ICHARM Work Plan

FY 2016 (2016.4-2017.3)
FY 2017 (2017.4-2018.3)

United Nations
Educational, Scientific and
Cultural Organization

Category	Content	Activities and expected results in FY2016	Activities and expected results in FY2017
(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. 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 effect of the disaster database including its use on disaster reduction will be evaluated quantitatively in model areas both in Japan and overseas.			
(i)-(a)-1. Research on simple methods for evaluating the socioeconomic effect of flood disasters	1. Develop a simple method for evaluating the socioeconomic effect of flood disasters	Develop a simple model for evaluating socioeconomic activities based on micro geodata (residential maps, etc.) and commercial data (phone numbers, shops, etc.) installed in a data integration and analysis system, and verify the model using official commercial statistics.	Develop a simple method for evaluating the impact of flood disasters on socioeconomic activities by selecting recent flood disaster cases and assessing the socioeconomic activities in the target basins from business transaction and bulk data. Verify the method by comparing the results with flood statistics, etc. for direct damage, and eventually estimate indirect damage.
	2. Among the developed simple methods for evaluating the socioeconomic impact of flood disasters, use a globally applicable method to estimate such impact at national and global levels.	Evaluate the socioeconomic impact of flood disasters by nation using a globally applicable portion of big data such as satellite images of nighttime light distribution in urban areas, energy consumption, etc.	Verify the estimated impact for nations and the world using global statistics published by UN and other organizations and national statistics. Develop a flood damage risk allocation model incorporating investment and insurance made by nations and other entities for flood management. The model development will be conducted for several Asia-Pacific nations as part of the IFI activities in the region.

(b) Support system for early warning capable of providing accurate information in a shorter period of time			
More advanced application of WRF, a regional atmospheric model, 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 so as to ensure over 10 hours of lead time 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 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	Study the dynamic wave method for practical use. Modify the GUI program to install the automatic parameter setting function in IFAS.	Modify the program sources of IFAS and RRI for more accuracy. Study a feedback function that can optimize parameters in real time during the operation of IFAS for flood prediction.
	Provide detailed information on the applicability of satellite rainfall data. Develop a basin-specific data correction method.	Verify satellite rainfall for accuracy. Study a data correction method based on the verification results and issues identified.	Verify the effect of the data correction method for accuracy improvement of satellite rainfall. Propose the developed data correction method.
	Improve the accuracy of the WRF model for heavy rainfall prediction using X- and C-band MP radars and the Ensemble Kalman filter.	Study the effective use of radar and other data to improve the accuracy of the WRF model for heavy rainfall prediction using the Ensemble Kalman filter.	Verify the method to improve the accuracy of the WRF model for heavy rainfall prediction using the Ensemble Kalman filter. Propose the developed method.
	Develop a method for predicting flood inundation in real time with prediction uncertainty by using		Conduct case studies in domestic and overseas basins to verify the improved model. Present the results of the case studies.

		multiple rainfall prediction approaches.		
	(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 a DSM modification method using ground observation and the DSM obtained from satellite data.	Study a method for estimating river bed morphology. Modify DSM using the developed bed morphology estimation method.
		Develop a flood damage risk mapping method that takes sediment hydraulic phenomena into account.	Conduct on-site observation and start studying sediment hydraulics and inundation analysis.	Test flood inundation analysis considering sediment hydraulic phenomena by applying the modified DSM.
		Develop a method for mapping flood inundation risk in mountainous rivers.	Analyze factors and data needed for understanding flush floods in mountainous rivers.	Test flood inundation analysis including flush floods in mountainous rivers.
		Develop an inundation simulation method for wide areas in Asia and other regions by using a simple model.	N/A	Study a high-speed simulation model for wide areas using simplified continuous and motion equations for drift ice.
(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 support integrated long-term water resources management under different natural and	Improve the capabilities of the system for integrated water resources management	Study and design module units to simulate highly technical dam operations, such as integrated dam operations and pre-releases, and water intake restrictions.	Develop a program for the module units to simulate highly technical dam operations, such as integrated dam operations and pre-releases, and water intake restrictions.
		Study soil moisture content	Study drought indices based on the	Study the initial settings for models by

	topographical conditions	based on satellite data.	estimation of soil moisture content from satellite observation.	using the estimated soil moisture content. Compare different models for reproducibility.
		Improve the system applicability to rivers in Japan and overseas with different climate conditions.	Study coupling different models; e.g., RRI with advanced models of evapotranspiration and snowmelt.	Combine RRI and other models with evapotranspiration and snowmelt models. Test the combined models for applicability to different climate conditions.
	(i)-(c)-2. Research on the creation of climate change risk information on natural disasters (MEXT program)	Assess water disaster risk in Asia. Create information on adaptation measures.	Develop hazard scenarios according to probabilities of exceedance under the present and future climates, based on the downscaled results from different RCP scenario experiments using a global climate model over Asian river basins. Develop a flood risk assessment model and a drought risk assessment model, both using local river basin scales. Then, calculate flood and drought risks under the present and future climates, and compare and assess the results for climate change impact with uncertainty. Arrange workshops to present the final results to local administrative bodies.	N/A
(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	List aspects of disaster risk that requires more accurate and advanced evaluation.	Study a method for more accurate and advanced disaster risk evaluation.
	Propose risk indices to holistically evaluate disaster risk reduction effect.	Sort existing risk assessment indices.	Study indices that can evaluate and present the effect of measures and investments on disaster risk reduction in an easy-to-understand manner.
	Propose a method for building disaster resilient communities in Japan and overseas by using the developed risk indices.	Sort existing methods for building disaster resilient communities.	Study a method for evaluating methods for building disaster resilient communities.
(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.	Study a method for characterizing areas vulnerable to flood and sediment disasters.	Verify the results of applicability tests of the method for characterizing areas vulnerable to flood and sediment disasters.
	Propose a method for forecasting the possibility of a water related disaster by community in real time before its occurrence.	Verify the reproducibility of the RRI model to reproduce inundation area in real time using forecasted rainfall as input.	Study the improvement of RRI's reproducibility of inundation area and the optimal frequency for updating the reproduction of inundation area.

		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.	Sort requirements needed for a Web-GIS water related disaster risk information delivery system.	Develop a prototype of the Web-GIS water related disaster risk information delivery system
		Propose the effective use of the Web-GIS information delivery system to stakeholders of local administrative bodies in Japan and overseas.	N/A	Study the effective use of the Web-GIS information delivery system by using its prototype.
	(i)-(e)-2. Research on risk forecasting simulation for floods caused by localized torrential rainfall and on a disaster response timeline	Propose a disaster response timeline	Study hazard scenarios used to develop a disaster response timeline.	Analyze the relationship between the hazard scenarios and possible behaviors in the face of the anticipated hazards.
		Propose a system for disaster response training.	Study an on-the-map training approach for administrators.	Study the content of disaster response training on the basis of the response process during a flood.
	(i)-(e)-3. Local practice using research results	ADB Myanmar project -risk assessment for urban management in Myanmar- (Yangon, Mandalay, Mawlamyine)	Develop a flood hazard map for each three target city and provide training on the operation of the RRI model, a storm-surge model, and an agricultural damage simulation model. Propose a business plan for the Department of Meteorology and Hydrology (DMH). Provide technical assistance for	N/A

			analyzing the 2015 flood. Sort and publish all project outcomes, and hold workshops for relevant organizations.	
		UNESCO Pakistan project Phase II	Improve Indus-IFAS with additional functions for snowmelt, several rainfall input types, and real-time GSMaP correction. Develop an IFAS model using global data for the eastern tributary basin of the Indus River. Participate in workshops and provide advice for training.	Test the Indus-IFAS with the additional functions and the expanded coverage including the eastern tributary basin of the Indus River.
(ii) Effective Capacity Development				
(1) Foster the development of 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 management at any levels, from local to international.				
	(ii)-(1)-1. Nurture professionals who can train researchers and take leadership	Doctor Course "Disaster Management"	2-3 students (2014-2017)	2-3 students (2015-2018)
	(ii)-(1)-2. Development of the participant's capacity to practically manage the problems and issues concerning water-related disasters in local levels	Master Course "Water-related Disaster Management, Disaster Management Policy Program"	10-15 students from candidate countries: Bosnia Herzegovina, Brazil, Cambodia, Indonesia, Macedonia, Malawi, Mozambique, Myanmar, Papua New Guinea, Philippines, East Timor, Vietnam, Zimbabwe, Pakistan, etc.	10-15 students Candidate countries to be decided in consultation with JICA
	(ii)-(1)-3. Training to learn knowledge and technologies	JICA training program "Flood Risk Management	14-22 students from candidate countries:	14-22 students Candidate countries to be decided in

	relevant to water-related disaster risk management for a period of several days or weeks	with IFAS" Phase II	Bhutan, Bosnia Herzegovina, Djibouti, India, Kenya, Myanmar, Nigeria, Philippines, Sri Lanka, Thailand, etc.	consultation with JICA
		Capacity development program (summer program) with Tokyo University for international students	About 20 students	About 20 students
		Follow-up seminars for ICHARM master's program graduates and others.	Holding a follow-up seminar in a graduates' country	Holding a follow-up seminar in a graduates' country
(2) Build a network of local experts and institutions equipped to address water-related risks with accumulated knowledge and applied skill both in research and practice, through trainings on occasion of international projects and education/training activities at ICHARM.				
	(ii)-(2)-1. Follow up and encouragement for ex-trainees	Seminar in an ex-trainees' country	- Make and maintain list of graduates - Implement internet networking - Organize follow-up seminars	
(iii) Efficient Information Network				
(1) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.				
	(iii)-(1)-1. Accumulate disaster archives	Promote the collection of disaster information by demonstrating the effective use of such information	In collaboration with the University of Tokyo (and its DIAS project), Tohoku University and other organizations, develop a framework to promote the collection of disaster information through the effective use of such information; e.g., using big data to assess the socio-economic impact of flood disasters.	
	(iii)-(1)-2. Collaboration	Promote collaboration with other organizations archiving water disaster information	-Collaboration for collecting reliable disaster information with UNESCO centers, international organizations (UNISDR, Red Cross, etc.), the University of Tokyo (and its DIAS project), Tohoku University and other entities. -Promotion of regional efforts in data archiving through International Flood	

			Initiative (IFI)	
(2) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network, such as the International Flood Initiative, and through dissemination of technical knowledge for water-related hazard and risk management				
	(iii)-(2)-1. Collaboration with relevant organizations	IFI secretariat	-Function as the secretariat in collaboration with the partners. -Develop and update the strategy in collaboration with relevant organizations. -Disseminate the activities such as International Conference on Flood Management (ICFM).	
		Local efforts led by IFI	Coordinate a pilot project for monitoring flood management in the Asia-Pacific region, which will be launched as one of the efforts initiated by Sendai Framework in collaboration with Asian Water Cycle Initiative (AWCI) and Network of Asian River Basin Organizations (NARBO).	Coordinate a pilot project for monitoring flood management in the Asia-Pacific region.
		Typhoon Committee (TC)	Contribution to TC -Chair for the TC Working Group for Hydrology -Case study on the assessment of climate change impact in collaboration with member countries	
	(iii)-(2)-2. Synergy effects	Alumni networking	-Continue to update ICHARM Alumni list -Continue to keep in touch with ex-trainees by disseminating ICHARM newsletter, etc.	
	(iii)-(2)-3. Public relations	ICHARM website	Continue updating	
		ICHARM newsletter	Publish four times a year (January, April, July and October) with timely updates	

Reference

- Sendai Framework for Disaster Risk Reduction 2015 – 2030 (Sendai Framework), United Nations, 18 March 2015
- Strategic Plan of the eighth phase of International Hydrological Programme (IHP-VIII, 2014-2021), UNESCO-IHP, 4-7 June 2012