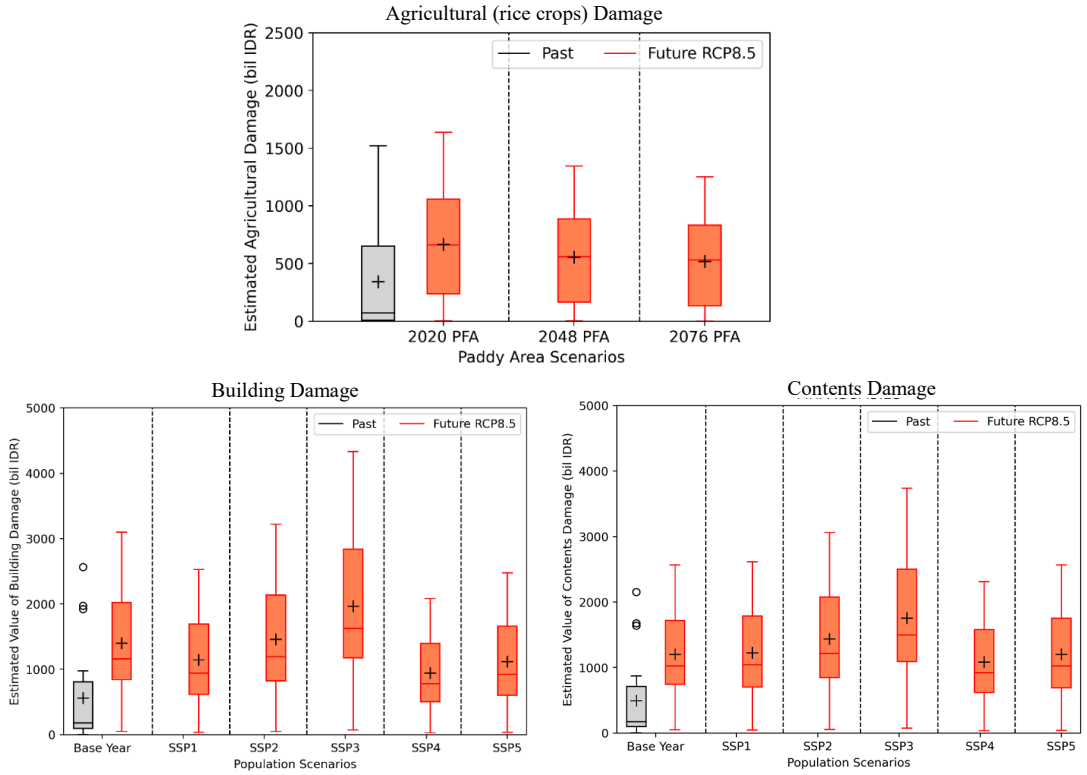


Figure 3-6 Calculated flood damage to agricultural production and to residential buildings and contents in past and future periods

3. 3 Monitoring and prediction of changes in water-related disaster risks

ICHARM will develop, verify and improve methods for monitoring and forecasting changes in hazards due to meteorological conditions with different temporal scales ranging from season to climate change and changes in exposure and vulnerability due to social development and economic changes. These methods will be applied to case studies at multiple locations both in and outside Japan, and the outcomes will be used to provide support for all stakeholders to select appropriate methods according to their needs and conditions to mitigate future risks of water-related disasters by themselves. The methods will be modified with various local adjustments and compared with each other for further improvement to eventually become globally applicable.

(Source: ICHARM Mid-term Programme)

3.3.1 Improvement of the accuracy of several-day-ahead rainfall and flood forecasting by improving an ensemble rainfall forecasting method

Rainfall forecasting is an important element directly linked to the accuracy of flood forecasting. ICHARM developed an ensemble rainfall forecasting system and incorporated it into a runoff model to perform more reliable ensemble discharge forecasting. We also applied this approach to estimate the runoff in dam basins to control the discharge of dams, which has eventually led to the development of a system that contributes to increasing hydropower generation and reducing flood risk in downstream areas. Although the ensemble rainfall forecasting system has been proven useful to some extent, its prediction accuracy still needs improving, for example, in predicting rainfall during the linear precipitation zone phenomenon. Therefore, we reviewed the system for more accurate rainfall forecasting. In addition, we conducted joint research with the Meteorological Research Institute of Japan to improve prediction accuracy by assimilating satellite microwave radiometer data. Significant progress has been made from these efforts.

Ensemble rainfall forecasting is achieved using the Weather Research and Forecasting (WRF) model, which is a regional weather model, and the Local Ensemble Transform Kalman Filter (LETKF) for ensemble initial value generation and data assimilation. In FY2025, the research team improved the settings of LETKF and further adjusted the perturbations to the lateral boundaries. The improved WRF-LETKF model was applied to the July 2020 case of a linear precipitation zone over Kyushu, Japan, and successfully enhanced the reproducibility of the phenomenon.

Furthermore, the team reproduced cloud water content and other values using the integrated model coupling WRF with the Coupled Atmosphere and Land Data Assimilation System (CALDAS), which assimilates microwave radiometer data from the AMSR2 satellite into a weather prediction model, and used them for WRF-LETKF. With CALDAS-WRF only, the assimilation effect was short-lived because satellite data were assimilated into the WRF model by a simple method. However, with additional processing using WRF-LETKF, the assimilation effect lasted longer, and the accuracy of rainfall prediction improved.

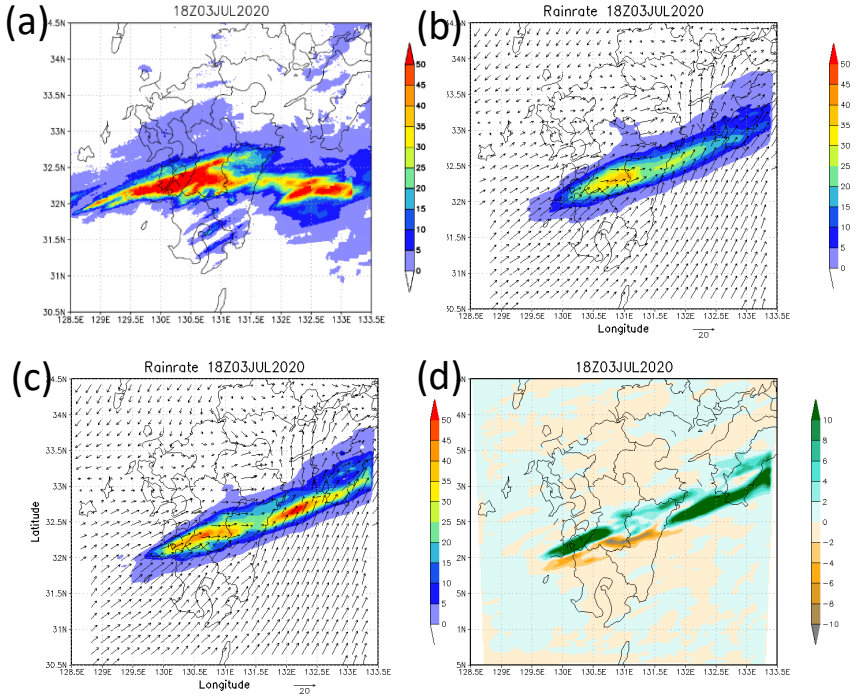


Figure 3-7 Rainfall distributions due to the linear precipitation zone phenomenon at 18:00 on July 3, 2020: (a) observed rainfall, (b) analyzed surface rainfall and wind by WRF-LETKF, (c) analyzed rainfall and wind by WRF-LETKF with cloud water assimilation by CALDAS, and (d) analyzed rainfall improved by WRF-LETKF with CALDAS assimilation (green indicates an increase).

3.3.2 Development of a hydrological model capable of representing low to high water conditions considering the effects of seasonal and regional factors such as snow cover and melt

The research team finalized a plan to develop two water cycle models: one for evaluating vegetation dynamics in the Memuro and Obihiro regions of the Tokachi River basin in Hokkaido, Japan, and the other for evaluating snowfall, snow cover, and snowmelt runoff in the Tokachi Dam and Bisei Dam basins, where rigorous assessment of upstream snowmelt runoff is essential. Following this plan, the team collected the data necessary for model development and created a database for model calibration and verification. Through reviewing and analyzing the collected data, the team confirmed the irrigation effects of water supplied from Bisei Dam on agricultural crops in the Memuro area.

The team also continued developing another advanced water cycle model, WEB-RRI-S, by adding snowfall, snow-cover, and snowmelt-runoff components to the WEB-RRI model. To this end, it began preparing various basin parameters and datasets required for this model development.

In addition to these model development activities, a team member delivered a presentation titled “Development of a Real Time Analysis Platform for Snowfall, Snow Accumulation, and Snowmelt: Delivering High Accuracy, High Temporal, and High Spatial Resolution Information from Japan to the World” under the NEDO incentive driven program for solution development utilizing satellite data in the Energy Management Infrastructure category in FY2024. The presentation received the Jury’s Special Prize, and the team’s efforts were widely disseminated to the public.

3. 4 Proposal, evaluation and application of policies for water-related disaster risk reduction

When developing policies that are practical under climate change, it is essential to consider stakeholders' understanding of disaster risk reduction measures, lifestyles, socio-economic activities, and possible changes in disaster risks. To achieve these, ICHARM will develop models to evaluate each policy's outcomes and socio-economic assessment methods applicable to different nations, as well as provide training for strengthening human resources to lead local consensus building and political decision making. (Source: ICHARM Mid-term Programme)

3.4.1 Technological development to support the creation of a virtuous cycle for promoting basin-wide flood management

In private companies, due to the growing awareness of ESG management (a management approach that emphasizes the three elements of Environment, Society, and Governance), there is an increasing movement to disclose the financial and other impacts of future climate change in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), as well as to evaluate these impacts. The evaluations include risk assessments related to physical impacts from floods, and there is a growing demand among companies for technical methods for such assessments. Trough the wider adoption of quantitative risk assessment methods that meet this demand, companies are expected to be able to evaluate the content and extent of their flood management activities and to create mechanisms for competitively advancing initiatives by differentiating themselves from other companies. Additionally, in March 2025, the Sustainability Standards Board of Japan (SSBJ) released the first sustainability disclosure standards in Japan. These standards were developed with the application to prime-listed companies in mind, and prime-listed companies are required to disclose financial information related to sustainability based on these standards.

Figure3-8 A web page of the Water Disaster Risk and Resilience Assessment Support System (under development)

The changes in awareness and behavior of these private companies, including investors, can serve as a significant driving force in promoting basin-wide flood management. Therefore, ICHARM started a research project in FY2023 to clarify what actual changes have occurred among private companies and related investors and how these changes may affect the promotion of basin-wide flood management.

In FY2025, in addition to the development of the web version of the Water Disaster Risk and

Resilience Assessment Support System, which is a tool for companies to assess flood risks themselves, ICHARM conducted surveys and interviews on water disaster risks and behavioral changes and collected responses from a total of 28 companies. The survey revealed that only about one-fourth of the companies had implemented concrete flood risk reduction measures that take climate change impacts into account, and that the information they consider particularly important when planning such measures is the potential damage they themselves may incur.

This research was conducted as part of one of the 14 issues in the third phase of SIP, "Development of a Resilient Smart Network System against Natural Disasters." See Section 3.6.1 for more information on SIP.

3. 5 Support in constructing the applicability of water-related disaster management

ICHARM will support local governments and citizens at several locations in Japan and overseas in the implementation of means for effectively sharing information from early warning systems and other sources among administrators and residents to facilitate coordinated disaster responses among different sectors. We will also develop, verify, and help them implement methods for preparing operation continuity plans based on local needs and conditions and improving interoperability during disaster response by liking administrative functions effectively at all levels.(Source: ICHARM Mid-term Programme)

3.5.1 Development and support for implementation of optimal operation methods for existing dams for better flood management

In previous years, the research team developed an approach for optimizing the operation of existing dams by considering both flood control and water utilization in the Ohi and Sai river basins in Japan. Building on this work, the team further examined how to apply this approach to river basins in developing countries with limited data availability.

Applying the approach to the Tana River basin in Kenya, the team significantly improved the reproduction accuracy of time-series river flow by correcting satellite rainfall data (GSMaP) using limited ground-based rainfall observations. It then used predicted rainfall to estimate the effects of optimized dam operation on flood control and water utilization (power generation). The simulation results indicated increased power generation and reduced peak flood discharge downstream of the dam. These findings were shared with local stakeholders, contributing to policy decision-making discussions.

3.5.2 Education and community collaboration for the social implementation of the Virtual Flood Experience System

To promote the social implementation of the Virtual Flood Experience System (VFES), it is important to verify its effects and identify challenges through broad use in educational and community activities. In FY2025, the research team collaborated with elementary, junior high, and high schools in Japan and conducted flood disaster education lessons using VFES in inquiry-based learning and experiential classes.

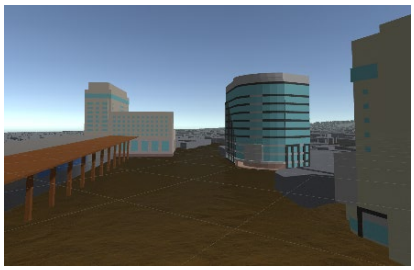


Photo 3-9 Nagano Station recreated in virtual space

Through these educational practices, the team gradually developed a basic lesson structure for flood disaster education using VFES. One of the insights gained through the efforts is that when a virtual flood experience is conducted after step-by-step explanations of key topics, such as the topography, weather, and other characteristics of the target area, the process from rainfall to flooding,

and past flood disasters, participants are more likely to perceive local flood disaster risks as a "personal matter." To verify the educational effects of this approach, the team conducted a survey at Matsushiro Elementary School in Nagano City and observed a significant change in participants' responses to questions related to personalizing flood risk, such as "Do you think flooding could occur in your area?" After the workshop, more participants answered that flooding could occur in their area.

Also, in FY2025, through collaboration with Shinshu University in Nagano Prefecture, we established a cooperative framework with the Nagano Prefectural Board of Education and promoted initiatives to utilize VFES in school education. Through coordination with schools via the board of education, the research team conducted VFES-based lessons at several schools, including Toyono Junior High School in Nagano City, enabling educational activities in areas that had previously experienced flood damage. By organizing lesson structures and teaching materials, the team was able to standardize disaster prevention education content using VFES. A dissemination framework, supported through cooperation with the board of education, is now beginning to take shape.

In addition, through these experiences in various locations, the team gained concrete insights into methods for constructing virtual spaces and their educational applications. At Mitsukaido First High School Affiliated Junior High School in Ibaraki Prefecture, during a class on evacuation behavior as part of exploratory learning, students actively examined evacuation strategies while considering the local population structure and information delivery methods. At Matsumoto City Sugano Junior High School in Nagano Prefecture, students experienced a virtual flood situation created using PLATEAU's three-dimensional city model, where the closely reproduced cityscape helped them recognize potential disaster risks in familiar everyday locations. At the same time, some students had difficulty orienting themselves in parts of the virtual space, highlighting the importance of providing supplementary information such as building names.

Furthermore, in collaboration with Aoyama Gakuin High School in Tokyo, the research team launched an initiative for high school students and provided an inquiry-based learning lesson using the game engine version of VFES in programming classes, representing an educational practice that integrates information technology with disaster prevention learning. In addition, in courses for local elementary school students conducted by the Faculty of Education at Shinshu University, the team provided them with flood experience using the Minecraft version of VFES and confirmed that experiential learning utilizing game elements encourages active participation among children. With cooperation from students of the Disaster Science Department at Tagajo High School in Miyagi Prefecture, the team also examined the feasibility of accessing the virtual space for flood experience from smartphones, demonstrating the potential for virtual experiences using personal devices.

Through these efforts, the research team confirmed that education on water-related disasters using VFES can be applied across a wide range of age groups, from elementary to high school students, and that, when combined with learning linked to local terrain and history, VFES demonstrates strong potential as an educational tool for deepening students' understanding of water-related disaster risks.

3. 6 Research funded by external sources

ICHARM's research activities were funded with operating grants from MLIT and funds from external sources, such as MEXT, the Cabinet Office, and JICA. The following sections explain research projects funded by external sources.

3.6.1 Cross-ministerial Strategic Innovation Promotion Program (SIP) by the Cabinet Office: Promoting R&D to facilitate disaster damage control behavior through risk communication

SIP is a national project established and operated directly under the Cabinet Office's Council for Science, Technology and Innovation in Japan and managed in a cross-ministerial and interdisciplinary framework to achieve scientific and technological innovation. SIP addresses the most important social problems facing Japan and world-leading issues that can contribute to the resurgence of Japan's economy.

Under the strong leadership of program directors assigned to each research and development project, each project team carries out various tasks using an end-to-end approach from basic research to implementation. In other words, they undertake a project with an overall picture from start to end, including practical application and commercialization of inventions. SIP has entered its third phase, spanning from 2023 to 2027, with 14 projects underway[1].

ICHARM is involved in a project led by Professor YAMADA Tomohito of Hokkaido University. The project aims to find effective ways of utilizing risk information to induce individuals and businesses to take voluntary actions for disaster risk reduction and prevention. The project is composed of the following three research themes: 1) the development of technology to predict basin-scale windstorm and flood damage; 2) the development of technology to visualize water-related disaster damage; and 3) the development of technology to generate and evaluate real-time disaster risk information that promotes self-directed actions to reduce disaster risks.

ICHARM, mainly involved in Research and Development Theme 2) the development of technology to visualize water-related disaster damage, is working on creating a society where water disasters are perceived as personal matters and preemptive disaster prevention actions are promoted. This goal is achieved through the development and implementation of a system that allows companies and others to quantitatively assess water disaster risks they will face in the future and the risks mitigated by prior disaster prevention measures (Water Disaster Risk and Resilience Assessment Support System), as well as technologies that increase residents' experience of water disasters using a

[1] https://www8.cao.go.jp/cstp/panhu/sip_english/sip_en.html

virtual flood experience system.

For specific research and development on the Virtual Flood Experience System, refer to Section 3.1.3; for the Water Disaster Risk and Resilience Assessment Support System, refer to Section 3.4.1; for education and regional collaboration aimed at the social implementation of the Virtual Flood Experience System, refer to Section 3.5.2; and for outreach activities, refer to Section 6.1.1.

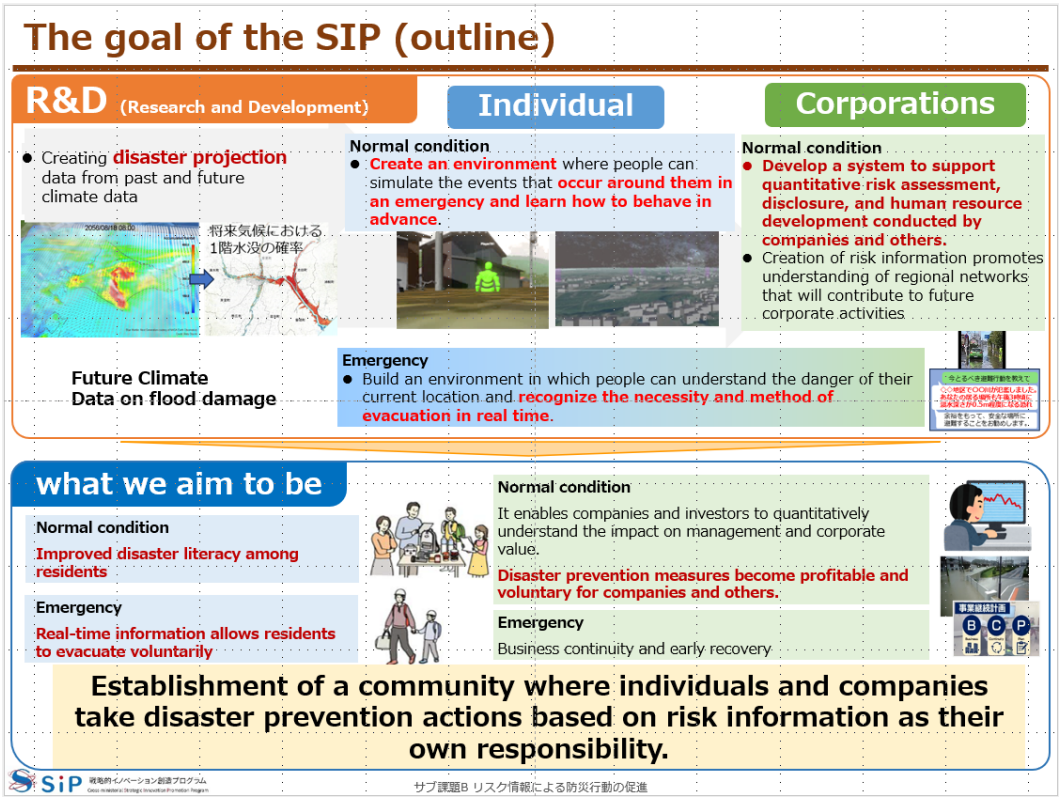


Figure 3-10 A vision of society set by SIP: Use of risk information to facilitate voluntary individual and corporate actions for disaster risk reduction

3.6.2 The MEXT Program for the Advanced Studies of Climate Change Projection (SENTAN)

ICHARM has participated in the MEXT Program for the Advanced Studies of Climate Change Prediction (SENTAN) since FY2022 and has been conducting research on climate change in collaboration with Kyoto University and other organizations.

ICHARM is assigned to “Task D: Evaluation of hazards and associated risks in the Asia-Pacific regions and the promotion of international cooperation,” led by Professor TACHIKAWA Yasuto of Kyoto University, which is under “Research Area No.4: Development of integrated hazard prediction models.” ICHARM develops and implements a water cycle model in the Philippines and OSS-SR tailored to their local needs and conditions.

In FY2025, we dynamically downscaled the Meteorological Research Institute Atmospheric General Circulation Model (MRI-AGCM 3.2) for the Pampanga River basin and the Pasig-Marikina-Laguna Lake basin in the Philippines. Using these simulations, we analyzed the impact of global warming on rainfall distribution. In the Davao River basin case, we decided to expand the project area to include the basin's surrounding areas and discussed the future implementation and operation of OSS-SR under the leadership of local agencies, which is part of the preparation for nationwide and worldwide dissemination of this system. See Sections 5.1.1 and 5.1.3 for more information.

3.6.3 Science and Technology Research Partnership for Sustainable Development (SATREPS)

SATREPS is a collaborative program involving multiple projects launched between JST and JICA or between AMED and JICA to promote international joint research between Japan and developing countries to solve global issues[2].

ICHARM has been participating in projects in the Philippines, Argentina, and Ghana as a joint research institute, leading project implementation in collaboration with domestic and foreign government agencies and research institutes. The following summarizes our activities in these countries in FY2025.

a) Philippines: "Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines"[3]

ICHARM are conducting research activities including downscaling of climate change models and evaluating water-related disaster resilience in the Pampanga River basin and the Pasig-Marikina River-Laguna Lake basin. The activity is carried out under the framework of "Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines (HyDEPP-SATREPS)", which is a joint research project between Japan and the Philippines, led by Professor Miho Ohara of the University of Tokyo.

In FY2025, the 8th and 9th Joint Coordination Committee (JCC) meetings were held onsite on June 20 and in hybrid format on November 12, respectively. During the meetings, the members reviewed the progress of collaborative research and had discussions for finalizing the research findings.

On June 16, ICHARM members conducted a field survey for the river channel and bed materials of tributaries flowing into Laguna Lake, with researchers and students of the University of the Philippines Los Baños, the main counterpart of the project. ICHARM staff continued regular guidance for the students who joined the survey, and finally a master's course student and a Ph. D. course student finished their educational programs in the University of the Philippines by using ICHARM's RSR model. In addition. electrical resistivity equipment for groundwater monitoring and aquifer

[2] https://www.jst.go.jp/global/english/index.html
[3] https://www.jst.go.jp/global/english/kadai/r0109_pilipinas.html

investigation was provided with a training program, and 34 participants completed the training program (Photo 3-2).

Photo 3-2 Training for groundwater observation

Photo 3-3 Field visit to Osaki City

To facilitate dialogue and gather input form stakeholders in the two target river basins, two workshops were held on September16 in the Pampanga River basin and on October 27 in the Municipality of Bay in Laguna Province. Based on the discussions in those workshops, the project members produced policy briefs as final outputs of the project, and held another workshop to disseminate the policy briefs on November 12 in Quezon City in Metro Manila. In addition, the final workshop of the project was held on February 27 in Tokyo, and 13 Philippine invitees were stayed in Japan from February 24 to March 3. During the stay, they visited Osaki City, Miyagi Prefecture, from February 25 to 26 to observe local practices implemented under “River Basin Disaster Resilience and Sustainability by All” (Photo 3-3), and also went to Lake Kasumigaura in Ibaraki Prefecture on February 28.

This project ended in May 2026, and ICHARM finalized and disseminated research achievements in collaboration with Philippine members.

b) Argentina: “Numerical Weather Prediction and Warning Communication System for Densely Populated and Vulnerable Cities”[4]

In SATREPS’s Argentina project, “Numerical Weather Prediction and Warning Communication System for Densely Populated and Vulnerable Cities (Principal Investigator: Senior Researcher MIYOSHI Takemasa, RIKEN),” ICHARM serves as a collaborative research organization responsible for developing hydrologic forecasting systems for the project area. In FY2025, ICHARM researchers visited Argentina from August 22 to 31, 2025, to participate in field visits and technical meetings on the development of hydrological models with counterpart researchers. From September to October, two Argentina researchers stayed at ICHARM for about one month and developed hydrological models for two river basins in Buenos Aires and Cordova States. From November 11 to 18, another researcher also visited ICHARM. From November 19 to 28, 14 researchers from Argentina visited

[4] https://www.jst.go.jp/global/english/kadai/r0309_argentine.html

Japan to report on the research progress of each group, attend a Joint Coordinating Committee meeting, and conduct field visits to observe flood control and disaster management facilities.

Photo 3-4 Field visit in Argentina

Photo 3-5 Visiting researchers from Argentina

c) Ghana: “The Project for the Development of Integrated Sediment and Environmental Management Towards Sustainable Conservation, Disaster Risk Reduction, and Livelihood Improvements in Coastal Areas”

ICHARM is participating in the SATREPS research project in Ghana, titled “The Project for the Development of Integrated Sediment and Environmental Management Towards Sustainable Conservation, Disaster Risk Reduction, and Livelihood Improvements in Coastal Areas.” Led by Professor TAJIMA Yoshimitsu of the University of Tokyo, the project aims to contribute to coastal erosion control in the Republic of Ghana. ICHARM is in charge of monitoring sediment flow from target rivers and developing a sediment simulation model.

Photo 3-6 Researchers assigned to river cross-section surveys and river sediment sampling along the Volta River

In FY2025, from August 6 to 15, site visits were conducted in the lower reaches of the Pra River, the estuary of the Volta River, and the Densu Delta to formulate detailed plans for sediment and flow monitoring. Subsequently, observation and analysis methods were developed and verified at the Tone River and other rivers in Japan to prepare for field surveys in Ghanaian rivers.

From February 23 to March 19, 2026, the ICHARM team revisited the study areas in Ghana to conduct river cross-section surveys and river sediment sampling, aiming to collect channel-topography and sediment-condition data essential for numerical modeling. The team also provided technical guidance and carried out joint observations to strengthen the local monitoring system, ensuring that Ghanaian research partners can continue observations independently.

3.6.4 World Bank project “Knowledge exchange on flood and drought management between South Sudan and Japan”

ICHARM made a single source contract of the World Bank project “Knowledge exchange on flood and drought management between South Sudan and Japan” for the period from February 5 to August 31, 2025, and supported countries in Eastern and Southern Africa in strengthening resilience to climate change in water-related fields. The project aims to provide the following support to the Ministry of Water Resources and Irrigation (MWRI) of South Sudan and other organizations related to flood and drought management.

(1) An overview of science and technology for monitoring, forecasting, and warning floods and droughts, including case examples;

(2) Trial demonstrations of comprehensive hydrological forecasting and recommendations for developing a flood and drought monitoring and an early warning system for a selected sub-basin in South Sudan; and

(3) Knowledge exchange through field visits and workshops in Japan for capacity building of the organizations’ staff.

To understand scientific mechanism of floods and droughts, ICHARM explained a rainfall prediction method that combines ground and satellite rainfall observation data, and the WEB-RRI model that covers a series of events ranging from floods to droughts. Regarding droughts, ICHARM introduced a method for monitoring and predicting agricultural droughts using satellite data assimilation technology that incorporates land-cover and vegetation information. For capacity building, during a training period from August 25 to 29, 2025, 19 people from five African countries (South Sudan, Comoros, Madagascar, Malawi, and Mozambique), the Nile Equatorial Lakes Subsidiary Action Program (NELSAP), and the World Bank visited Japan. They learned flood control and irrigation practices in Kusaki Dam, the Watarase Retarding Basin, and the Yoshida River basin in Miyagi and other prefectures and received operation training of a flood and drought prediction system at ICHARM. The participants learned about the application of cutting-edge science technology while taking historical context into account, through collaboration among diverse stakeholders such as the national, prefectural and municipal governments, and local communities. They also learned about practices of reducing water-related disaster risks, improving agricultural productivity, environmental conservation, and regional development. Participants also experienced how to obtain regional flood information using the RRI model.

Photo 3-7 Field visit to the Yoshida River

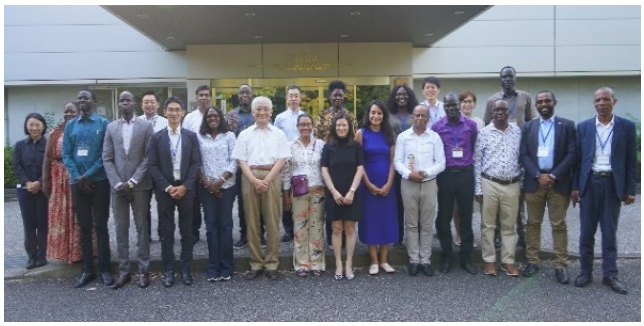


Photo 3-8 Participants in capacity building training

3.6.5 World Bank project “Technical Support for Advanced Forecast of Rainfall and Reservoir Inflow for Optimized Reservoir Operation”

ICHARM made a single source contract of the World Bank project “Technical Support for Advanced Forecast of Rainfall and Reservoir Inflow for Optimized Reservoir Operation” for the period from March 14 to December 31, 2025. Under this contract, we provide technical cooperation to Indian governments to improve dam operation based on meteorological and hydrological prediction. ICHARM is responsible for making more accurate predictions of inflow into reservoirs, while the Japan Water Agency (JWA), a partner organization, applies these outputs for optimal dam operation and integrated operation. The project includes the following tasks:

(1) Introduction of an advanced rainfall and reservoir-inflow forecasting system and assessment of possible improvement areas;

(2) Assessment of areas for introducing optimized reservoir operations incorporating an advanced rainfall and inflow forecasting system;

(3) Two online knowledge sharing programs on an advanced rainfall and inflow forecasting system and an integrated reservoir operation system, and a hybrid program in Japan including site visits; and

(4) A proposal for a knowledge exchange program to be implemented jointly with academic and research institutions in India.

From May 12 to 16, five ICHARM researchers, together with JWA staff, conducted field surveys in India and held meetings with the World Bank, the Ministry of Jal Shakti (MoJS), and the Central Water Commission (CWC). As a result, the Krishna River within the Karnataka and Andhra Pradesh states was selected as the target river of this project, including four cascading weirs and dams in each state. From November 18 to 21, ICHARM organized the “Site Visit and Workshop on Integrated Reservoir Operation for Cascading Dams in Japan,” and invited a delegation of seven participants led by Shri V.L. Kantha Rao, the secretary of the Department of Water Resources, River Development and Ganga Rejuvenation, MoJS. The delegation visited Sameura Dam, the Yodogawa Integrated Dam and Reservoir Group Management Office, Hiyoshi Dam, etc. and received lectures on optimal dam operation in Tokyo. In addition, the delegation had a technical exchange meeting with the Water and Disaster Management Bureau of MLIT and paid a courtesy call to Mr. HIROSE Masayoshi, the vice

minister of engineering affairs of MLIT. ICHARM will develop an advanced rainfall and inflow prediction system and an optimal reservoir operation system in cooperation with the Indian governments and the World Bank.

Photo 3-9 Field visit to Almatti Dam

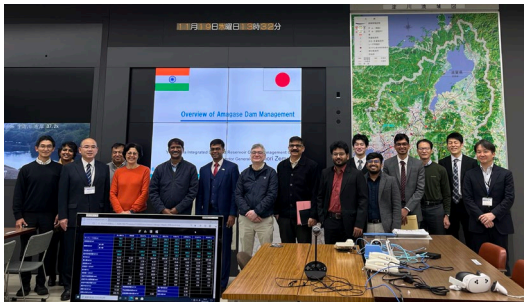


Photo 3-10 Visit to the Yodogawa Integrated Dam and Reservoir Group Management Office

3.6.6 UNESCO project “Enhancing flood resilience in Kenya”

Between October 2023 and January 2024, floods linked to the El Niño phenomenon struck Kenya, forcing the evacuation of over 500,000 people and claiming 186 lives. To enhance resilience to such events, ICHARM, in collaboration with the UNESCO Nairobi Office and Kenya’s Meteorological Department and Water Resources Authority, was assigned to implement the Flood Resilience Enhancement Project in Kenya in July 2025. In this project, we developed flood prediction and early warning systems in Kenya, prepared flood disaster maps with flood hot spots, and conducted capacity development training for local practitioners in Japan and Kenya.

On July 2, an inception workshop was held in Nairobi as a kickoff, where stakeholders discussed activity plans in detail. From July 3 to 6, field visits were conducted to the target watershed, the Tana River, including visits to major meteorological and hydrological observation stations and meetings at communities living along the Tana River.

Over the roughly two-week period from October 27 to early November, we conducted a facilitator training in cooperation with the University of Tokyo. For the training, one expert each from the Kenya Meteorological Department (KMD), the State Department for Water and Sanitation, the Kenya Electricity Generating Company (KenGen), and the Tana River County Government was invited, aiming to strengthen cross-disciplinary initiatives. Additionally, one instructor and coordinator from the UNESCO Regional Office for Eastern Africa also participated. The training program consisted of introductory lectures and tests on meteorology, hydrology, and disaster prevention, hands-on training, field visits, and group work. In the hands-on training, participants practiced using forecasted rainfall, hydrological modeling, and risk mapping. In the group work, they designed detailed content and structure assuming the implementation of expert training in Kenya.

Furthermore, on December 9, an expert training on the flood early warning system was conducted in Malindi, Kenya, hosted by UNESCO. A total of 38 participants from 16

organizations, including KMD, the Ministry of Water Resources, and KenGen, took part. In this training, Kenyan experts who had previously received facilitator training in Japan provided instruction.

Photo 3-11 Inception workshop

Photo 3-12 Participants in facilitator training with ICHARM researchers

Photo 3-13 Expert training

Photo 3-14 Certificate awarding ceremony

3.6.7 UNESCO project “Development of an integrated early warning system for water-related hazards in Ghana”

The repeated occurrence of floods and droughts in Ghana significantly affects socio-economic activities. A key factor underlying this issue is the lack of adequate data and forecasting capabilities related to hazards. To tackle these challenges, ICHARM joined a UNESCO project in collaboration with the University of Tokyo, and developed an Integrated Early Warning System for Floods and Droughts (IEWS) for the lower Volta River basin, which covers most of Ghana’s territory. In addition, ICHARM provided a training program for governmental officials and researchers in Ghana in November 2025. This training program included scientific lectures, as well as demonstrations and hands-on training sessions using IEWS.

The training program composed of a preliminary half-day online session and a two-day on-site session in Accra. The on-site session mainly provided lectures on climate change, bias-correction of satellite-based rainfall, rainfall prediction, flood monitoring and prediction, and agricultural drought monitoring and prediction, as well as hands-on training for IEWS operation. Out of the 20 participants, 16 took the examination to assess their understanding, and all of them successfully completed the training with a score of 80% or higher. The participants requested more advanced training programs, and also confirmed continued discussions toward coordination and collaboration among related organizations, with the support from Japan.

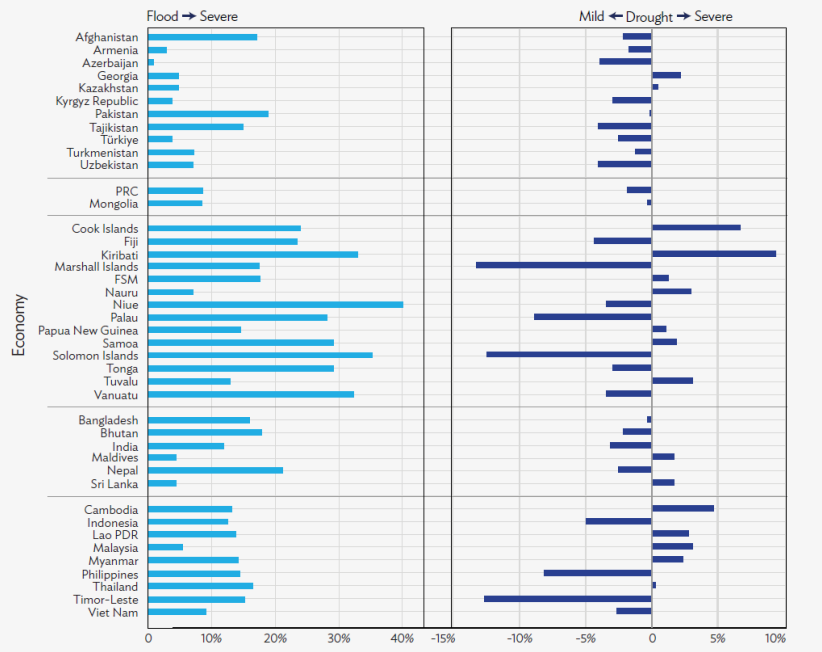
Photo 3-15 On-site training

Photo 3-16 Hands-on training

3.6.8 Asian Development Bank report “Asian Water Development Outlook 2025”

The Asian Water Development Outlook (AWDO) was first developed in 2007 by ADB with the Asia-Pacific Water Forum (APWF). ADB then published the second (2013), third (2016), and fourth (2020) AWDO editions and the fifth edition in December 2025. AWDO aims to track the region’s water security status and highlight important water management issues in the Asia-Pacific region. ICHARM made a contract with ADB to develop the second edition in 2009, and provided technical advice for the third edition. Accordingly, ADB requested ICHARM to draft the AWDO 2025 edition, developing a climate change model for Key Dimension 5 “Water-Related Disaster Security.”

According to Figure 3-11, extreme rainfall is projected to increase across all countries in Asia and the Pacific by the end of the century (2081–2100), consistent with trends reported in the Intergovernmental Panel on Climate Change Sixth Assessment Report. The once-in-25-year rainfall event is expected to become more intense, particularly in high-latitude areas and the equatorial Pacific. In contrast, Central and West Asia is projected to see smaller increases. Short-term drought conditions, measured using the 3-month Standardized Precipitation Index, are expected to ease in two-thirds of countries. The Marshall Islands shows the largest projected decrease in drought severity (13.2%). However, drought is expected to worsen in Kiribati and the Cook Islands. Compared to rainfall projections, uncertainty remains higher for drought outcomes. Figure 3-12 shows future rainfall change for a 200-year return period as an example of the output.



PRC = People's Republic of China, Lao PDR = Lao People's Democratic Republic, FSM = Federated States of Micronesia.
Source: ADB.

Figure 3-11 Future change in extreme rainfall and drought (AWDO 2025)

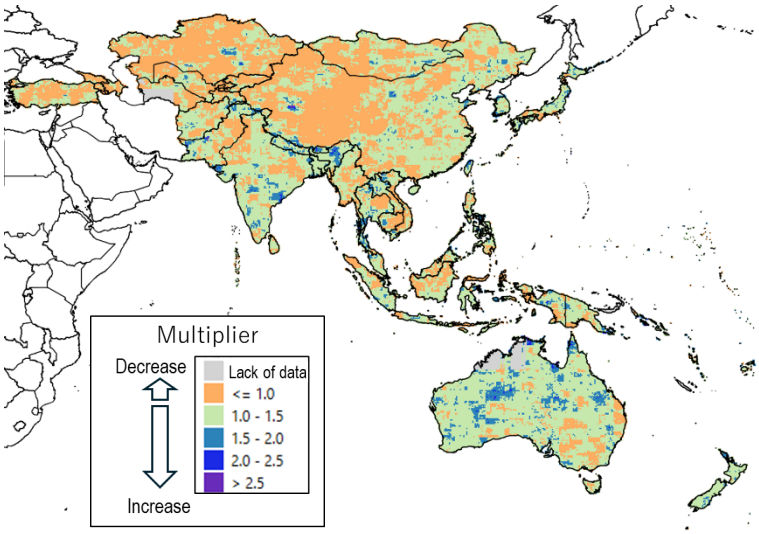


Figure 3-12 Future change in the once-in-200-year rainfall

3. 7 Research Meeting

ICHARM has held the Research Meeting roughly once a month since March 2008. Researchers make presentations on their ongoing research to upgrade their research-related skills, learn different perspectives, and practice interactions with other researchers.

In FY2025, the meeting was held 11 times from Nos. 167 to 177, and 20 researchers delivered a presentation.

3.8 ICHARM Best Paper Award

ICHARM established the ICHARM Best Paper Award in 2009 to select and honor the best paper of the year among peer-reviewed papers whose first author is an ICHARM researcher.

In FY2025, the following paper was selected for the award, and the ceremony was held on December 26, 2025.

Title: Assessment of future risk of agricultural crop production under climate and social changes scenarios: A case of the Solo River basin in Indonesia

Authors: Badri Bhakta Shrestha, Mohamed Rasmy, Tomoki Ushiyama, Ralph Allen Acierto, Takatoshi Kawamoto, Masakazu Fujikane, Takafumi Shinya, Keijiro Kubota

Publication: Journal of Flood Risk Management, Wiley, 18(1), e13052

https://doi.org/10.1111/jfr3.13052

Photo 3-17 Awarding ceremony of ICHARM Best Paper Award

4. Training

ICHARM conducts various education and training programs with the aim of not only improving individual problem-solving skills but also improving organizational disaster management capabilities. We also continue providing support for students and trainees who return home after completing programs by holding follow-up seminars, through which we also gain feedback to improve our programs.

The following reports the main training activities in FY2025. ANNEX 1 shows the number of trainees by country.

4.1 Doctoral program: Disaster Management Program

ICHARM launched a doctoral program, "Disaster Management Program," in 2010 in collaboration with GRIPS to develop experts capable of formulating policies on water-related disaster risk management and taking leadership in their implementation. By March 2025, 24 students from nine countries had graduated from this program.

Photo 4-1 Entrance ceremony for the 15th batch of doctoral students in October 2025

In October 2025, the 15th batch of three students enrolled in the program. As of March 2026, a total of nine students are in the program: two in the third year, three in the second year, and three in the first year. (One of the third-year students withdrew for health reasons.)

Disaster risk reduction has been one of the most widely debated water issues worldwide and requires closer collaboration between policymaking and science. In response to this need, JICA has operated a new scholarship program for foreign students named "Disaster Risk Reduction Leaders Capacity Development for the Sendai Framework Implementation" since 2018. ICHARM and GRIPS cooperate in implementing this program by providing doctoral education to the scholarship recipients. As of March 2026, four out of the nine doctoral students are enrolled under this scheme: two in the second year, and two in the first year.

4.2 Master's program: Water-related Disaster Management Course of Disaster Management Policy Program

Since 2007, ICHARM has offered a one-year master's program, "Water-related Risk Management Course of Disaster Management Policy Program (JICA Knowledge Co-Creation Program "Flood Disaster Risk Reduction"), as a joint initiative with JICA and GRIPS. This program targets officials

from administrative organizations in developing countries and is designed for participants to earn a master's degree within a single year. In the first half of the course, from October to March, the classes consist mostly of lectures; in the second half, from April to the end, students work on research and their graduation theses. In addition, several study trips are conducted for students to visit dam, river, and other management offices around Japan, where they can gain firsthand knowledge and experience in current flood management in Japan from experts of MLIT and other organizations.

Between 2007 and March 2026, 202 students from 41 countries graduated from the master's program.

In September 2025, the 18th batch of seven students from six countries (Bangladesh, Mexico, Peru, Philippines, Sri Lanka, Timor-Leste), who entered the program in October 2024, graduated with a master's degree. In the following month, the 19th batch of 14 students from six countries (Bangladesh, Bhuta, Indonesia, Kenya, Madagascar, Malawi, Sri Lanka, Timor-Leste, Vietnam) enrolled in the program.

Photo 4-2 Students on a study trip

Photo 4-3 Master's and doctoral students after the graduation ceremony at GRIPS in September 2025

4.3 Follow-up Seminar for ICHARM alumni and Alumni Webinars

ICHARM, in collaboration with JICA and GRIPS, offers the master's program, "Water-related Disaster Management Course of Disaster Management Policy Program," and the doctoral program, "Disaster Management Program." To date, 223 students have graduated from these programs.

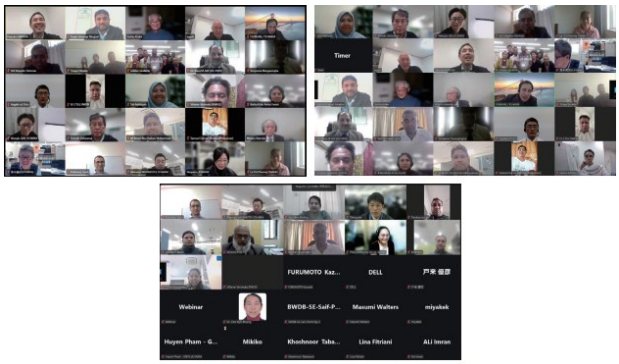


Photo 4-4 Participants in the Follow-up Seminar

Since 2007, we have held an annual follow-up seminar for graduates of ICHARM's educational and training programs. This event allows us to see how graduates are applying the knowledge and skills they acquired through the training at ICHARM and to learn about the challenges they face in their professional practice. Such information is used to improve our training programs and research activities.

In addition to the annual follow-up seminars, we began holding four Alumni Webinars per year starting in 2024, focusing on four fields: meteorology, sediment, hydrology, and risk management. The aim is to strengthen the network between graduates and current students by sharing knowledge and information on the latest trends and technological innovations in water disaster management, and to support the activities of ICHARM graduates. In FY2025, the fourth webinar (hydrology) was held on May 27 with 79 participants, the fifth (meteorology) on September 1 with 46 participants, the sixth (sediment) on December 23 with 84 participants, and the seventh (hydrology) on March 24 with 78 participants.

The following graph shows gender breakdowns based on the gender information that participants provided during registration.

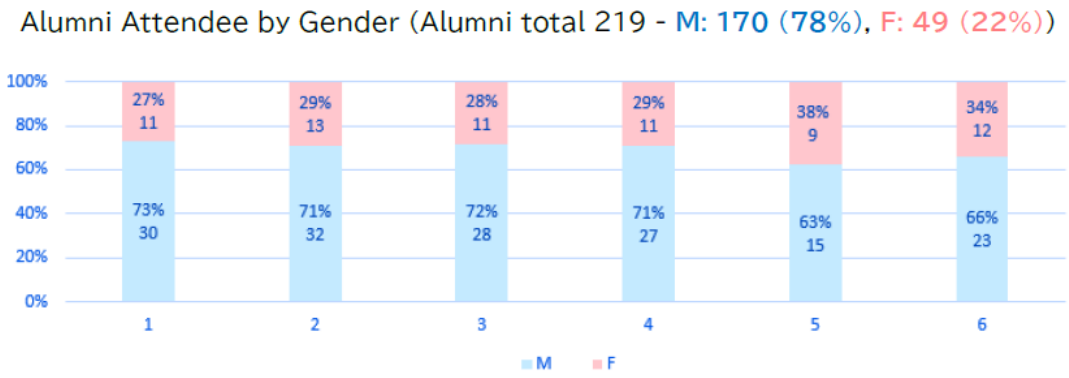


Figure 4-1 Alumni Webinar attendees by gender

4.4 Learning opportunities for students and researchers from external organizations

Since its establishment in 2006, ICHARM has actively accepted foreign researchers and interns from both within Japan and internationally. In FY2025, we welcomed interns from the universities and research institutions listed below. They stayed for periods ranging from about one month to several months and received guidance from ICHARM researchers on topics such as hydraulic and hydrological analysis, sediment transport analysis, and disaster risk analysis.

- Kyoto University (Japan): 1 person
- The University of Tokyo (Japan): 1 person
- SATREPS (Argentina): 2 persons
- University of the Philippines Los Baños (Philippines): 1 person
- Nagoya University (Japan): 1 person
- University of Tanta (Egypt): 1 person

5. Information Networking

In its information networking activities, ICHARM continued to support the establishment and implementation of the Platform on Water Resilience and Disasters in various countries while fulfilling the responsibilities of the IFI secretariat. In the Philippines, we initiated a project in Digos City, located near Davao, the center of our previous activities. We also launched new platform-building projects in Thailand and Indonesia. In addition, in collaboration with MLIT, we contributed to the Typhoon Committee, where an ICHARM senior researcher serves as the chair of the Working Group of Hydrology, and organized a side event at an international conference hosted by UNESCO.

Through these activities, we advanced initiatives in various countries based on the concept of "Water Cycle Integrator (WCI)" advocated by ICHARM. We also strengthened networks with flood management experts and administrators in Japan and abroad, making substantial progress toward establishing an effective information network, one of the three principal pillars of ICHARM's activities.

5.1 International Flood Initiative (IFI)

IFI, implemented in collaboration with UNESCO and other UN agencies, has been working with government agencies and relevant organizations in the Philippines, Sri Lanka, Indonesia, and other countries to establish Platforms on Water Resilience and Disasters. ICHARM, serving as the IFI secretariat, has continued to support these projects.

Table 5-1 shows activities related to the IFI platforms in FY2025.

Table 5-1 Activities related to the IFI platforms in FY2025

Country	Date	Activity
Vietnam	2025 October 15-17	17th Asia Oceania GEO (AOGEO) Symposium
Indonesia	November 17	Online meeting with the Ministry of Public Works
Sri Lanka	2026 February 12	Meeting with the Mahaweli Authority
Indonesia	February 25-26	Meetings with the Ministry of Public Works, the National Disaster Management Authority, the Ministry of Forestry, and the Meteorological, Climatological, and Geophysical Agency
Philippines	March 19	Workshop at Davao City, Philippines
Thailand	March 24	Third plenary meeting of the platform on water resilience and disasters

These platform projects are conducted based on the WCI concept, which consists of three functions: knowledge integration, capacity integration, and process integration. WCI was proposed by ICHARM and adopted in the Water Action Agenda, one of the major outcomes of the United Nations 2023 Water Conference. Its application is expected to expand at the local, national, and regional levels through cooperation with UN member countries, UNESCO Category 2 centres, and other organizations.

5.1.1 IFI activities in the Philippines

From March 16 to 19, 2026, an ICHARM delegation conducted a series of technical engagements and workshops in the Davao Region, Philippines, to advance the deployment of the Davao Regional Online Synthesis System (DROSS). The team collaborated with the Department of Science and Technology Region XI (DOST XI), the HELP Davao Network, and local academic and government partners. The mission focused on institutionalizing DROSS for flood and landslide management, fostering local facilitators, and scaling the technology to the local level.

Photo 5-1 Courtesy visit to the governor's office at the Davao De Oro Provincial Office

5.1.2 IFI activities in Indonesia

During the Asia Water Cycle Initiative (AWCI) session on October 15, 2025, a representative from the Ministry of Public Works of Indonesia introduced disaster management initiatives, including the Water Resources Data Center (WRDC), an online data center under development. Following the session, ICHARM had an online meeting with the Ministry of Public Works (PU) to learn more about the WRDC and to discuss potential collaboration among ministry agencies and joint activities with ICHARM.

PU

BNPB

MoF

BMKG

Photo 5-2 Meetings with IFI partners in Indonesia

On February 25-26, 2026, ICHARM visited PU, the National Disaster Management Authority (BNPB), the Ministry of Forestry (MoF),

and the Meteorological, Climatological, and Geophysical Agency (BMKG) to present ICHARM's recent research on climate change impacts, discuss coordinated measures for addressing challenges in the Solo River, and prepare for the next IFI Platform meeting.

5.1.3 IFI activities in Thailand

On March 24, 2026, the Third Plenary Meeting of the Platform on Water Resilience and Disasters in Thailand was convened at the Office of the National Water Resources (ONWR) in Bangkok under the theme "Forecasting for Risk-Informed Decision Making and Policy." ICHARM joined approximately 80 participants from eleven Thai government agencies, three universities (Chulalongkorn, Kasetsart, and Mahidol), and international partners including WMO, ESCAP, and JICA Thailand.

The third plenary discussed the specific content and delivery methods of the flood forecasting and warning system, marking the platform's shift from planning to action. In November 2025, severe flooding struck Songkhla Province, including Hat Yai City, when Cyclone Senyar made landfall after forming in the Strait of Malacca. Against the backdrop of this disaster, participants shared the importance of unifying forecast information across agencies and ensuring its timely delivery. During the plenary, Executive Director Koike delivered an opening message drawing on Japan's experience in water governance. The government-agency session enabled cross-ministerial sharing of the latest initiatives, and in the academic session, Senior Researcher Miyamoto introduced ICHARM's plan for water-related disaster resilience and the Online Synthesis System (OSS), while researchers from the three universities emphasized the need to understand the uncertainty embedded in transmitted forecast information. At the closing discussion, participants confirmed the need to strengthen the production and dissemination of science-based forecast-and-warning information at the frontline of water disaster management, along with capacity development.

Photo 5-3 The 3rd plenary meeting of the Platform on Water Resilience and Disasters in Thailand

5.1.4 IFI activities in Sri Lanka

In November 2025, the Mahaweli River in Sri Lanka experienced significant flooding during Cyclone Ditwah due to extremely heavy rainfall across the basin. The intense precipitation rapidly

increased river discharge, causing water levels to rise and overflow into surrounding low-lying areas. As a result, nearby communities, agricultural lands, and infrastructure were inundated, leading to displacement of residents and disruption of transportation and irrigation activities. The event highlighted the vulnerability of settlements along the Mahaweli River and emphasized the need for improved flood forecasting, river basin management, and early warning systems.

To address these challenges, the director general of the Majhaweli Authority requested collaboration with ICHARM to enhance flood forecasting and early warning capabilities for the Mahaweli River basin through technical cooperation, knowledge exchange, and capacity building between the two institutions under the International Flood Initiative (IFI).

In response, with support from a team of researchers at the University of Tokyo's Data Integration and Analysis System, ICHARM developed a Mahaweli River early warning system that includes river-flow and inundation monitoring and forecasting (https://ff-srilanka.diasjp.net/RRI/). River-flow monitoring reflects the past 24 hours, while inundation monitoring covers the period from 12 a.m. UTC of the previous day to the present. Forecasts are updated daily with a six-day lead time. Although ensemble forecasting is possible, it requires additional preparation time; therefore, single forecasting is currently used. Neither the monitoring nor the forecasting considers the effects of dams. In the future, it would be beneficial to add a subsystem that combines real-time dam state data with dam operation functionality. Such an improvement would help mitigate disaster risks during extreme events and enhance water use efficiency during normal times. The director general expressed strong appreciation for ICHARM's leadership and quick response in providing critical information during the recovery period.

Photo 5-4　At the Mahaweli Authority

5.2　UNESCAP/WMO Typhoon Committee (TC)

The Typhoon Committee is an international organization, established in 1968 by WMO and ESCAP, composed of 14 countries and territories in the Northwest Pacific region. The committee sets five sections: the Working Groups on Meteorology (WGM), Hydrology (WGH), and Disaster Risk Reduction (WGDRR), the Training and Research Coordination Group (TRCG), and the Advisory Working Group (AWG), which governs those four. It aims to minimize typhoon-related damage by enhancing cooperation among members in sharing information and upgrading technical support and

capacity development; for example, improving the accuracy of typhoon forecasting, sharing disaster risk reduction measures, and strengthening regional resilience.

With its senior researcher currently serving as the WGH chair, ICHARM, in collaboration with MLIT, leads the discussions of WGH.

5.2.1 The 20th Annual Meeting of the Working Group on Disaster Risk Reduction

From May 27 to 30, 2025, the 20th Annual Meeting of the Typhoon Committee (TC) Working Group on Disaster Risk Reduction (WGDRR) was held in Seoul, South Korea, hosted by the National Disaster Management Institute (NDMI) of South Korea. Concurrently, the Advisory Working Group (AWG) meeting also took place. The meetings were attended by over 50 participants from 11 countries and territories (China, Hong Kong, Macau, Japan, Laos, Malaysia, the Philippines, South Korea, Thailand, Vietnam, and the United States), and the TC Secretariat, as well as representatives from the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the World Meteorological Organization (WMO), and the United Nations Office for Disaster Risk Reduction (UNDRR). From ICHARM, Senior Researcher MIYAMOTO Mamoru participated as the WGH chair. During the WGDRR meeting, international organizations and research institutions presented the latest initiatives and knowledge-sharing efforts in disaster risk reduction, leading to active discussions. The AWG addressed various agenda items for the current term, including preparations for the 20th Integrated Workshop, the establishment of the Typhoon Committee Research Award of Young Scientists, and arrangements for the upcoming annual session.

Photo 5-5 Senior Researcher Miyamoto at the WGDRR meeting

5.2.2 The 14th annual meeting of WGH

The 14th Annual Meeting of the Working Group on Hydrology (WGH) of the Typhoon Committee was held over three days from September 23 to 25, 2025, in Guam, U.S. territory, co-hosted by Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the U.S. National Oceanic and Atmospheric Administration (NOAA). This annual meeting, chaired by

Photo 5-6 Participants in the annual meeting of WGH

Senior Researcher MIYAMOTO Mamoru, was held under the theme “Strategic Action for a Resilient Tomorrow: Strengthening Interagency Coordination and Data-Driven, Multi-Hazard Early Warning Systems to Address Typhoon Impacts,” attended by more than 30 practitioners and researchers from 10 countries and regions (China, Japan, Laos, Malaysia, the Philippines, South Korea, Singapore, Thailand, Vietnam, and the United States) and the Typhoon Committee Secretariat. Following keynote presentations from MLIT and the University of Guam, each member reported on their typhoon and flood countermeasures for 2024 and 2025, which led to active discussions. Furthermore, the participants discussed the progress, outcomes, and budget status of nine ongoing Annual Operating Plans (AOPs) and new AOP proposals from Malaysia. Other agenda items included preparations for the 20th Integrated Workshop (IWS) and the formulation of WGH’s policy for the upcoming annual session, covering various topics related to the current term's group operations.

5.2.3 The 20th Integrated Workshop

The Typhoon Committee High-Level Forum and the 20th Integrated Workshop were held in Macao, China, from December 2 to 5, 2025. Senior Researcher MIYAMOTO Mamoru participated in these events as the chairperson of the Working Group on Hydrology (WGH). The 20th Integrated Workshop, themed "Closing Gaps and Creating Opportunities Together: Developing the Typhoon Committee’s Future Strategy," included reports on the activities through the Typhoon Committee during 2025 and discussions on the work plan for 2026 and the formulation of the committee’s next strategic plan. The committee’s three working groups had parallel sessions separately during the same period. Miyamoto chaired the meeting of WGH, shared information on the responses of the member countries to typhoon impacts and their progress in implementing the group’s Annual Operating Plans (AOPs). Additionally, the WGH members discussed two new AOPs proposed by Malaysia, as well as future activity policies for 2026 and beyond. On the final day of the Integrated Workshop, Miyamoto reported the WGH's efforts in the plenary session, which generated high interest and strong support for future cooperation among participants.

Photo 5-7 Presentation at the parallel session

5.2.4 The 58th annual session

The 58th Annual Session of the Typhoon Committee (TC) was held in Jeju Island, South Korea, from March 10 to 13, 2026, and Senior Researcher MIYAMOTO Mamoru participated in this meeting. The annual session is the most important meeting where all stakeholders gather to make decisions and

pass resolutions for the entire committee. A total of 114 participants attended the meeting, representing 11 of the 14 member countries and regions (China; Hong Kong, China; Macau, China; Japan; Laos; Malaysia; the Philippines; South Korea; Thailand; Singapore; and Vietnam), along with the World Meteorological Organization (WMO) and the Typhoon Committee Secretariat (TCS). Japanese representatives were also in attendance from the Ministry of Land, Infrastructure, Transport and Tourism's Water and Disaster Management Bureau, the Japan Meteorological Agency, the Asian Disaster Reduction Center, the Infrastructure Development Institute, and Tohoku University.

On the second day, the four working groups reported on the review of the Annual Operating Plans (AOPs) and activity plans for the coming year. Miyamoto presented the review and plans as the WGH chair. On the third day, the Typhoon Committee Secretariat led discussions on retiring the names of typhoons that caused significant damage and reported on the budget and financial balance. Participation in this session not only demonstrated the international presence of Japan, ICHARM, and the Public Works Research Institute but was also a valuable opportunity to promote efforts to strengthen regional disaster resilience.

Photo 5-8　Participants in the 58th annual session

5. 3　International contribution in hydrology

5.3.1　UNESCO Intergovernmental Hydrological Programme IX (IHP-IX)

UNESCO-IHP, established in 1975, is UN's only intergovernmental program dedicated to water-related issues, including science, management, education, and capacity building.

IHP sets a mid-term plan every eight years and is currently in the midst of its ninth plan (UNESCO-IHP-IX: 2022-2029). Under the theme of "Science for a Water Secure World in a Changing Environment," the plan aims to help member countries complete the goals set to achieve by 2030, including the 2030 Agenda, SDGs, especially its water-related ones, and water-related global goals, such as the Paris Agreement and the Sendai Framework for Disaster Risk Reduction. IHP has addressed the following five key

water priority areas:

1. Scientific Research and innovation
2. Water education in the Fourth Industrial Revolution including Sustainability
3. Bridging the data-knowledge gap
4. Integrated water management under conditions of global change
5. Water governance based on science for mitigation, adaptation, and resilience

UNESCO-IHP-IX has three cross-cutting working themes, and the ICHARM executive director chairs one of them: “Hydrological systems, rivers, climate risk and water-food-energy nexus.”

a） Commemorative event of the 50th anniversary of the UNESCO Intergovernmental Hydrological Programme (IHP) and the 60th anniversary of International Hydrological Decade (IHD)

The year 2025 marks the 60th anniversary of UNESCO’s International Hydrological Decade (IHD) and the 50th anniversary of the UNESCO Intergovernmental Hydrological Programme (IHP). To celebrate these milestones, Executive Director KOIKE Toshio, Senior Researcher MIYAMOTO Mamoru, and Research Specialist NAGUMO Naoko participated in commemorative events held at UNESCO headquarters from June 10 to 13, 2025. Among the commemorative events were 27 side events and two pre-events, in addition to the main event on June 11, with 650 onsite participants and 1430 online. Japan hosted one of the side events on June 12, entitled “Frontiers in Hydrology and their Contributions to Water Security in a Changing World.” Professor OKI Taikan of the University of Tokyo presented the results of the commemorative symposium held in Tokyo, Japan, in March 2025. Following this presentation, Professor SAYAMA Takahiro of Kyoto University and Emeritus Professor Ian White of Australian National University reported the activities of the IHP Regional Steering Committee for Asia and the Pacific. Executive Director Koike also delivered a presentation titled “Together with Africa,” reporting on ICHARM’s research and information-networking activities in Africa. The event brought together numerous officials and researchers from UNESCO-related and other organizations, including Ms. Lidia Brito, the assistant director general for UNESCO’s Natural Sciences and Mr. KANO Yudai, the ambassador and permanent delegate of Japan to UNESCO.

Photo 5-9　Participants in the UNESCO commemorative event

b） UNESCO IHP Regional Steering Committee for Asia and the Pacific

Photo 5-10 Executive Director Koike speaking at the scientific workshop

The UNESCO Intergovernmental Hydrological Programme Regional Steering Committee for Asia and the Pacific (IHP RSC-AP) was established in 1993 to shape UNESCO's water programmes to address water issues, such as water scarcity, water-related disasters, and water education at a regional level. The Institute of Meteorology, Hydrology and Environment (IMHEN) under the Ministry of Agriculture and Environment of Vietnam hosted the 32nd Regional Steering Committee Meeting in Hanoi, Vietnam, on October 21- 23, 2025. On the morning of the 21st, a scientific workshop on "Water Science and Management for Sustainable Development under Climate Change" was held to commemorate the 50th anniversary of the IHP program and 60 years of UNESCO's dedication to water sciences. Executive Director KOIKE Toshio gave a lecture on "Hazard and Risk Management." In the afternoon, a conference was held on the Catalog of Hydrological Analysis (CHA), which aims to share information on water-related issues, such as disaster reduction, water environment conservation, and water resources management, across the Asia-Pacific region. The conference confirmed well-coordinated collaboration among researchers and engineers in this region in developing a hydrological analysis catalog to enhance their capacity to assess water-related disaster risks. On the 22nd, an RSC-AP meeting was held, with country reports presented in the morning and activity reports from water-related centers under the auspices of UNESCO, as well as from chairs and networks in Asia and the Pacific, in the afternoon. During the activity reports, Deputy Director KUSAKABE Takaaki reported on ICHARM's activities as a UNESCO Category 2 Center. Finally, the participants discussed future activities and proposed that RSC-AP establish a task force to make recommendations to important international events, such as the upcoming United Nations Water Conference and the World Water Forum.

c） UNESCO Water Sciences Report Task Force


Photo 5-11 UNESCO Water Sciences Report Task Force

In June 2024, the UNESCO Intergovernmental Hydrological Programme (IHP) decided to undertake a pre-feasibility study on the proposed UNESCO Water Sciences Report. To this end, a task force comprising 24 experts from UNESCO Member States and international organizations was established in February 2025. Since its formation, the task force has held a series of online meetings to discuss gaps in existing global water-related reports, as well as the scope, reporting framework, and financial mechanisms of the proposed report. As a

member of the task force, Chief Researcher OKADA Tomoyuki participated in the first in-person task force meeting, which was held in Seoul on October 27-28, 2025, with the support of the Ministry of Climate, Energy and Environment and the IHP National Committee of the Republic of Korea. The meeting focused on the draft scope of the Water Sciences Report proposed by the IHP Secretariat. The outcomes of the discussions are expected to support the secretariat in finalizing the draft scope, which will be presented at the 27th session of the IHP Intergovernmental Council in June 2026.

5.3.2 Collaboration with WMO

Photo 5-12 Participants in the Hydrology Meeting

The 79th Executive Council of the World Meteorological Organization (WMO) was held in Geneva, Switzerland, from June 16 to 20, 2025. During the conference, the council approved the appointment of Senior Researcher MIYAMOTO Mamoru as the regional hydrological advisor for WMO's Regional Association II. WMO divides the world into six regions, each with its regional association responsible for setting regional priorities and activities. Regional Association II, encompassing Asia and the Middle East, comprises 35 countries and territories. The regional hydrological advisor will play a key role in providing technical and scientific guidance on hydrological priorities, strengthening hydrometeorological services in member countries and territories, and advancing hydrological programs tailored to regional needs. His appointment is expected to help the regional members strengthen collaboration and networking, implement global strategies, improve hydrological services and early warning systems in the face of climate change, and enhance water-related disaster resilience. Notably, high expectations are placed on his liaison role for technical and institutional cooperation with international organizations and projects, such as the Typhoon Committee and the Platforms on Water Resilience and Disasters, supported by the International Flood Initiative.

Two meetings of the World Meteorological Organization (WMO) Regional Association II (RAII), which convenes hydrological and meteorological experts, were held in the second week of November 2025. The Hydrology Meeting was held in Siem Reap, Cambodia, on November 10-11, 2025, and the Chairs' Meeting was held in Shanghai, China, on November 13-14, 2025. Senior Researcher Miyamoto participated in these meetings. He reported on the establishment of the Platform on Water Resilience and Disasters in Thailand during the 17th Session and the creation of collaboration opportunities among related organizations to strengthen water-related disaster resilience. He also shared prospects for expanding collaboration with other sectors, such as energy and agriculture, in the 18th Session. Furthermore, throughout the meeting, as the regional hydrological advisor, he led discussions on activity policies, expert structures, and operational plans, and coordinated the overall proceedings.

5.3.3 Contribution to ISO (ISO/TC/268)

MLIT proposed the "basic principles for flood risk assessment for risk finance" as a Preliminary Work Item (PWI) at TC268 Working Group 5 (Risk Finance), and it was approved as ISO/PWI 26539 in January 2026. In order to facilitate discussions toward the standardization of the basic principles in Japan, technical knowledge in risk finance and flood risk assessment is required. Therefore, a working group has been established to examine this draft standard, and Senior Researcher Miyamoto has been appointed as the project leader. He leads the international discussions and also participates in the national committee of the Working Group on Flood Risk Assessment as a member.

5.4 Other international networking activities

5.4.1 Side event at the 81st session of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

The 81st session of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) was held in Bangkok, Thailand, from April 21 to 25, 2025, under the theme "Regional Cooperation for Resilient and Sustainable Urban Development in the Asia-Pacific Region." Ministers and key stakeholders from Asia-Pacific countries gathered to exchange views on current and future policy challenges for inclusive and sustainable development in the region. As a panelist, Senior Researcher Miyamoto participated in a side event, “Safeguarding Cities Against Water-Related Hazards and Earthquakes,” held on April 21. During the panel discussion, where the panelists debated on data necessary for accurate disaster analysis and prediction, Miyamoto introduced efforts related to the Platform on Water Resilience and Disasters, which promotes the use of satellite data and data integration in water-related disaster management. He also shared examples of satellite rainfall data utilization in discussions about the accuracy of satellite data.

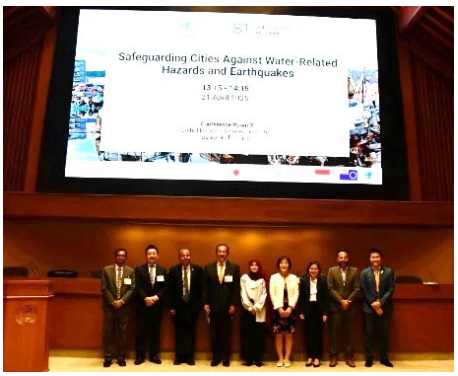


Photo 5-13 Panelists of the side event

5.4.2 9th Tokyo International Conference on African Development (TICAD 9)

During the 9th Tokyo International Conference on African Development (TICAD 9) in Yokohama, Japan, on August 20-22, 2025, ICHARM co-hosted a side event, "Climate and Water-Related Resilience in Africa: How Water-Related Risks Can Be Reduced?" on the 21st with MLIT, UNCRD, JAXA, JICA, UNDRR, GFDRR, the World Bank, the African Development Bank (AfDB), OECD, and the Japan Water Forum. Several speakers, including MLIT's vice minister for engineering affairs, the foreign minister of the Republic of South Sudan, a member of the Nigerian Parliamentary Assembly affiliated with the Presidential Office, and the Egyptian minister of water resources (via video), emphasized the increasing severity of water-related disasters in Africa, pointing out that these disasters are adversely affecting drinking water, sanitation, and health, consequently undermining sustainable development efforts. Executive Director KOIKE Toshio, as a keynote speaker, provided an overview of predicted changes in the water cycle in Africa due to climate change. He also introduced ICHARM's past projects in West Africa, such as those on the Volta and Niger rivers, and human resource development projects carried out in collaboration with GRIPS and JICA, which have produced master's and doctoral graduates from African countries. He emphasized the importance of nurturing facilitators who can serve as bridges between science and society, and concluded his speech by referencing the communique from the 1955 Asian-African Conference, also known as the Bandung Conference, which expressed a similar idea. TICAD 9 concluded its meeting by adopting the Yokohama Declaration[5], which includes building resilience against extreme weather events and other policy agendas.

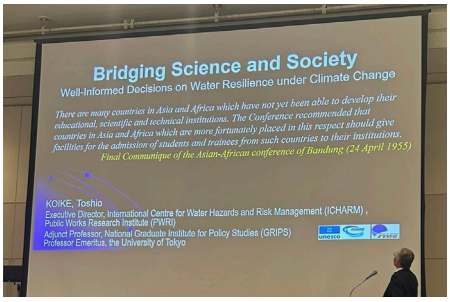


Photo 5-14 Executive Director Koike delivering the keynote speech

5.4.3 14th Symposium on River, Coastal and Estuarine Morphodynamics

The 14th Symposium on River, Coastal and Estuarine Morphodynamics (the 14th RCEM Symposium) was held in Barcelona, Spain, from September 1 to 5, 2025. RCEM is held every two years, bringing together researchers from all over the world to discuss the latest scientific trends in rivers, coasts, and estuarine environments. During the conference, keynote speakers presented the most recent research

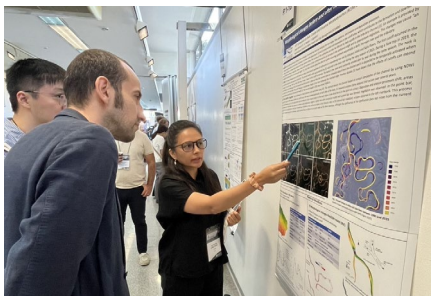


Photo 5-15 Presentation during the poster session

[5] https://www.mofa.go.jp/mofaj/files/100893311.pdf

trends such as machine learning and numerical modelling, followed by general sessions and a poster session where researchers were able to have discussions divided into three main topics: River, Coastal, and Estuarine morphodynamics. From ICHARM, Research Specialist Kattia Rubi ARNEZ FERREL attended the conference and presented her investigation titled “Morphological changes before and after cutoffs in meandering rivers.” She introduced a method to investigate morphological changes using satellite imagery in combination with numerical simulations to evaluate changes in the river. Her presentation showed a unique case of two neck cutoffs occurring in two branches of a meandering river before a confluence, showing a change in the angle of the confluence after the cutoff occurrence. The poster session led to active discussions with many researchers, yielding valuable ideas from the conversations. At the end of the conference, it was announced that Japan would host RCEM 2027.

5.4.4 17th Asia-Oceania Group on Earth Observations (AOGEO) Symposium

The 17th Asia-Oceania Group on Earth Observations (AOGEO) Symposium was convened in Bangkok, Thailand, from October 15 to17, 2025. The AOGEO symposium has been held since 2007 with the aim of fostering the Earth observation community in the Asia-Oceania region and deepening the common understanding of Earth observation in the region. The 2025 event, themed "Envisioning Earth Intelligence Across Boundaries: Accelerating Impact in Asia-Oceania Region," was co-hosted by the GEO secretariat, Japan’s Ministry of Education, Culture, Sports, Science and Technology (MEXT), and Thailand’s Geo-Informatics and Space Technology Development Agency (GISTDA). From ICHARM, Executive Director KOIKE Toshio, Deputy Director KUSAKABE Takaaki, and Senior Researcher MIYAMOTO Mamoru participated in the symposium, leading the Asian Water Cycle Initiative (AWCI) session. The AWCI session consisted of two parts: Part 1 discussed the activities of Platforms on Water Resilience and Disasters, and Part 2 explored the development of new technologies applicable to water-related disaster resilience. In Part 1, based on presentations on Platform activities from Thailand, the Philippines, Sri Lanka, and Indonesia and on the latest developments by organizations such as WMO, ESCAP, and JAXA, participants discussed how Platform activities could be accelerated by aligning them with the Early Warnings for All (EW4All) initiative. In Part 2, following presentations on the latest technological developments by GISTDA, JAXA, Synspective Inc., and others, discussions focused on strengthening flood resilience through the application of Earth

Photo 5-16 Participants in the AWCI session

intelligence technologies. Senior Researcher Miyamoto reported the outcomes of these AWCI sessions in the plenary session on the final day, which were adopted as part of the 2025 AOGEO Statement.

5.4.5 Special Session at the 19th World Water Congress of the International Water Resources Association (IWRA)

On December 1, 2025, ICHARM, UNESCO-IHP, and the World Bank organized a special session entitled "Making Africa More Resilient to Hydro-Climatic Extremes" at the 19th World Water Congress [6] of the International Water Resources Association (IWRA) in Marrakech, Morocco. The session aimed to share the achievements of various resilient projects in Africa and foster collaboration among relevant stakeholders. Research Specialist NAGUMO Naoko emceed the whole session. Executive Director KOIKE Toshio made opening remarks, followed by three keynote messages from the World Bank, UNESCO's Division of Water Sciences, and the Ministry of Water Resources and Irrigation of South Sudan. Then, four speakers participated in a panel discussion on effective early warning information, which was moderated by Chief Researcher OKADA Tomoyuki. Key takeaways are as follows: Tailored information should be understandable to end users; the economic value of observation data needs to be recognized; and preparation and training lead to automatic emergency responses. The audience also commented on effective communication methods with farmers. Lastly, the session was concluded with remarks from Deputy Director KUSAKABE Takaaki.

Photo 5-17 Speakers and organizers

5.4.6 International symposium of the Science Council of Japan

The Integrated Research on Disaster Risk (IRDR) Subcommittee of the Civil Engineering and Architecture Committee under the Science Council of Japan issued a recommendation in March 2026 titled "Science, Technology and Innovation to Strengthen Disaster Resilience in Megacities Facing Catastrophic Disaster Risks." Prior to the publication, the international symposium "The Future of Global

Photo 5-18 Speakers and the secretariat members (Source: Secretariat)

[6] https://worldwatercongress.com/

Disaster Risk Reduction: Strengthening the Resilience of Megacities through Science, Technology and Innovation (STI)"[7] took place at the council's auditorium in Tokyo on December 9, 2025. Participants exchanged views on the council's proposal and engaged in discussions informed by practical insights from experts in Japan and overseas. Chief Researcher KURIBAYASHI Daisuke, a member of the IRDR Promotion Group under the IRDR Subcommittee, spoke about Chapter 6 of the recommendation, "Dissemination and Distribution of Disaster Information." In his presentation, Kuribayashi also briefly explained ICHARM's ongoing work on the Virtual Flood Experience System (VFES), highlighting its relevance to strengthening disaster preparedness during ordinary times.

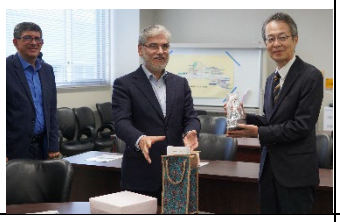
5.5 Visitors

ICHARM constantly seeks opportunities to exchange views and ideas with domestic and international organizations to expand and strengthen our global network. In FY2025, we welcomed about 145 visitors from the institutions shown in Table 5-2.

Table 5-2 Foreign visitors

	Date	Visiting Organizations	Number of visitors
1	2025 4/18	National Center for Hydrology and Meteorology (NCHM), Ministry of Energy and Natural Resources, Bhutan	8
2	4/23	Water Resources and Hydropower Research (IWHR), People's Republic of China	4
3	5/8	International Centre for Integrated Mountain Development (ICIMOD) **Director General Pema Gyamtsho delivered lecture "Safeguarding the Himalayan Region from Climate Crisis."** 	1
4	7/15	Sichuan University, People's Republic of China 20 master's and doctoral students from the Global Vision Program	21
5	7/18	Korea University, Incheon National University, and Korea National University of Transportation, Republic of Korea	15
6	8/13	National Emergency Management Authority (NEMA), Saudi Arabia **H.E. Dr. Mohammed bin Saud Al-Tamimi, Governor of NEMA** 	4
7	8/20	University of Technology, Malaysia (UTM), National Water Research Institute of Malaysia (NAHRIM), and MARA University of Technology (UiTM)	21

[7] https://www.scj.go.jp/ja/event/2025/386-s-1209.html

8	8/28-29	East and South Africa Flood and Drought Countermeasures Training Program in Japan: South Sudan, Comoros, Madagascar, Malawi, Mozambique, Nile Equatorial Lakes Subsidiary Action Program (NELSAP), and World Bank	19
9	9/22	United Nations Office for Disaster Risk Reduction (UNDRR) **Ms. Paola Albrito, Director of UNDRR** 	6
10	10/6	JICA Knowledge Co-Creation Program	16
11	10/8	Ministry of Science, Research and Technology, Iran **H.E. Professor SIMAEESARRAF Hossein, Minister of Science, Research and Technology** 	7
12	10/23	SATREPS Ghana Project: University of Cape Coast (UCC), Ghana, UCC's Africa Centre of Excellence in Coastal Resilience, Centre for Coastal Management (ACECoR), and University of Tokyo	5
13	10/27-11/7	Training for Facilitators: Kenya Meteorological Department (KMD), State Department for Water and Sanitation, Kenya Electricity Generating Company (KenGen), Tana River County Government, and UNESCO	5
14	2026 2/4	Vrije Universiteit Amsterdam, Netherlands	1
15	2/13	Assam State Disaster Management Authority (ASDMA), India **Ms. Meenakshi Das Nath, Secretary of Revenue & Disaster Management and Additional CEO of ASDM** 	10
16	3/17	University of Technology, Panama; University of Costa Rica	2

6. Outreach & Public Relations

ICHARM conducted various outreach and public-relations activities for domestic and international audiences. As part of our outreach activities, the executive and deputy directors, as well as other staff members, gave lectures and presentations at many domestic and international conferences. We also organized the ICHARM Open Day for junior high and high school students. By participating in webinars, ICHARM provided information about the latest digital technologies and best practices for committed practitioners worldwide. At the same time, we actively disseminated the philosophy of the IFI platform project and the WCI concept advocated by ICHARM. To ensure broader and timely dissemination of these activities in Japan and abroad, we published newsletters and updated our website.

6.1 Presentations and lectures

At various domestic and international conferences, the executive director and other researchers gave lectures and presentations on topics such as Japan's new flood control management policy, "River Basin Disaster Resilience and Sustainability by All," and climate change adaptation measures. Table 6-1 shows the conferences and other meetings they attended.

Table 6-1 Conferences and other meetings where ICHARM staff delivered presentations

	Date	Conferences and Meetings
At ICHARM		
1	2025 4/18	National Center for Hydrology and Meteorology (NCHM), Ministry of Energy and Natural Resources, Bhutan
2	4/23	Water Resources and Hydropower Research (IWHR), People's Republic of China
3	5/8	International Centre for Integrated Mountain Development (ICIMOD)
4	7/15	Sichuan University, People's Republic of China
5	7/18	Korea University, Incheon National University, and Korea National University of Transportation, Republic of Korea
6	8/13	National Emergency Management Authority (NEMA), Saudi Arabia H.E. Dr. Mohammed bin Saud Al-Tamimi, Governor of NEMA
7	8/20	University of Technology, Malaysia (UTM), National Water Research Institute of Malaysia (NAHRIM), and MARA University of Technology (UiTM)
8	8/28-29	East and South Africa Flood and Drought Countermeasures Training Program in Japan: South Sudan, Comoros, Madagascar, Malawi, Mozambique, Nile Equatorial Lakes Subsidiary Action Program (NELSAP), and World Bank
9	9/22	United Nations Office for Disaster Risk Reduction (UNDRR)
10	10/6	JICA Knowledge Co-Creation Program
11	10/8	Ministry of Science, Reseach and Technology, Iran
12	10/23	SATREPS Ghana Project: University of Cape Coast (UCC), Ghana, UCC's Africa Centre of Excellence in Coastal Resilience, Centre for Coastal Management (ACECoR), and University of Tokyo

13	10/27-11/7	Training for Facilitators: Kenya Meteorological Department (KMD), State Department for Water and Sanitation, Kenya Electricity Generating Company (KenGen), Tana River County Government, and UNESCO
14	2026 2/4	Vrije Universiteit Amsterdam, Netherlands
15	2/13	Assam Civil Service, India
16	3/17	University of Technology, Panama; University of Costa Rica
Outside ICHARM		
1	2025 4/21	81st session of the Economic and Social Commission for Asia and the Pacific (ESCAP) (See 5.4.1)
2	4/24	UNESCO Centre for Water Law, Policy and Science (CWLPS) 20th anniversary symposium
3	5/22	Korea Water Resources Association Annual Academic Conference
4	6/12	Commemorative event of the 50th anniversary of the UNESCO Intergovernmental Hydrological Programme (IHP) and the 60th anniversary of International Hydrological Decade (See 5.3.1 a)
5	6/25	41st International Association for Hydro-environment Engineering and Research (IAHR) World Congress
6	6/26	Experiment on Typhoon Intensity Change in Coastal Area Phase 2 (EXOTICCA-II) international symposium
7	7/8	7th UN Special Thematic Sessions on Water and Disasters
8	7/30	ADB–Japan Scholarship Program (ADB-JSP) Conference 2025
9	8/21	9th Tokyo International Conference on African Development (See 5.4.2)
10	9/2	14th Symposium on River, Coastal and Estuarine Morphodynamics (See 5.4.3)
11	9/4	Public seminar to launch a new report “Dam Safety Management in Japan.”
12	9/7	5th International Forum on Big Data for Sustainable Development Goals (FBAS 2025)
13	9/23	UN General Assembly High-level Week 2025
14	10/13	3rd Global River Symposium
15	10/15-17	17th Asia-Oceania Group on Earth Observations Symposium (See 5.4.4)
16	10/17	16th UN-Habitat Environmental Technology Expert Group Meeting
17	10/21-22	32nd session of IHP Regional Steering Committee Meeting for Asia and the Pacific (RSC-AP)
18	11/25	26th meeting of High-level Experts and Leaders Panel on Water and Disasters (HELP)
19	12/1	19th World Water Congress of the International Water Resources Association (IWRA) (See 5.4.5)
20	12/9	Academic Forum “The Future of Global Disaster Risk Reduction” (See 5.4.6)
21	12/18	Annual Conference of American Geophysical Union (AGU25)
22	2026 2/13-14	International Conferences on Dam Safety 2026

6.1.1 Outreach activities to promote the Virtual Flood Experience System (VFES)

As mentioned in Section 3.6.1, ICHARM is participating in the Cabinet Office's "Strategic Innovation Creation Program" (SIP) under the project "Development of a Resilient Smart Network System against Natural Disasters," and in Research and Development Theme 2, "Development of Technologies for Visualizing Flood Risk and Damage Impact," we are working on developing and implementing technologies to enhance residents' experience of water-related disasters. Through this, ICHARM aims to create a society where people perceive water-related disasters as a personal concern and are motivated to take proactive disaster prevention actions. In FY2025, the VFES research team actively conducted various outreach events across Japan.

<Exhibition at the Joso City Flood Response Drill>

On April 26, at the Joso City Hall in Ibaraki Prefecture, the team set up an exhibition booth for visitors to try VFES in collaboration with the Foundation of River & basin Integrated Communications (FRICS) when the Kinu River Flood Response Drill took place.

After trying the device, visitors commented, "Changing scores based on evacuation routes leads to repetitive learning" and "It gave me an opportunity to think about better evacuation routes for myself."

Photo 6-1 Experience by city officers

<Experience Exhibit at the Chubetsu River Comprehensive Flood Prevention Drill in Hokkaido>

On May 31, at the "FY2025 Ishikari River System Chubetsu River Comprehensive Flood Prevention Drill" held in Asahikawa City, Hokkaido, the team set up a SIP exhibition booth in collaboration with Hokkaido University and displayed a VFES configured to reproduce the city's topography. Some visitors mentioned the fear they felt when they saw water rising from all directions and the realism of the townscape generated by the system. Others praised the system for conveying a strong sense of elevation.

Photo 6-2 Experience by residents

＜Hands-on Exhibit at the SIP Symposium＞

On June 9, the SIP Smart Disaster Prevention Network Symposium 2025 was held in Chuo Ward, Tokyo, by the Cabinet Office and the National Research Institute for Earth Science and Disaster Resilience, and Senior Researcher DENDA Masatoshi and Researcher YAMASHITA Daiki participated in a hands-on exhibit. Visitors of all ages came to the ICHARM booth to experience VFES, and educators in particular offered positive feedback, suggesting that VFES could be incorporated into disaster education lessons.

Photo 6-3　Dr. Denda and Mr. Yamashita explain how to use VFES

<Exhibition at a Workshop>

On July 27, a radio workshop was held at the Shinshu University Faculty of Engineering in Nagano Prefecture as part of the “Nobody Left Behind in Disasters” program. The team exhibited the Nagano version of VFES, and about 20 elementary school students and their parents experienced the system.

<Participation in Children’s Learning Program>

On July 28, the team participated in a learning program for local elementary school students held at the Faculty of Education of Shinshu University in Nagano Prefecture.

Photo 6-4　Mr. Yamashita has a lecture in the Learning course

The program was designed to help students enjoy learning about familiar science topics and disaster prevention. The team guided students through a flood experience activity using the Minecraft version of VFES. This initiative marked the first full-scale use of this type of VFES for elementary school students, providing an opportunity to explore new possibilities for disaster prevention education.

<Exhibition at the BOSAI National Conference (Japan's National Conference for Disaster Risk Reduction)>

On September 6, at the BOSAI National Conference 2025 in Niigata Prefecture, the team jointly exhibited the Sapporo City version of VFES with Hokkaido University and the River Information Center. Visitors ranging widely from children to experts showed strong interest in its potential use as an educational tool to learn about local disaster prevention.

Photo 6-5 Scene of experience

<Exhibition at the Open Forum on Natural Disasters>

On September 20, the team offered an exhibition at the Open Forum on Natural Disasters. Approximately 80 people came to experience VFES. Elementary school students were particularly fascinated by the system and repeatedly tried evacuation simulations, demonstrating that trial and error also plays an important role in learning disaster prevention lessons.

<Exhibition at the SIP/BRIDGE Future Science Festival>

On September 27, the team attended the SIP/BRIDGE Future Science Festival held at the Osaka Science and Technology Center. This event was organized by the Cabinet Office and designed as a family-friendly science event where visitors could learn about and experience the achievements of the SIP and BRIDGE programs. At the ICHARM-hosted event, participants experienced a flood simulation specifically prepared for this event, which reproduced Osaka City in detail using Minecraft. Children who tried the system commented that the city and flooding were so realistic that it was a little scary and that it's fun to learn about disaster prevention through Minecraft. Parents also praised the event, saying that it was a good opportunity to think about flooding together with children. Observing participants working through evacuation simulations, the team found that VFES motivates further learning regardless of whether users' choices are successful or unsuccessful, demonstrating its effectiveness as a learning tool.

Photos 6-6 (Above) Flood situation in Osaka City recreated in Minecraft (Below) Experience scene

＜Public Works Research Institute Symposium＞

On October 17, the FY2025 Public Works Research Institute Symposium was held at Hitotsubashi Hall in Tokyo, with approximately 1,900 participants, including online attendees. Chief Researcher KURIBAYASHI Daisuke gave a presentation titled "Initiatives for a Virtual Flood Experience System toward Personalizing Disasters." A poster exhibition was also held, allowing for discussions with participants.

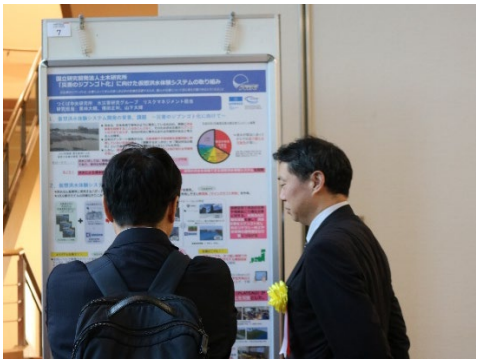


Photo 6-7　Poster exhibition

<Science Agora 2025>

On October 25 and 26, Science Agora 2025 was held at the Telecom Center Building in Tokyo, hosted by the Japan Science and Technology Agency (JST), and attracted approximately 3,800 visitors. On the 25th, PWRI held a seminar titled "How to Protect Daily Life and Infrastructure: Solutions through the Power of Civil Engineering," featuring presentations on cutting-edge research conducted at PWRI along with hands-on exhibits.

Photo 6-8　Experience Corner

Chief Researcher KURIBAYASHI Daisuke delivered a talk titled “Turning Disasters into Personal Matters through Information and Experience!!: Efforts on the Virtual Flood Experience System,” introducing the increasing occurrence of heavy rain events, hazard maps, personal timelines, and VFES. The ICHARM team set up a VFES experience section, and Researcher YAMASHITA Daiki helped about 20 children try flood simulations using the Osaka City version of the Minecraft-based VFES.

＜Open house events on Civil Engineering Day＞

On November 15, PWRI and NILIM hosted the open house event on Civil Engineering Day, which was attended by approximately 1,400 visitors. ICHARM held a workshop titled "Experience Floods with Minecraft!" in the ICHARM auditorium. Under the guidance of Researcher YAMASHITA Daiki and support staff, about 180 participants experienced virtual flood situations in Osaka City using the Minecraft-

Photo 6-9　Experience Scene

based VFES. In the post-event questionnaire, this workshop received the highest rating among the various activities, earning high evaluations not only from young students but also from adults. This suggests that the Minecraft-based VFES is an effective flood experience tool for a wide range of age groups.

<Osaka Municipal Fukushima Elementary School>

On November 17, at Osaka Municipal Fukushima Elementary School, the team held a virtual flood experience session as one of the activities offered in the Lively Activity Room, with support from the National Research Institute for Earth Science and Disaster Resilience, which serves as the Secretariat of the SIP project. About 20 participants, mainly lower-grade elementary school students, attended. The session was conducted at the request of a local teacher who had seen a VFES demonstration at the 2025 Osaka Expo held on September 27. Many participants said they found the experience interesting and enjoyable. Alongside the flood experience, participants also created their own “My Timeline” charts, personal chronological action plans during flooding, and worked enthusiastically while receiving guidance.

Photo 6-10　Group photo

6.2　Youth outreach activities

6.2.1　Open Day

On September 8, 2025, the ICHARM Open Day was held as part of its community contribution activities, inviting students from schools in Tsukuba City, where the center is based, to provide an opportunity to learn about ICHARM and interact with international students studying there. A total of 108 people participated in the event: 88 students from the Ibaraki Prefectural Takezono High School and the Ibaraki Prefectural Namiki Secondary School, four teachers, and 16 ICHARM master's and doctoral students from eight countries. The program was conducted entirely in English.

Photo 6-11　Participants in the ICHARM Open Day

The open day began with the opening keynote speech by Executive Director KOIKE Toshio, who

introduced the 1955 Bandung Conference, a milestone event marking the start of Japan's official development assistance following postwar independence. He explained that ICHARM accepts students from developing countries as part of Japan's development assistance. He also referred to the 2024 World Water Conference, held at the United Nations while carrying on the spirit of the Bandung Conference. Moreover, he shared with the young students part of the speech given by Sri Lankan President Jayewardene at the San Francisco Peace Conference in 1951: Hatred ceases not by hatred but by love. Perhaps due to the recent tense international situation, many students seemed particularly moved by this quotation.

In the poster session that followed, master's and doctoral students from eight countries (Afghanistan, Bangladesh, Mexico, Peru, the Philippines, Sri Lanka, Nepal, and Timor-Leste) gave poster presentations focusing on water-related disasters in their countries, in addition to the countries' features, lifestyle, and culture. The local school students went around each poster and enjoyed international exchanges by listening to presentations and asking many questions.

Some ICHARM students even wore national costumes, adding to the event's international atmosphere. In the post-event questionnaire, one student commented: "Learning about the support that Southeast and South Asian countries provided to Japan at the time of its independence really helped me understand the importance of mutual assistance between countries." Another student wrote: "I am impressed by the wonderful aspirations of the students studying at ICHARM. They find commonalities between the disasters in their respective countries and those in Japan, and want to contribute to their own countries by learning Japan's excellent disaster prevention techniques. ICHARM's support for them, including actively providing learning opportunities, makes me proud as a fellow Japanese."

6.2.2 Summer internship

PWRI offers an annual summer internship program for individuals interested in working at the institute in the hope that it will lead to new employment opportunities. As part of this program, in FY2025, ICHARM welcomed one intern from Osaka Metropolitan University, who learned how to use the Virtual Flood Experience System and the three-dimensional urban models employed in the system.

6.3 ICHARM Newsletter

The ICHARM Newsletter has been published four times a year since March 2006 to publicize ICHARM's activities in research, education and training, and local practice projects, as well as a list of published papers. In recent years, in addition to articles written by ICHARM staff, the newsletter includes ones contributed by our educational program graduates and other experts at international organizations in an attempt to gather news from diverse perspectives.

In FY2025, we published four issues of the newsletter from No. 76 to No. 79. The number of readers has reached about 5,700 in Japan and overseas. ANNEX 2 lists the articles published in the four issues.

Photo 6-1 The top page of ICHARM Newsletter No. 79

6.4 Website

ICHARM uses the website to provide the public with the latest information on research and project progress, as well as notices of upcoming events. ANNEX 3 provides a list of updates made in FY2025.

Figure 6-1 shows the number of views for each page from April 2025 to March 2026. According to this figure, the page with the most views is the download page of the RRI model, followed by the top page of the RRI model (in Japanese).

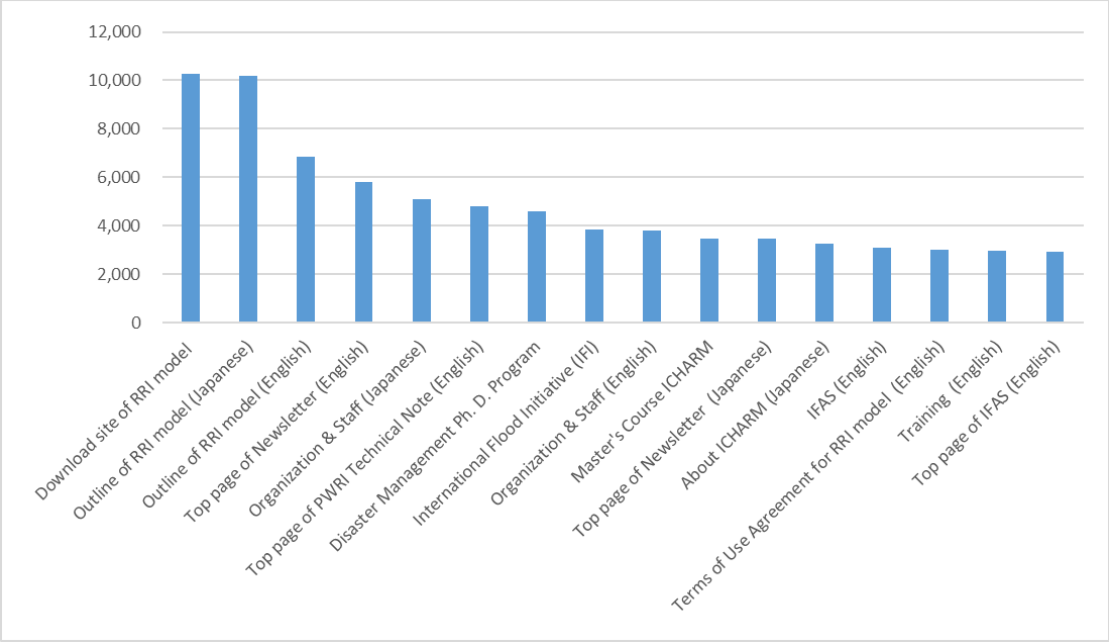


Figure 6-1 The number of views of popular pages on the ICHARM website (April 2025 –March 2026)

6.5 Publications

Table 6-2 shows the number of publications during FY2025 in which ICHARM researchers were involved. ANNEX 4 shows the list of research papers and articles.

Table 6-2 Number of publications in which ICHARM researchers were involved

Category	Number
Peer Reviewed Paper	7
Non-peer Reviewed Paper, Oral Presentation	14
Poster Presentation	3
PWRI Publication	5

7. Awards

On the occasion of the event to celebrate the 50th anniversary of the Intergovernmental Hydrological Programme (IHP) and the 60th anniversary of the International Hydrological Decade (IHD) at the UNESCO headquarters on June 11, 2025, ICHARM was honored to receive a commemorative plaque in recognition of its longstanding global contributions to research, education, and information networking as a UNESCO Category 2 Centre since its establishment.

Photo 7-1 Executive Director Koike holding the commemorative plaque awarded by UNESCO

8. Management

8.1 9th Governing Board meeting

ICHARM holds a Governing Board meeting once a year in accordance with Article 6 of the Agreement between UNESCO and the Government of Japan on the Continuation of ICHARM, which was extended on February 13, 2026.

The 9th Governing Board meeting was held online on June 23, 2025, and was attended by seven board members from Japan and abroad, including PWRI President FUJITA Koichi, who chaired the meeting, as shown in Table 8-1. Observers from MOFA, MEXT, and JICA also participated.

At this meeting, the board first voted on the rules of procedure for the Governing Board and reviewed the Activity Report, which summarizes the main activities that ICHARM carried out in FY2024.

Table 8-1 List of participants in the 9th ICHARM Governing Board meeting (organizations in alphabetical order)

Name	Position Title, Organization
KIJIMA Yoko	Vice President, GRIPS, on behalf of President OTA Hiroko
HIROSE Masayoshi	Vice Minister for Engineering Affairs, MLIT
FUJITA Koichi	President, PWRI
MATSUOKA Yuki	Head, UNDRR Kobe Office
Abou AMANI	Director of the Division of Water Sciences and Secretary of the UNESCO-IHP, on behalf of Acting Assistant Director-General for Natural Sciences Sector Lidia BRITO
TACHIKAWA Yasuto	Chair Holder, UNESCO Chair on Water, Energy and Disaster Management for Sustainable Development (WENDI)
Stefan UHLENBROOK	Director of Hydrology, Water and Cryosphere, WMO

Photo 8-1 Participants and staff in the 9th ICHARM Governing Board Meeting

Photo 8-2 Secretariat members of the ICHARM Governing Board

8.2 Organization

The number of ICHARM staff was 39 as of April 2025 and 36 as of March 2026, as shown in Table 8-2. Since ICHARM is a research center of PWRI, which is under the management of MLIT, many of its staff are seconded from MLIT. In addition, as an international center, ICHARM employs foreign researchers mainly as research specialists. As of March 2026, there were eight of them at ICHARM.

The main responsibilities of each position are described below, with reference to PWRI's organizational regulations, circulars, and administrative instructions:

The executive director is in charge of the overall management of ICHARM.

The deputy director assists the executive director in fulfilling its responsibilities. In addition, the deputy director, since also assuming the director of the Water Hazard and Risk Management Research Group, oversees the research and other activities of the group. The Water Hazard and Risk Management Research Group is defined to conduct investigation, testing, research, training, and the development and guidance of civil engineering technologies related to the following matters:

1. International dissemination of technologies for the prevention and mitigation of water-related disasters
2. Hazards by water-related disasters
3. Risk management of water-related disasters

The director for special research manages affairs related to particularly important research that does not belong to the scope of the group.

The research and training advisor provides necessary guidance to researchers and trainees.

The deputy head, the chief staff, and the administer manage the administrative work of ICHARM.

The chief researcher, under the direction of the deputy director, conducts the work that belongs to the scope of the group, including investigation, testing, research, and the development and guidance of civil engineering technologies.

The senior researcher and the researcher conduct their respective duties under the direction of the chief researcher.

The research specialist supports research work requiring a high level of expertise under the guidance and supervision of the deputy director or the chief researcher.

The collaborating researcher is the researcher accepted by PWRI from private companies (consultants, contractors, manufacturers), public corporations, local governments, and other entities. Their compensation and expenses, such as travel expenses, are generally covered by their organizations.

The research assistant is hired from among doctoral students enrolled in the "Doctoral Program in Disaster Management," a joint graduate program of PWRI and GRIPS, and works under the guidance and supervision of the deputy director or the chief researcher to support research and training projects that require a high level of expertise and advanced English language skills necessary to carry out the

projects.

The assistant provides support to researchers and administrative staff in the performance of their duties.

Table 8-2 Staff composition of ICHARM

Position	No. of staff (as of Apr. 2025)	No. of foreign/ female staff	No. of staff (as of Mar. 2026)	No. of foreign/ female staff
Executive Director	1		1	
Deputy Director (Director of the Water Hazard and Risk Management Research Group)	1		1	
Director for Special Research	1		1	
Research and Training Advisor	1		1	
Deputy Head (administrative staff)	1		1	
Administer (administrative staff)	2		2	
Chief Researcher	4		4	
Senior Researcher	6	Foreign: 1	5	Foreign: 1
Researcher	1		1	
Research Specialist	6	Foreign: 4 Female: 3	6	Foreign: 4 Female: 3
Collaborating Researcher	1		1	
Research Assistant	4	Foreign: 4 Female: 1	3	Foreign: 3 Female: 1
Assistant	10	Female: 7	9	Female: 6
Total	39	Foreign: 9 Female: 11	36	Foreign: 8 Female: 10

* The foreign female staff are counted twice, both as foreigners and as women.

8.3 Revenue

ICHARM has two main sources of revenue. One is the operating grants provided by MLIT, the ministry that oversees PWRI, which is used for personnel, research, travel, and other expenses. The other is external funding, which is used for expenses required to carry out specific research projects, including compensation for research specialists and assistants. Such research projects are, for example, those led or commissioned by Kyoto University, the Cabinet Office, or the World Bank, training programs in collaboration with JICA, and SATREPS in collaboration with JICA and JST.

The amounts in dollars are based on an exchange rate of 1 USD = 158 JPY. In FY2025, ICHARM's total revenue was about 501 million yen (3.2 million US dollars), consisting of the operation subsidy of 333 million yen (2.1 million US dollars) and the external funding of 168 million yen (1.1 million US dollars). Figure 8-1 shows annual changes in ICHARM's revenue since FY2011. ANNEX 5 shows the financial statement of ICHARM in FY 2025.

The revenue in FY2023 decreased significantly because the PRISM project (FY2022 budget: 250 million yen, 1.7 million dollars) ended. Furthermore, ICHARM was no longer the principal organization of the SATREP Philippine project. In FY2025, the operational subsidy decreased by 22 million yen (0.14 million US dollars) due to reduced research funding following the departure of a senior researcher and a researcher. On the other hand, the external fund increased by 12 million yen (0.08 million US dollars). Although the BRIDGE project (20 million yen, 0.13 million US dollars) came to an end, new projects financed by UNESCO and the World Bank were added. The revenue of the ADB project (6 million yen, 0.04 million US dollars), which ended in March 2026, will be registered in FY2026.

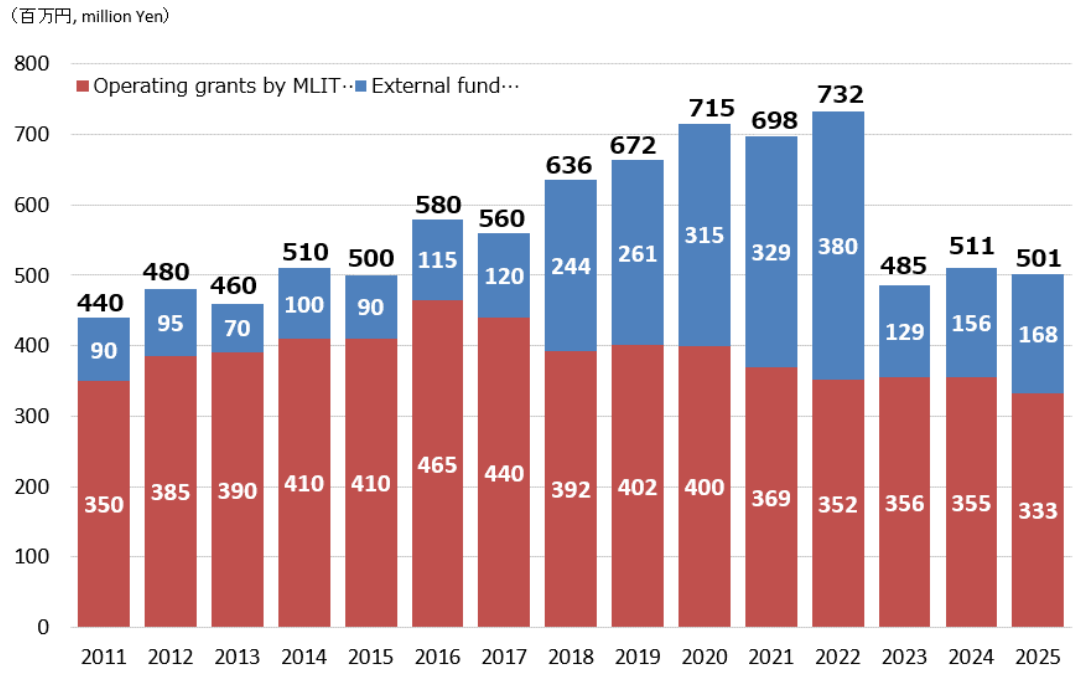


Figure 8-1 Trend of ICHARM revenue from FY2011

Annex 1 Number of Alumni of ICHARM Training Program

Ph.D. Program "Disaster Management" (as of September 2025)

Year \ Country	Afghanistan	Bangladesh	Bhutan	Bosnia-Herzegovina	Brazil	Cambodia	China	Colombia	El Salvador	Ethiopia	Djibouti	Fiji	Guatemala	Honduras	India	Indonesia	Japan	Kenya	Laos	Liberia	Malaysia	Malawi	Maldives	Mexico	Morocco	Mauritius	Mozambique	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Papua New Guinea	Peru	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Tanzania	Thailand	Timor-Leste	Tonga	Tunisia	Venezuela	Vietnam	Zimbabwe	Total
2010-2013																	1																															1
2011-2014																													1																			1
2012-2015		1											1																																			2
2013-2016		2											1																																			3
2014-2017																																																0
2015-2018		1																														1															2
2016-2019		1																														1															2
2017-2020		1																																													1
2018-2021																	1																					1									1		3
2019-2022																																																0
2020-2023		1								1																																						2
2021-2024																													1						1			1										3
2022-2025		1																											1			1						1										4
Total	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**3**	**0**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**24**

Master's. Program "Water-related Disaster Management Course of Disaster Management Policy Program" (as of September 2025)

2007-2008		2				3								1		3												1																		10
2008-2009		2				2			1							1												1																		7
2009-2010		2				1			1							3	1											1					1							1						12
2010-2011		2				2	1						1			1												1	3			1														12
2011-2012		2				2					1					2													2			6			1			1				1		1		19
2012-2013		2					1														2							1	1		1				1	1	1						1			12
2013-2014		2				1		1										1										1				1			2		2						1			12
2014-2015		1					1				1			2			3											1				2					2									13
2015-2016		2			1																		1					1	1			2			1		2				1				1	13
2016-2017					1																1						1	1					1							1			2		8
2017-2018		2			1							1			1													2			2			1		2		1					1		14
2018-2019		1													1					1								1			1			1		1									7
2019-2020		2	2		2																							2	2			1														11
2020-2021		1	2																		1					1		1													1					7
2021-2022		2	1													1					2	1								1					2			3								13
2022-2023			2																													2			4			2				1		1			12
2023-2024		1												1		1						3			1							1			1			3				1					13
2024-2025		1																						1										2	1			1				1					7
Total	**0**	**27**	**7**	**0**	**5**	**0**	**11**	**3**	**1**	**2**	**0**	**3**	**1**	**1**	**5**	**9**	**4**	**4**	**0**	**1**	**5**	**5**	**1**	**1**	**1**	**1**	**10**	**15**	**0**	**1**	**19**	**1**	**2**	**15**	**1**	**1**	**21**	**0**	**1**	**1**	**5**	**1**	**2**	**2**	**4**	**1**	**202**

Volume20, No.1, Issue No.76, April 2025

Volume20, No.2, Issue No.77, July 2025

Volume20, No.3, Issue No.78, October 2025

Volume20, No.4, Issue No.79, January 2026

Volume20, No.4, Issue No.79, January 2026

ANNEX 3: Major updates on ICHARM Website

Apr. 2025	23	The 57th Annual Session of the Typhoon Committee
	23	ICHARM’s real-time snow analysis platform wins Judges' Special Award from NEDO
	23	"Award" updated.
	30	ICHARM Newsletter Volume 20 No.1 (Issue No.76) is now available
Jul	16	ICHARM Receives the Long-Term Contribution Award from UNESCO
	16	"Award" updated.
	29	9th ICHARM Governing Board meeting was held
	31	ICHARM Newsletter Volume 20 No.2 (Issue No.77) is now available
Oct.	7	Technical Note of PWRI No.4455, 2021-2022 M.Sc. Program, “Water-related Disaster Management Course of Disaster Management Policy Program” has been published.
	7	Technical Note of PWRI No.4464, 2023-2024 M.Sc. Program, “Water-related Disaster Management Course of Disaster Management Policy Program” has been published.
	31	ICHARM Newsletter Volume 20 No.3 (Issue No.78) is now available
Jan. 2026	30	ICHARM Newsletter Volume 20 No.4 (Issue No.79) is now available
Mar	23	Visit by Assam State Disaster Management Authority (ASDMA)

ANNEX 4: Publication list

ICHARM Publication List (April 2025 ~ March 2026)

A. Peer Reviewed Papers

- SAWADA Yohei, FUJII Hideyuki, TSUTSUI Hiroyuki, AIDA Kentaro, SHIMADA Rigen, KACHI Misako and KOIKE Toshio, Ecohydrological Land Reanalysis: Vegetation Water Content and Soil Moisture Data by Land Data Assimilation, Geoscience Data Journal, Volume12, Issue4, August 10, 2025, https://doi.org/10.1002/gdj3.70025
- Ralph Allen Acierto, KOIKE Toshio, USHIYAMA Tomoki, TANAKA Yozo and KUBOTA Keijiro, Evaluating future warming impacts on probable maximum precipitation using DAD analysis: insights from 5-km d4PDF ensembles in Kyushu, Hydrological Research Letters, August 9, 2025, https://doi.org/10.3178/hrl.25-00003
- Badri Bhakta Shrestha, Mohamed RASMY, TAMAKAWA Katsunori, Sauhardra Joshi and KURIBAYASHI Daisuke, Impact of Urbanization on Flooding and Risk Based on Hydrologic–Hydraulic Modeling and Analytic Hierarchy Process: A Case of Kathmandu Valley of Nepal, Hydrology, MDPI, Volume 12, Issue 11, October 30, 2025, https://doi.org/10.3390/hydrology12110283
- 南雲 直子、江頭 進治、久保 純子、川幅と流域面積の関係に係る要因分析、地理学評論98巻6号、日本地理学会、pp.363-377、2025年11月
- 小石 一宇、山田 正、山田 朋人、慣性力を考慮した新しい流量流積関係式と浅水方程式に代わる実用的な表現形式の提案、土木学会論文集 82巻1号、土木学会、2026年1月、https://doi.org/10.2208/jscejj.25-00097
- Hassan Haren Hote, KOIKE Toshio, TSUTSUI Hiroyuki and Mohamed Rasmy Abdul Wahid, An integrated framework for strengthening local agriculture drought management, Water Policy, Volume 28 Issue 2, February 1, 2026, https://doi.org/10.2166/wp.2026.144
- Md. Shahinur Rahman, HARADA Daisuke and EGASHIRA Shinji, Sediment Sorting Processes Affected by Tidal Currents in the Meghna Estuary, Journal of Disaster Research, Volume 21 (2026) Issue 1, pp.266-278, February 1, 2026, https://doi.org/10.20965/jdr.2026.p0266

B: Non-peer Reviewed Paper

None

C: Oral Presentation

- MIYAMOTO Mamoru and KOIKE Toshio, Development of Methodology for Enhancing Water-related Disaster Resilience, The 2025 Korea Water Reources Association's Conference, Yeosu, Republic of Korea, May 21-23, 2025
- Badri Bhakta Shrestha, Abdul Wahid Mohamed RASMY, TAMAKAWA Katsunori, JOSHI Sauhardra and KURIBAYASHI Daisuke, Hydro-meteorological and Damage Characteristics of September 2024 Flood in the Bagmati River basin of Nepal, Japan Geoscience Union Meeting 2025 (JpGU 2025),

Makuhari Messe, Chiba prefecture, Japan, May 25-30, 2025

- Md. Shahinur RAHMAN, HARADA Daisuke and EGASHIRA Shinji, NUMERICAL STUDY OF SEDIMENT BUDGET IN THE NOAKHALI ISLANDS AREA OF THE MEGHNA ESTUARY, 41st IAHR World Congress, Singapore, June 22-27 , 2025
- SERRANO Jonathan Suba, OHARA Miho, Abdul Wahid Mohamed RASMY, USHIYAMA Tomoki and Ralph Allen Acierto, Assessment of Climate Change Effect to Riverine and Lakeshore Flooding by Developing Flood Risk Curves for the Pasig-Marikina-Laguna Lake Basin, Philippines, 41st IAHR World Congress, Singapore, June 22-27 , 2025
- Badri Bhakta Shrestha, Wahid Mohamed RASMY and KURIBAYASHI Daisuke, Assessing flood damage to residential areas using building footprint data and contribution of flood-prone households in disaster risk reduction, The 2nd International Sociohydrology Conference, Hongo Campus, the University of Tokyo, July 19-21, 2025
- 龐 朝霞、大原 美保、南雲 直子、Patricia Ann J. Sanchez、SDGsの観点からみた洪水の社会的影響の実証分析 ―フィリピン共和国の洪水常襲地帯における住民調査を基に―、日本自然災害学会 2025年度学術講演会、北海道教育大学 札幌校、2025年9月18日
- KOIKE Toshio, Keynote Speech: Building sustainable, resilient and balanced urban and rural landscapes in the context of water-related disasters intensified by climate change, UN-HABITAT 16th Expert Group Meeting, Nagoya City, Japan, October 17, 2025
- OHARA Miho and KURIBAYASHI Daisuke, Emergency Response Training for Local Government Officers to Effectively Learn Lessons from After-Action Reports of Past Disasters, CECAR10（第10回アジア土木技術国際会議）, Jeju, South Korea, October 21-24, 2025
- 小池 俊雄、基調講演「安全で親しみのもてる関川・保倉川を目指して」、関川・姫川 7.11水害から30年シンポジウム、関川・姫川流域治水協議会、新潟県上越市 高田城址公園オーレンプラザ ホール、2025年11月23日
- KOIKE Toshio, Making Africa more resilient to hydro-climatic extremes, XIX World Water Congress Special Session, Marrakech, Morocco, December 1, 2025
- SERRANO Jonathan Suba, BALLARAN Vicente, Jr., OHARA Miho, Abdul Wahid Mohamed RASMY, USHIYAMA Tomoki and Ralph Allen ACIERTO, DEVELOPMENT OF FLOOD EXPOSURE CURVES FOR CLIMATE CHANGE IMPACT ASSESSMENT OF PASIG-MARIKINA-LAGUNA LAKE BASIN, 70th Conference on Hydraulic Engineering, JSCE, Fukushima prefecture, Koriyama Central Community Hall、December 10-12, 2025
- 原田 大輔、秦 梦露、江頭 進治、砂州・河床波上の流れにおける流木の挙動、第70回水工学講演会、土木学会水工学委員会、福島県 郡山市立中央公民館、2025年12月10日～12日
- 南雲 直子、地理学から考えるNbSの展開、日本学術会議公開シンポジウム「Nature-based Solutions：自然に根ざした社会問題の解決に向けて」、オンライン、2026年2月23日
- 南雲 直子、小池 俊雄、Abdul Wahid Mohamed RASMY、筒井 浩行、Ralph Allen Acierto、岡田 智幸、安川 雅紀、玉川 勝徳、ガーナにおける統合型早期警戒システムの開発と研

修プログラムの実践、日本地理学会2026年春季学術大会、法政大学市ケ谷キャンパス、2026年3月26日～28日

D: Poster Presentation

- Kattia Rubi ARNEZ FERREL, HARADA Daisuke and EGASHIRA Shinji, Effect of sediment mobility on scour around bridge piers, 41st IAHR World Congress, Singapore, June 22-27, 2025
- Kattia Rubi ARNEZ FERREL, HARADA Daisuke and EGASHIRA Shinji, Morphological changes pre- and post- neck cutoffs in meandering rivers, 14th Symposium on River, Coastal and Estuarine Morphodynamics (RCEM2025), Barcelona, Spain, September 1-5, 2025
- Shrestha Badri Bhakta, Abdul Wahid Mohamed RASMY, TAMAKAWA Katsunori, JOSHI Sauhardra and KURIBAYASHI Daisuke, Assessing the characteristics and impact of unexpected 2024 flood in the Bagmati River basin of Nepal, AGU Annual Meeting 2025, New Orleans, USA, December 15-19, 2025

E: PWRI Publication

- 森 範行、江頭 進治、藤兼 雅和、高堀 幸作、2023-2024 修士課程「防災政策プログラム 水災害リスクマネジメントコース」 実施報告書、土木研究所資料　第4464号、2025年9月30日、https://thesis.pwri.go.jp/files/96871447268c8eb0abb98a.pdf
- MORI Noriyuki, EGASHIRA Shinji, FUJIKANE Masakazu and KOUBORI Kosaku, Report on 2023-2024 M.Sc. Program, “Water-related Disaster Management Course of Disaster Management Policy Program”, PWRI Technical Note No 4464, September 30, 2025, https://thesis.pwri.go.jp/files/76880786068c8eebbbb6bc.pd
- 栗林 大輔、成果報告書「水災害に対する社会の強靭化に関する研究」、2025年10月1日
- 久保田 啓二朗、成果報告書「気候変動の影響を考慮した最大降雨量の推定方法に関する研究」、2025年10月1日
- 小石 一宇、降雨－流出－氾濫一体型の分布型流出モデルの予測精度向上に資する基礎的研究、土木研究所資料 第４４６１号、令和６年度交流研究員報告書概要版、pp.151-154、2025年10月、https://thesis.pwri.go.jp/files/787829164691bbf202009b.pdf

F: Magazine, Article

None

G: Others

None

Annex 5 FY2025 ICHARM Budget

(1US$=¥158)

	Donor	Budget (¥ 1000)	Budget (1000 US$)	Note
Operating grants	**MLIT**	**332,941**	**2,107.21**	
Personnel (except for part-time staff)		170,576	1,079.59	
Research		53,302	337.35	
Training		104,703	662.68	
Travel expense		4,360	27.59	
External funding (except for KAKENHI)		**163,316**	**1,033.65**	
SIP	Cabinet Office	97,211	615.26	
Master's program	JICA	14,036	88.84	
Research program on Advanced Studies of Climate Change Prediction	Kyoto University	6,891	43.61	
SATREPS: the Philippines	JST	1,386	8.77	
SATREPS: Argentina	JST	10,720	67.85	
SATREPS: Gana	JST	4,558	28.85	
Others	JAXA	3,185	20.16	
Others	JICA	1,673	10.59	
Others	UNESCO	17,214	108.95	
Others	WB	6,442	40.77	
Others	ADB	0	0	US$40.22 (FY2026)
Grants-in-Aid for Scientific Research ("KAKENHI")	Japan Society for the Promotion of Science	**4,396**	**27.82**	
Total		**500,653**	**3,168.68**	