ICHARM Work Plan

FY 2020 (2020.4-2021.3)

Category	Content	Activities and expected results in FY2020
(i) Innovative research		
(a) Technology for constantly monitoring, storing and using disaster information		
Methods will be proposed for disaster data collection and basic database development with their practical applications. This should eventually lead to data analysis using a Data Integration and Analysis System (DIAS). A data correction method will be also proposed to be used in the process of building a database using global data and near-real time data from satellites. The impact of disaster reduction will be assessed quantitatively by the disaster database including its use in model areas both in Japan and overseas.		
(i)-(a)-1. Research on simple methods for assessing the socio-economic impact of flood disasters	Develop a simple method for assessing the socio-economic impact of flood disasters	Continue economic impact assessment using a simple method developed by ADBI, based on the inundation depth and economic data collected in Joso City, flooded by the Kanto Tohoku torrential rainfall in 2015.
	Among the developed simple methods for assessing the socio-economic impact of flood disasters, test a globally applicable method by estimating such impact at national and global levels.	Test the applicability of the ADBI economic impact assessment using the flood damage data collected in Davao, Mindanao Island, the Philippines.
(b) Support system for early warning capable of providing accurate information in a shorter period of time		
More advanced application of a regional atmospheric model (WRF) and further improvement of IFAS and RRI will be achieved. Using these advanced technologies, a method will be developed for more accurate real-time prediction of rainfall, runoff and inundation to ensure over 10 hours of lead time necessary for evacuation in a wide area and dam discharges prior to rainfall. The developed method will be tested for applicability to river basins both in Japan and overseas with different conditions of data availability, climate and topography, and eventually used to establish an early flood warning and system. A technology will be developed to evaluate water disaster hazards by using satellites and sediment hydraulic models.		
(i)-(b)-1. Research on technologies for more accurate real-time	Improve the accuracy of the flood inundation prediction model by upgrading the	By applying the parameter optimization method to water level prediction systems of small and medium scale river using RRI models and improve the prediction accuracy and eliminate unnecessary work.

	prediction of runoff and inundation by complementing insufficient data availability	flood tracking method and introducing an automatic parameter optimization method.	
		Clarify the applicability of satellite rainfall data and develop a basin-specific data correction method.	Study correction technology of GSMaP in case real-time ground rain gauge data cannot be obtained. Examine the density of the ground rain gauge required to secure the accuracy of GSMaP.
		Improve the accuracy of the WRF model for heavy rainfall prediction using X- and C-band MP radars and the Ensemble Kalman filter.	Evaluate the accuracy of heavy rain forecasting with a relatively long lead time, specializing in large-scale and important weather phenomena such as typhoons. Regarding localized torrential rain, examined a method to improve the accuracy of prediction by increasing the resolution of meteorological models.
		Develop a method for real-time flood inundation forecasting using multiple rainfall forecasting approaches with prediction uncertainty.	Study effective dam operation rules using the prediction results obtained from the ensemble prediction with their distribution.
	(i)-(b)-2. Development of technologies using satellites and sediment hydraulic models for assessing the impact of water disaster hazards	Estimate sediment transport and develop an estimation method of river channel topography change.	In order to evaluate the behavior of riverbed sediments composed of fine sediment, establish a new evaluation method for sediment transport using density flow theory. By introducing it into numerical calculation, develop a method for estimating the change in river channel topography applicable to a riverbed composed of fine sediment.
		Develop a flood damage risk mapping method that takes sediment hydraulic phenomena into account.	Verify the results of sediment, driftwood and flood analysis based on sediment hydraulic model experiments and field survey results.

		Develop a method for mapping flood inundation risk in mountainous rivers.	Propose a method to evaluate sediment inflow including fine sediment in mountain rivers and create a flood inundation area map by numerical simulation.
(c) Assessment and planning technology for appropriate water resources management with insufficient information			
	A long-term water balance simulation technology will be developed to support optimal planning of water resources management both in Japan and overseas. This technology will offer a variety of functions to support highly technical dam operation integrating flood control and water use, water demand settings, soil moisture content settings based on satellite observation technology, application to a wide range of climate categories, input of highly detailed topographical, geological and other data.		
	(i)-(c)-1. Development of a simulation system to provide long-term support for integrated water resources management under different natural and topographical conditions	Improve technologies for integrated water resources management.	Evaluate on-site demonstration experiments jointly with the electric power companies and improve the system based on the evaluation results.
		Study soil moisture content based on satellite data.	Evaluate and improve the drought monitoring and forecasting system by CLVDAS applied to the state of Ceara, Brazil, based on operation. Reflect the results of soil moisture observation by microwave radiometer to the microwave observation algorithm.
		Improve the applicability of systems and models to rivers in Japan and overseas with different climate conditions.	By combining WEB-RRI and SIMRIW (Simulation Model for Rice-Weather Relations), the suitability of hydrological models to rice cultivation areas will be improved.
	(i)-(c)-2. Integrated Research Program for advancing Climate Models (TOUGOU) (MEXT program)	Assess water disaster risk in Asia and create information on adaptation measures.	Calculate future water cycle phenomena both in the present and future using WEB-RRI. Conduct forecast calculation of the future hazard such as floods and droughts, and assess the risk based on the results of hazard calculations and land use in the basin.
(d) Technology for assessing the impact on local communities of water related disasters in flood plains and for evaluating the effect of investments in disaster risk reduction			
	A disaster risk assessment method will be developed to evaluate “strength against fatal damage” and “resilience for speedy restoration”. Indices will be proposed to help policy makers in Japan and overseas easily recognize local disaster risks and holistically evaluate the effect of investments on disaster		

risk reduction so that they can make informed investment decisions. A method will be proposed for building disaster resilient communities in Japan and overseas by using the developed risk indices.		
(i)-(d)-1. Research on a multifaceted water disaster risk assessment for worldwide use and a disaster-resilient community building method based on the assessment	Propose a highly accurate and advanced method for multifaceted evaluation of disaster risk	Study a method to evaluate the risks particular to disaster cases in which floods occur concurrently across a wide area by analyzing questionnaire survey results on the resilience of the businesses in Okayama and Hiroshima prefectures, affected by the heavy rainfall in July 2018.
	Propose risk indices to holistically evaluate the disaster risk reduction effect of disaster prevention measures and investments	Conduct risk assessment using the indicator developed to evaluate the level of damage at which a pre-disaster level of population and gross regional product can still be sustained after a disaster, based on the results of the questionnaire survey conducted in Iwaizumi Town, Iwate Prefecture, in the previous fiscal year.
	Propose a method for building disaster resilient communities in Japan and overseas by using the developed risk indices.	Propose a list of approaches to build resilient local communities, based on the risk assessment explained above.
(e) Technology for the effective use of water related disaster risk information to reduce disaster damage		
An information system, as well as communication tools such as disaster response timeline tables, will be developed to support disaster management efforts by administrators and local residents to prevent or mitigate flood and sediment disasters. The effective use of such a system and tools will be proposed.		
(i)-(e)-1. Research on a water disaster risk information delivery system to support local disaster management efforts in areas with insufficient water disaster information	Propose a method for identifying areas vulnerable to disasters (disaster hot spots) prior to disasters.	Review the method applied to Aga Town of Niigata Prefecture, Iwaizumi Town of Iwate Prefecture, and Calumpit of Bulacan Province, the Philippines. And improve the automatic risk-map creating tool using RRI-model output and revise the manual of this method.
	Propose a method for forecasting the possibility of a water-related disaster by community in real time.	Study the improvement of the Web-GIS information delivery system used to assess the possibility of water-related disasters at the community scale to achieve real-time prediction in the future.

		Propose a Web-GIS water-related disaster risk information delivery system that helps accumulate and share various types of disaster risk information and deliver evacuation information.	Analyze the technical issues that became apparent through the test operation of the WEB-GIS information delivery system for Aga Town and improve the system. Test the applicability of the system to other communities by applying it to Iwaizumi Town, Iwate Prefecture.
		Propose the effective use of the Web-GIS information delivery system to stakeholders of local administrative bodies in Japan and overseas.	Study the system specifications to disseminate the Web-GIS information delivery system.
	(i)-(e)-2 Development of risk communication systems to increase public awareness of water-related disasters and risk management	Develop a DIAS-based simulation system that can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.	Improve the DIAS-based simulation system for practical use. The system can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.
		Develop a more effective risk communication system by incorporating psychological factors.	Develop a VR flood simulation app for Hita City, Ooita Prefecture, and Aga Town, Niigata Prefecture, to provide a system which can contribute to raising public awareness of safe evacuation from a flood by letting people experience evacuation in a virtual flood.
	(i)-(e)-3. Local practice using research results	Continue supporting JST-JICA SATREPS, a project to develop an Area-BCM (Business Continuity	Complete a development of flood inundation analysis model for the entire Chao Phraya River basin.

		Management) system to strengthen the disaster resilience of Thailand's industrial parks.	Examine to develop an industrial park-scale flood inundation analysis model which creates detailed spatio-temporal information on disaster risk using the results as boundary conditions provided by the basin scale model. By collecting time series data of the inundation depth at the time of the 2011 flood and comparing the calculation results to them, conduct calibration and reproducibility verification of the model.
		JST-JICA SATREPS, The Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in Philippines (new project)	Collect natural and social environment data, integrate hydrological and agricultural models for flood and drought risk assessment, and analyze local issues for the evaluation of water-related disaster resilience in the basins of the Pampanga River, the Pasig-Marikina River, and Lake Laguna in the Luzon Islands in the Philippines.
(ii) Effective Capacity Development			
(1) Train solution-oriented practitioners and Training-of-Trainers (TOT) instructors with solid theoretical and engineering competence who will contribute effectively to the planning and practice of disaster risk management at local and national levels.			
	(ii)-(1)-1. Capacity development for professionals who can train and supervise local researchers	Doctoral Course "Disaster Management"	2-3 students (2020-2021)
	(ii)-(1)-2. Capacity development for experts with practical solutions to local problems on water-related disasters	Master's Course "Water-related Disaster Management Course of Disaster Management Policy Program"	● 2020-2021: about 14 students from the candidate countries. ● Determine the candidate countries based on the results of a needs survey. ● Communicate closely with the candidate countries about the requirements for applicants, such as submission of a proof of English fluency.

	(ii)-(1)-3. Days- and weeks-long training to learn knowledge and technologies for water-related disaster risk management	Short-term training	Provide lectures and exercises in cooperation with the JICA Knowledge Co-Creation Program on “Water Related Disaster Management (Preparedness, Mitigation and Reconstruction)”.
		Hold follow-up seminars for ICHARM master’s program graduates and others.	Hold a follow-up seminar in a country of graduates.
(2) Build and strengthen a network of local experts and institutions involved in water-related disaster management by providing knowledge and skills accumulated from research and local practice for training in international projects and ICHARM’s educational and training programs.			
	(ii)-(2)-1. Follow up and encouragement for ex-trainees	Hold workshops in ex-trainees’ countries.	● Create and update an alumni list. ● Continue strengthening the alumni network using the Internet and providing information on training programs. ● Organize follow-up seminars.
(iii) Efficient information network			
(1) Collect, analyze and disseminate the records and experiences of major water-related disasters around the world as the comprehensive knowledge center for practitioners.			
	(iii)-(1)-1. Collection and organization of disaster-related records and documents	Promote collaboration with other organizations and collect water disaster information.	Develop a framework for the efficient collection of water-related disaster information by assessing and evaluating the socio-economic impact of flood disasters using big data processed by DIAS of the University of Tokyo and promote the sharing and effective use of the collected information.
	(iii)-(1)-2. Collaboration with other organizations	Promote the collaboration with other organizations and collect water disaster information.	Promote the collaboration for collecting abundant and reliable disaster information with international organizations (WMO, UNDRR, etc.), the University of Tokyo and its DIAS project, and other UNESCO Centres and Chairs. Strengthen the collaboration with water-related disaster management agencies of each country through an IFI Platform on Water Resilience and Disasters.
(2) Mainstream disaster risk reduction by disseminating knowledge and technology for water-related disaster risk management and building and maintaining a worldwide influential network such as IFI.			
	(iii)-(2)-1. Collaboration with relevant organizations	Fulfill the duties as the IFI secretariat.	● Carry out the responsibilities as the IFI secretariat in collaboration with the participating organizations by reviewing the concept of IFI and other issues at the Advisory Committee

			meeting scheduled in August 2020 and holding periodical teleconferences as the Management Committee meeting. ● Continue efforts to disseminate IFI activities at various major international conferences such as ICFM8 and AOGEO and in collaboration with relevant organizations such as ADBI. Promote the partnership with the IFI implementing countries and relevant organizations.
		Support local efforts led by IFI.	Support the Philippines, Myanmar, Sri Lanka, and Indonesia in establishing the Platforms on Water Resilience and Disasters and promoting related activities. Continue efforts to expand IFI activities to other Asian countries, Africa and Latin America.
		Play a leading role in Typhoon Committee (TC).	● Fulfill the duties as the chair of WGH and promote AOP7 "Platform on Water Resilience and Disasters under International Flood Initiative" in collaboration with the WGH members. ● In promoting AOP7, enhance collaborative activities with JMA as a WGM member and the IFI-relevant organizations of the Philippines. ● Organize the 9th WGH meeting in Kyusyu, Japan, coinciding with the 4th APWS in October 2020 and participate in the 15th IWS meeting and the 52nd and 53rd Annual sessions as WGH chair. In collaboration with the Members, summarize discussions on typhoon-related disasters in the TC region and contribute to developing and applying effective measures.
		Japanese Ministry of Foreign Affairs (MOFA) and the International Atomic Energy Agency (IAEA)/Regional Cooperative Agreement (RCA) RAS/7/030 Project on "Assessing Deep Groundwater Resources for Sustainable Management	Based upon MOFA requests for participation in the IAEA activities, ICHARM will send a researcher to: 1) Represent Japan in the First Coordination of the RAS/7/035 Project to be held in summer 2020 in China to promote the application of isotope techniques in Japan. 2) Participate in the 1st Regional Training Course of the IAEA/RCA RAS/7/035 Project to be held in Thailand in fall 2020 as the IAEA lecturer and expert to give training to participants from the RCA member countries and provide expert advice for the specific study areas of the RCA member countries.

		through Utilization of Isotopic Techniques"	
	(iii)-(2)-2. Synergy effects enhanced by alumni networking	Alumni networking	● Continue updating the alumni list. ● Continue using SNS to network ICHARM alumni and facilitate the interaction among the alumni, as well as between ICHARM and the alumni. ● Keep in close touch with alumni by sending newsletters and other means.
	(iii)-(2)-3. Public relations	Maintain the ICHARM website.	● Actively disseminate the latest activities on research, training and international networking, and other information and announcements by posting them on the website in a timely manner. ● Continue to improve the contents based on the viewers' feedback. ● Reply to comments and inquiries from the viewers quickly and appropriately.
		Publish the ICHARM newsletter.	● Publish the newsletter four times a year (January, April, July and October), and include various articles about ICHARM activities that are current and informative. ● Enrich and diversify the contents by promoting activities on research, training and international networking and collecting contributions from partner organizations and graduates, including feedback from the subscribers. ● Diversify and increase the subscribers by promoting various networking activities inside and outside Japan.