ICHARM Work Plan

FY 2018 (2018.4-2019.3)
FY 2019 (2019.4-2020.3)

Category	Content	Activities and expected results in FY2018	Activities and expected results in FY2019
(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	Study a simple method for assessing the socio-economic impact of floods at the community level using the DIAS with various data of local level on socio-economic activity, population, agriculture, etc. Select communities in Japan with flood disaster experiences and collect disaster-related data from them. Discuss related issues with other research institutes.	Propose a simple method for assessing the socio-economic impact of floods at the local level using data stored in DIAS and other data, in addition to data collected in the previous year and results from discussions with other research institutes.
	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.	Study national data to be collected through IFI platforms for water and disaster in various fields (topography, hydrology, inundation, flood damage, socio-economy, etc.), and determine the direction for the development of a simple method for assessing the socio-economic impact of overseas flood events.	Select areas in overseas countries with flood disaster experiences for case studies, and apply the proposed assessment method to test its applicability.
(b) Support system for early warning capable of providing accurate information in a shorter period of time			
More advanced application of a regional atmospheric model (WRF) and further improvement of IFAS and RRI will be achieved. Using these advanced technologies, a method will be developed for more accurate real-time prediction of rainfall, runoff and inundation to ensure over 10 hours of lead time necessary for evacuation in a wide area and dam discharges prior to rainfall. The developed method will be tested for applicability to river basins both in Japan and overseas with different conditions of data availability, climate and topography, and eventually used to establish an early flood warning and system. A technology will be developed to evaluate water disaster hazards by using satellites and sediment hydraulic models.			

	(i)-(b)-1. Research on technologies for more accurate real-time prediction of runoff and inundation by complementing insufficient data availability	Improve the accuracy of the flood inundation prediction model by upgrading the flood tracking method and introducing an automatic parameter optimization method.	Test the WEB-RRI model for the reproducibility of flood events in several river basins in Japan and overseas; the WEB-RRI model is regarded as highly capable of simulating the behavior of water flow from land to rivers. Continue testing the flood reproducibility of IFAS using a parameter optimization algorism, and conduct on-site experiments to test the local applicability of a real-time optimization method.	Improve the WEB-RRI model based on the test results, and prepare for the public release of the simulation model including the production of a user's manual. Study the implementation of the real-time optimization method which uses the IFAS parameter optimization method.
		Clarify the applicability of satellite rainfall data, and develop a basin-specific data correction method.	Improve the applicability of GSMaP-IF2 by using rainfall data from the ground gauges newly installed in Pakistan and Sri Lanka, and test flood forecasting using GSMaP-IF2 for accuracy.	Promote the use of GSMaP-IF2, corrected using ground rainfall data, in flood forecasting and other applications in overseas countries.
		Improve the accuracy of the WRF model for heavy rainfall prediction using X- and C-band MP radars and the Ensemble Kalman filter.	Study how to improve the accuracy of heavy rain forecasting using the WRF model by combining GSMaP with radar rainfall and other types of data. Test the WRF cumulus and other models for applicability to Southeast Asia.	Test the accuracy of meteorological forecasting information, which is provided, as the boundary conditions for region calculation, by the GCM and the other methods, and study how to improve the accuracy of heavy rain forecasting by upgrading meteorological forecasting. Also study a method for correcting the forecasted location of heavy rainfall based on local, topographic and other conditions.
		Develop a method for real-time flood inundation forecasting using multiple rainfall forecasting approaches with prediction uncertainty.	Examine the accuracy of various types of heavy rain forecasting information applicable to real-time flood inundation forecasting. Conduct research on the development of a flood inundation forecasting system using	Develop a real-time flood forecasting method using rainfall data from satellites and the Japan Meteorological Agency. Study decision-making methods based on flood inundation information provided by

			various types of heavy rain forecasting information. Study decision-making methods based on flood inundation information provided by ensemble forecasting. Assist prefectures in Japan in developing a flood forecasting system for mountainous rivers.	ensemble forecasting.
	(i)-(b)-2. Development of technologies using satellites and sediment hydraulic models for assessing the impact of water disaster hazards	Develop a method for modifying DSM for the practical application of a sediment hydraulic model.	Study and collect data and information on the applicability of ADCP to overseas rivers. Develop flood mapping technology to map flooded areas including ones in urbanized areas by using data fusion technology capable of fusing optical and SAR sensor data. Study a method to collect data on sediment supply to rivers by using remote sensing technology.	Study the use of ADCP in overseas countries with insufficient river topographic data to support them in planning river improvement projects. Improve the accuracy and efficiency of topographic measurement of rivers and basins by using remote sensing technology such as UAVs, and develop a method to collect data on sediment supply to rivers by using remote sensing technology.
		Develop a flood damage risk mapping method that takes sediment hydraulic phenomena into account.	Evaluate and improve the reproducibility of a flood simulation model to simulate local flood events involving water, sediment and driftwood.	Combine the simulation model to evaluate sediment supply to rivers and the simulation model to evaluate floods with water, sediment and driftwood, and conduct simultaneous analysis of a flood event.
		Develop a method for mapping flood inundation risk in mountainous rivers.	Study a simulation model to evaluate sediment supply to rivers during heavy rainfall.	Develop a simulation model to evaluate sediment supply to rivers during heavy rainfall, and study the applicability of the model to selected rivers.
		Develop an inundation simulation method for wide areas in Asia and other regions by using a simple simulation	Improve the simulation accuracy of the simple method for wide-area inundation simulation by adjusting its parameters based on the comparison between past flood records	Promote the use of the method for inundation simulation in Asia.

		model.	and simulation results.	
(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.	Conduct joint research with power companies to study the operation of hydropower generation dams for better flood control and power generation efficiency by using a floodwater runoff model considering dam operation. Study the integration of LDAS-UT and the WEB-RRI model to eventually develop an advanced long-term runoff model.	Conduct joint on-site experiments with power companies to study the operation of hydropower generation dams for better flood control and power generation efficiency.
		Study soil moisture content based on satellite data.	Test LDAS-UT for applicability and accuracy at other locations besides Australia. Study a soil-moisture assessment method for each climate zones. Study a continent-scale drought risk monitoring technology coupled with a water stress model.	Improve LDAS-UT and develop a soil-moisture assessment method considering the effect of irrigation facilities and structures.
		Improve the applicability of systems and models to rivers in Japan and overseas with different climate conditions.	Install in the long-term runoff model a module for the snow- and glacier-melt phenomenon, and test its applicability and accuracy by applying it to rivers in the cold region.	Test the long-term runoff model with the snow- and glacier-melt module to evaluate its applicability to rivers in the cold region.
	(i)-(c)-2. Research on the creation of climate change risk information on natural disasters (MEXT program)	Assess water disaster risk in Asia, and create information on adaptation measures.	Develop a method for coupling the dynamical and statistical downscaling approaches, and study new downscaling technology that will ensure more accuracy and less work.	Prepare for the development of a versatile program for dynamical and statistical downscaling. Develop evaluation methods for drought

			Develop a long-term runoff model for Mindanao and Java islands and study a risk assessment method appropriate to each environment.	hazard and risk in Mindanao and Java islands considering the impact of climate change.
(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 how to improve risk assessment to cope with multiple disaster risks by upgrading an assessment method, based on the results of the investigation in Joso City, Inbaraki Prefecture, Japan. Also study a more advanced risk assessment method to evaluate factors that have not been fully evaluated by existing methods, such as the resilience of communities in terms of livelihood and business.	Test the validity of the improved disaster risk assessment method studied in the previous year by applying it to different communities.
		Propose risk indices to holistically evaluate the disaster risk reduction effect of disaster prevention measures and investments	Examine indices that can evaluate the risk reduction effect of disaster prevention measures and investments in an easy-to-understand manner, based on the results of discussions on risk indices in the case of Joso City.	Test the validity of the indices that can evaluate the risk reduction effect of disaster prevention measures and investment in an easy-to-understand manner by applying them to different communities.
		Propose a method for building disaster resilient communities in Japan and overseas by using the developed risk indices.	Study how to evaluate methods for developing disaster resilient communities, based on the review of the existing evaluation approach used in Joso City, Japan.	Conduct investigation in several communities on the disaster risk reduction effect of different methods for developing disaster resilient communities by using the risk assessment indices, and discuss the

				effectiveness of each method.
(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.	Test the applicability of the "Flood Chart" approach in Japan and overseas, which evaluates community-based flood risk using 8 indicators by using simulation results from the RRI model. Produce a manual to identify "disaster hot spot" using the "Flood Chart" evaluation.	Continue testing the applicability of the "Flood Chart" approach in Japan and overseas. Disseminate the manual in Japan and overseas.
		Propose a method for forecasting the possibility of a water-related disaster by community in real time.	Test a real-time inundation forecasting system using the RRI model with forecasted rainfall as input.	Improve the real-time inundation forecasting system based on the test results.
		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.	Start running the prototype information delivery system in collaboration with Aga Town, Japan. Study the development of an information delivery system in other municipalities.	Support Aga Town in organizing a municipal system for operation of the information delivery system. Study how to support other municipalities in operation of the information delivery system.
		Propose the effective use of the Web-GIS information delivery system to stakeholders of local administrative bodies in Japan and overseas.	Study an approach for disaster risk reduction using the prototype information delivery system with municipal officials in disaster management and local residents.	Improve the approach based on the results of the previous year and study different perspectives for a new approach.
	(i)-(e)-2. Research on risk forecasting simulation for floods caused by localized torrential rainfall and on a disaster	Propose a disaster response timeline.	Conduct interviews with local governments regarding a disaster response timeline, and sort operational problems and information that should be included in the timeline to	Study a prototype of "next-generation disaster response timeline," which can contribute to disaster mitigation and prevention activities by local governments

	response timeline		improve the government disaster management capacity. Based on that, study how to improve the government capacity of timeline-based operation and examine information necessary for such improvement. Study events to be assumed and requirements of simulation models to prepare timelines considering topographical conditions of mountainous and plain areas. Study how to prepare inundation scenarios considering flood patterns and dike breaches. Develop a timeline table for action in case of underground mall inundation caused by a river flood or urban flood in cooperation with business around the West Exit of Yokohama Station in Japan, as part of the Cross-Ministerial Strategic Innovation Promotion Program.	while coping with a changing situation, by using simulation models and real-time information (e.g., rainfall forecast, water level, inundation area captured by UAVs, etc.)
		Propose a system for disaster response drill.	Propose a system for disaster response drill based on a developed timeline, using a created inundation scenario and available information, and interview local governments on the proposed system and collect and sort feedback from the local governments.	Support municipalities in the implementation of the drill system (see the left column) at their request. Work with municipalities and other research institutes to improve and promote the drill system.
	(i)-(e)-3 Development of risk communication systems to increase public awareness of water-related disasters and risk management (new project)	Develop a DIAS-based simulation system that can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.	Study a prototype of the DIAS-based simulation system that can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.	Develop a prototype of the DIAS-based simulation system that can seamlessly reproduce, predict and visualize meteorological and hydrological events and related damage.
		Develop a more effective risk	Conduct preliminary research on psychology	Characterize the psychological process

		communication system by incorporating psychological factors.	associated with the behavior of disaster damage mitigation for selected local municipalities that experienced flood damage in the past. The research focuses on disaster management personnel, local residents and other relevant groups of people and investigates how they would behave in a flood event when damage mitigation efforts are conducted according to an existing flood response timeline.	during a disaster, based on the preliminary research conducted in the previous year, and select useful information that should be incorporated in the developed simulation system.
	(i)-(e)-4. Local practice using research results	UNESCO Pakistan project Phase II	Continue technical assistance to complete the development of Indus-IFAS, promote its use for flood forecasting, and improve forecasting accuracy. Provide technical assistance for the effective use of ADCP to upgrade river management.	—
		Continue supporting JST-JICA SATREPS, a project to develop an Area-BCM (Business Continuity Management) system to strengthen the disaster resilience of Thailand's industrial parks.	Study how to collect and analyze basic data necessary for flood risk assessment using the RRI model to promote Area-BCM among Thailand's industrial parks.	Conduct inundation hazard analysis using the RRI model to use the results for analyzing the impact of floods on the business operation of the industrial parks.
(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 (2018-2020)	2-3 students (2019-2021)
	(ii)-(1)-2. Capacity development for experts with practical	Master's Course "Water-related Disaster	● 2018-2019: about 14 students from the candidate countries.	● 2019-2020: about 14 students from the candidate countries.

	solutions to local problems on water-related disasters	Management Course of Disaster Management Policy Program"	● Candidate countries: India, Indonesia, Colombia, Zimbabwe, Sri Lanka, Serbia, Tunisia, Trinidad Tobago, Nepal, Pakistan, Bangladesh, the Philippines, Bhutan, Brazil, Vietnam, Peru, Myanmar, Liberia ● Communicate closely with the candidate countries about the requirements for applicants, such as provision of a proof of English fluency.	● Determine candidate countries based on the results of needs investigation. ● Communicate closely with the candidate countries about the requirements for applicants, such as provision 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	Plan and prepare to implement a short-term training program that will address issues on water-related disasters in different countries and contribute to policy making on river basin management and water-related disaster risk management. The program will provide the training for participants to learn science and technology including leading-edge approaches.	Enhance and implement the training program planned in the previous year, and increase training opportunities.
		Conduct a capacity development program (summer program) for international students with the University of Tokyo.	About 20 students	About 20 students
		Hold follow-up seminars for ICHARM master's program graduates and others.	Hold a follow-up seminar in a graduates' country	Hold a follow-up seminar in a graduates' country
(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 the 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 the collection of disaster information by demonstrating its usefulness.	Develop a framework for the efficient collection of disaster information by demonstrating its usefulness (e.g., the socio-economic impact of flood disasters was assessed using big data processed by the DIAS of the University of Tokyo), and promote sharing and use of the collected disaster information.	
	(iii)-(1)-2. Collaboration with other organizations	Promote collaboration with other organizations and collect water disaster information.	Collaborate for collecting reliable disaster information with UNESCO centers, international organizations such as UNESCO Chair and UNISDR, the University of Tokyo (and its DIAS project), and other entities. Strengthen the collaboration with water-related disaster management agencies of each country through an IFI platform on water and disaster.	
(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 member organizations. Assist countries in the development of a platform on water and disaster, which is proposed in the Jakarta Statement, adopted by IFI in 2016. Continue efforts to raise the presence of IFI by introducing its activities at various international opportunities such as UNESCO-IHP intergovernmental council and major international conferences.	
		Support local efforts led by IFI.	Support countries such as the Philippines, Myanmar and Sri Lanka through platforms on water and disaster in collecting, sharing and using disaster information. Assist them in implementing Target Actions in model river basins.	Support other Asian countries such as Indonesia in organizing platforms on water and disaster. Continue efforts to expand IFI activities to other regions of the world.
		Play a leading role in Typhoon Committee (TC).	● Promote the "Flash Flood Risk Information for Better Local Resilience" project led by the TC Working Group of Hydrology (WGH). ● Support organizing the 7th TC-WGH	● Promote the "Flash Flood Risk Information for Better Local Resilience" project led by the TC Working Group of Hydrology (WGH). ● Participate in the 8th TC-WGH

			meeting, scheduled in Japan. ● Participate in the 13th integrated meeting and the 51st plenary meeting as WGH chair, and lead discussions on typhoon-related damage in the region in collaboration with the member countries.	meeting, the 14th integrated meeting and the 52nd plenary meeting as WGH chair, and lead discussions on typhoon-related damage in the region in collaboration with the member countries.
		Japanese Ministry of Foreign Affairs (MOFA) and the International Atomic Energy Agency (IAEA)/Regional Cooperative Agreement (RCA) RAS/7/030 Project on "Assessing Deep Groundwater Resources for Sustainable Management through Utilization of Isotopic Techniques"	Contribution to IAEA/RCA RAS/7/030 Project in the Asia-Pacific Region as National Project Coordinators/Representatives of Japan: - Promoting application of isotope techniques in Japan to characterize water cycle in subsurface and surface water components. - Giving training to participants from the RCA member countries for the sustainable management of groundwater resources on the basis of comprehensive assessment using integration of isotopic, hydrogeological and chemical techniques; - Providing expert advice for specific study areas of the RCA member countries by answering questions of groundwater resource, recharge mechanism, age and volumes; Based upon MOFA request for participation, the following IAEA/RCA activities are scheduled in the RAS/7/030 Project: - 3rd Regional Training Course of the IAEA/RCA to be held in Jakarta, August 6-10, 2018 Indonesia. - Technical Workshop on groundwater dynamics for sustainable management using isotope techniques to be held in September 17-21, 2018 in China; Final meeting of the IAEA/RCA RAS/7/030 Project to be held in Mongolia on October 2019.	
	(iii)-(2)-2. Synergy effects enhanced by alumni networking	Build an alumni network	● Continue updating the alumni list. ● Keep in close touch with alumni by sending newsletters and other means.	
	(iii)-(2)-3. Public relations	Maintain the ICHARM website.	Post the latest news and information. Continue improving the content based on the viewers' feedback.	
		Publish the ICHARM newsletter.	Publish the newsletter four times a year (Jan., April, July and Oct.). Improve the content to meet the subscribers' needs, based on the feedback.	