ICHARM Work Plan

FY 2024-2025 (2024.4-2026.3)

Revised on June 28, 2024

Mid-term Programme	Projects	Planned activities and expected results in FY 2024-2025
(i) Innovative research		
1) Data collection, storage, sharing and statistical on water-related disasters		
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.	Support runoff inundation analysis using global observation data.	Check real-time rain gauge rainfall data that have been archived by Sri Lankan agencies in addition to the data provided by PAGASA in the Philippines. Improve the accuracy of the flood monitoring and forecasting systems by effectively correcting satellite rainfall data by increasing the number of rain gauge points for real-time rainfall data collection. Continue to operate the system that keeps the flood monitoring and forecasting systems in service even when they fail to receive rainfall data.
	Improve the resolution of soil moisture observation using global observation data.	Combine WEB-RRI with the dynamic vegetation model that has been installed in the data assimilation system and test the combined system. Then, create more information to support agriculture, in addition to soil moisture content, by improving the resolution of "vegetation biomass."
	Develop OSS-SR (Online Synthesis System for Sustainability and Resilience).	Continue the implementation of OSS-SR in Davao Del Sur State according to the tripartite MoU that ICHARM concluded with Davao Del Sur State University and DOST XI. Continue to seek the possibility of introducing the OSS-SR project to other communities and countries while considering their needs and conditions.
2) Risk assessment on water-related disasters		
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	Upgrade future climate prediction technology by using multiple models, downscaling GCMs, etc., and evaluate its regional applicability.	Conduct sensitivity analyses of rainfall estimated using a dynamic downscaling method to generate high-resolution climate data that can be used to assess the impact of global warming on small basins of 100 km^2 or less. Also establish the downscaling method required to achieve accurate rainfall estimation.
	Develop, upgrade, and apply hazard assessment of sediment, driftwood, and	Integrate the sediment hydraulic model capable of processing basin, two-dimensional, and three-dimensional data with a hydrological model. Test the combined model for accuracy and validity by applying it to various river

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.	flood inundation in Japan and abroad.	management settings in Japan and overseas. Propose the effective use of the findings for better river management practices.
	Study adaptation measures using integrated risk assessment methods.	Develop an integrated model by coupling WEB-RRI and SIMRIW (a rice-plant growth prediction model) for Indonesia and Sri Lanka, in addition to the Philippines, and investigate water-related disasters and food production under climate change impacts using d4PDF and other tools.
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	Improve the accuracy of forecasting rainfall and flood events several days ahead.	Improve the accuracy of rainfall and flood forecasting up to several days in advance by introducing the WRF-LETKF model to upgrade the data assimilation method and by improving the initial values of the atmospheric and terrestrial water circulation forecasting model. Also improve forecasting accuracy by assimilating cloud water content and other data obtained from satellite microwave observations into forecasting models. Then test the developed method for effectiveness by applying it to other cases.
	Develop a water circulation model that can represent low to high water, including the effects of seasonal and regional factors such as snow cover and melt.	Conduct verification of the developed dam inflow forecasting approach by applying it to flooding cases in the Tone River with different rainfall patterns, such as ones caused by a typical typhoon or frontal rainfall, in addition to the Sai River cases in 2018, 2019, and 2021. Also develop WEB-RRI-S, a version of WEB-RRI with a module for snow cover and melt.

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.	Evaluate changes in exposure and vulnerability due to social changes.	Prepare to compile policy recommendations based on water disaster risk assessments in the framework of the SATREPS Philippines Project. Continue performing water disaster risk assessments and revising policy recommendations while communicating with collaborative organizations and local governments. Conduct disaster awareness surveys for residents and provide training for administrative staff in the target areas of the Pampanga River basin and the Laguna Lake basin. Also organize training programs in Japan to develop human resources.
4) Proposal, evaluation and application of policies for water-related disaster risk reduction		
When developing policies to address climate change impacts, it is essential to consider stakeholders' understanding of disaster management measures, lifestyles, socio-economic activities, and possible changes in disaster risks. To achieve these, ICHARM will develop models to assess each policy's practicality and effectiveness, as well as socio-economic assessment methods applicable to different nations. We will also provide training for strengthening human resources to lead local consensus-building and political decision-making.	Develop technologies to support the effective implementation of "River Basin Disaster Resilience and Sustainability by All".	Continue to develop a system to evaluate water disaster risk and resilience. Study a framework in which third parties check evaluations conducted by companies for quality and technical validity. Conduct questionnaire surveys and other means to businesses and analyze the results to clarify their awareness levels regarding water disasters and climate change and decision-making mechanisms.

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.	Support the development of an early warning system by providing real-time water-level forecasts and information on flooding and other hazards.	Construct models for multiple rivers nationwide according to the manual for constructing small and medium-sized river flood forecasting models. Explore ways to utilize the forecasting results in the Integrated System of Disaster Reduction for Municipalities (IDR4M). Also prepare for the revision of the manual, based on the issues identified through model construction.
	Develop optimal operation methods for existing dams and other structures to enhance flood control and provide support for their implementation.	Test the developed optimal dam operation for effectiveness by applying it to rivers with multiple dams. The dam operation has been developed for a single hydroelectric dam in the upper Oi River based on ensemble inflow forecasts and optimized to improve its water use capacity and gain a flood control capacity. Conduct additional investigations for the Sai and Tone Rivers to identify the optimal operations for single-dam and multiple-dam cases and put them into practical use.
	Develop a method for disseminating flood forecast information with uncertainty.	Start developing a method to support various stakeholders in making timely decisions when preparing for or responding to floods by providing flood information with likelihood levels.
	Develop technologies (e.g., VR) to effectively provide risk information.	Conduct evacuation behavior experiments using a virtual flood experience system, which has been improved to create a metaverse where users can experience flood situations virtually, and analyze evacuation behavior from various standpoints, such as behavioral psychology and behavioral economics. Also Continue virtual content creation using the metaverse platform in collaboration with local communities. In participating in this effort, residents will learn about the characteristics of their communities, including nature, history, and urban activities, which will lead them to a deeper understanding of their living environment and a higher awareness of desired evacuation behavior in case of flooding.

	Strengthen communities' early recovery by learning lessons from past disaster response efforts.	Collect critical situations from disaster response reports published in fiscal 2021 or later using the critical-situation collection technology developed last year using a deep learning model. Then analyze all collected situations, including the ones gathered before 2020, to identify response actions likely to be taken when the flood disaster risk increases and critical situations during the recovery and reconstruction processes. Typical situations will be selected from the identified cases and used to plan practical actions, including ones for faster restoration. The outcomes will also be used to revise the Collection of Critical Situations during Flood Emergency Response (local government edition).
(ii) Effective capacity building 1) Foster solution-oriented practitioners and Training-of-Trainers (TOT) instructors who can effectively lead the planning and practice of disaster management with solid theoretical and engineering foundation at all levels from local to international settings.		
ICHARM will continue and enhance the doctoral and master's courses by strengthening the collaboration with GRIPS and JICA. Particularly, we will more closely connect the doctoral education with our research activities, for example, by providing opportunities to learn more practical knowledge while utilizing ICHARM's human resources. We will also make full use of more functional learning materials and remote learning methods.	Doctorial Course "Disaster Management"	Accept about 3 students per year.
	Master's Course "Water-related Disaster Management Course of Disaster Management Policy Program"	Accept about 14 students.
	Start preparing for new capacity development programs to develop and implement water-related disaster management policies.	Launch a short-term interdisciplinary training program on basin-wide flood management.
2) Train facilitators to acquire interdisciplinary scientific knowledge related to water-related disaster risk reduction and the capability to lead discussions and consensus building among various stakeholders.		

	It is important to increase the understanding and collaboration of all stakeholders in a river basin to build resilience and sustainability against increasingly intense water-related disaster risks. ICHARM will provide support to foster facilitators who can integrate and translate interdisciplinary scientific knowledge for all stakeholders to cooperate in building social consensus by employing a cross-sectoral approach in the public sector and encouraging the private sector for active participation.	Provide e-learning and training opportunities, including facilitator training, through IFI and other networks.	Upgrade the content of the materials used in the past e-learning training conducted in the Philippines and Indonesia and, with the improved materials, conduct facilitator training in each participating country using the IFI platform framework and OSS-SR. Conduct facilitator training in Sri Lanka in August 2024. Start discussions about holding facilitator training in Vietnam and Thailand while considering their needs and situations.
3) Maintain and enhance the capacity of local experts and institutions engaging in addressing water-related disaster management using the knowledge and skills accumulated in research and practice. ICHARM will provide support to build a global network of good practitioners involved in water-related hazard and risk management.			
	ICHARM will support the graduates from our educational and training programs in becoming leaders in water hazard and risk management in their localities by offering them opportunities to research and practice water-related disaster management. We will continue holding follow-up seminars to enhance the global network of ICHARM alumni and create a knowledge hub to	Enhance the network by holding follow-up seminars for ICHARM master's program graduates and others.	Conduct an online follow-up seminar once a year and hold webinars on different themes of meteorology, hydrology, sediment disasters, and disaster risk reduction.

contribute to water-related risk reduction worldwide.		
(iii) Efficient information networking 1) Accumulate, analyze and disseminate major water-related disaster records and experiences by maintaining and upgrading a worldwide practitioners' network.		
ICHARM, as the global knowledge center for water hazards, will be working closely with the UNESCO IHP, the World Meteorological Organization (WMO), the Typhoon Committee (TC), the International Flood Initiative (IFI), and other domestic and international agencies, exchanging data, information, lessons, and ideas regarding water-related disasters. By hosting and organizing international academic meetings, ICHARM will continue offering a place to collect and disseminate the most advanced knowledge to researchers around the world.	Fulfill the duties as the IFI secretariat.	Continue fulfilling the duties of the IFI secretariat: hosting regular meetings with participating organizations, sharing and aggregating information on flood disasters, and reviewing strategies and concepts. Also actively disseminate information about IFI's activities and promote collaboration with other organizations to reduce water-related disaster damage by participating in major international conferences and projects and strengthening professional networks.
	Support local efforts led by IFI.	Provide support for the Philippines, Sri Lanka, Indonesia, Thailand, and other countries in launching a Platform on Water Resilience and Disasters and performing platform-related activities. Also promote IFI activities in other countries in Asia, Africa, and South America.
	Play a leading role in Typhoon Committee (TC).	Continue contributing to TC by fulfilling the duties as the chair of the Working Group on Hydrology (WGH), maintaining cooperative relationships with WGH and other working group members and related organizations, leading the implementation of Annual Operation Plan (AOP), and supporting other related activities. Also, in collaboration with MLIT, assist Japan and other member countries in hosting WGH meetings. Furthermore, participate in integrated workshops and annual sessions as the WGH chair, lead discussions on regional typhoon-related disasters in cooperation with member countries, and contribute to planning and implementing necessary actions.
2) Integrate interdisciplinary scientific knowledge into a consilience of water-related risk management as a common asset of practitioners.		
ICHARM will establish a system to collect accurate data and information by strengthening collaboration with organizations collecting and archiving scientific	Collect water-related disaster information and support its accumulation and implementation.	Collect information from organizations involved in water-related disaster management in various countries through the IFI Platforms on Water Resilience and Disasters and other international and regional networks. The information will be accumulated using DIAS and other tools and used to support local efforts to reduce water-related disaster damage.

data, information, and knowledge about water-related disasters and nations co-hosting ICHARM's training and research projects. Collected data and information will be sorted out and accumulated as meta-data and integrated into a "consilience of water-related disaster risk management" as a shared asset of practitioners.	Develop a database that can be used by past and current students of ICHARM's graduate programs.	Study the detailed process to implement the ICHARM Alumni Meta Knowledge Database, tentatively named iAME, a tool to organize and accumulate the data used by doctoral and master's students in their research activities as metadata to be used for various purposes.
3) Mainstream water-related disaster risk reduction by facilitating active collaboration and communication among experts and organizations through sharing cases and findings in water-related hazard and risk management.		
ICHARM will continue contributing to worldwide efforts to implement and mainstream disaster risk reduction in step with the Sendai Framework and the Sustainable Development Goals (SDGs), both adopted in 2015. By enhancing research, capacity building, and networking, we will continue stressing the importance of water-related disaster risk reduction and promoting the creation of a resilient, sustainable society by involving all stakeholders at local, national, and international levels.	Provide technical support, analysis, and findings regarding water-related disaster management.	Provide timely and reliable technical support, analysis, and findings on the management of water-related disasters around the world through the publication of simulation results and scientific papers and contributions to the revision of technical guidelines.
	Organize, participate in, or contribute to major regional and international events.	Disseminate our activities and achievements and build and maintain professional networks with experts and organizations by hosting technical sessions and delivering presentations at major events organized by UN agencies and other international and regional organizations, as well as by participating in and contributing to international and regional projects. Support Indonesia in hosting the 10th World Water Forum (WWF10) in May 2024 as the coordinator for Sub-theme 3: Disaster Risk Reduction and Management.
	Public relations	Website: Update the website with the latest information and improve it through feedback from readers. Newsletter: Publish it four times a year in April, July, October, and January. Make improvements to keep the content appealing to readers: featuring contributions from graduates and collaborating experts, and reflecting readers' feedback from surveys. Outreach: Conduct open day events and outreach programs to raise the awareness of

			local youth about our activities.