Format for Biennial Reports by UNESCO's Water-related Centres on activities related to the IHP in the period (June 2014 – May 2016)

1. Basic information on the centre

Name of the Centre		International Centre for Water Hazard and Risk Management (ICHARM)
Name of Director		Prof. Toshio Koike
Name and title of contact person (for cooperation)		Dr. Junichi Yoshitani
E-mail		icharm@pwri.go.jp
Address		1-6 Minamihara, Tsukuba, Ibaraki, 305-8516, Japan
Website		http://www.icharm.pwri.go.jp/
Location of centre		city/town: Tsukuba, country: Japan
Geographic orientation *		☒ global ☐ regional
Region(s) (for regional centres)		
Year of establishment		2006
Year of renewal assessment		2011
Signature date of most recent Agreement		July 2013
Themes Of activities during reporting period	Focal Areas ·	☐ groundwater ☐ urban water management ☐ rural water management ☐ arid / semi-arid zones ☐ humid tropics ☐ cryosphere (snow, ice, glaciers) ☒ water related disasters (drought/floods) ☒ Erosion/sedimentation, and landslides ☒ ecohydrology/ecosystems ☐ water law and policy ☐ social/cultural/gender dimension of water ☐ transboundary river basins/ aquifers ☒ mathematical modelling ☐ hydroinformatics ☒ remote sensing/GIS ☐ IWRM ☐ Watershed processes/management ☒ global and change and impact assessment ☐ mathematical modelling ☒ water education ☐ water quality ☐ nano-technology ☐ waste water management/re-use ☐ water/energy/food nexus ☐ water systems and infrastructure ☐ other: (please specify) _____
	Scope of Activities ·	☐ vocational training ☒ postgraduate education ☐ continuing education ☐ public outreach ☒ research ☒ institutional capacity-building ☒ advising/ consulting ☒ software development ☐ data-sets/data-bases development

* check on appropriate box
· check all that apply

	☐ other: (please specify) _____
Support bodies [1]	Ministry of Land Infrastructure and Transport and Tourism
Hosting organization [2]	Public Works Research Institute
Sources of financial support [3]	National Budget
Existing networks and cooperation [4]	IFI
Governance	☒ director and governing board ☐ other: (please specify) _____ Link to election of board members to the IHP Intergovernmental Council (IGC) and hosting country IHP National Committee _____ Frequency of meetings: once every 2__year(s) ☒ Existence of UNESCO presence at meetings
Institutional affiliation of director	
Number of staff and types of staff	total number of staff (full-time, or equivalent) : _53_____ number of staff who are water experts: _32_____ number of visiting scientists and postgraduate students: _____
Annual turnover budget in USD	4.5 million

2. Activities undertaken in the framework of IHP in the period June 2014 – May 2016

2.1 Educational activities (i.e., those with accreditation) that directly contributed to the IHP-VIII (Appendix 1) and WWAP
Please include here those activities which led to accreditation of degrees, or those held in formal school settings.

ICHARM offered the following educational activities as shown in the table;

Category	Course title	Duration	Num. of Enrollee/	Collaboration
Ph.D. Program (3 years)	Disaster Management	2013.10-2016.9	3	GRIPS (National Graduate Institute for Policy Studies)
		2014.10-2017.9	2 (1 were dropped out)	
		2015.10-2018.9	2	
M.Sc. Program (1 year)	Water-related Disaster Management Policy Program	2013.10-2014.9	12	JICA (Japan International Cooperation Agency), GRIPS
		2014.10-2015.9	13	
		2015.10-2016.9	13	

[1] please specify bodies that cover the operational costs of the centre, and other essential costs such as salaries and utility bills, and that provide institutional support to ensure centre's sustainability
[2] if different from support bodies
[3] please specify sources of main budgetary and extrabudgetary funds to implement projects
[4] please write international networks, consortiums or projects that the centre is part of, or any other close links that the centre has with international organizations or programmes, which are not already mentioned above

2.1.1 Doctoral program: Disaster Management

In October 2010, ICHARM and GRIPS jointly launched the Ph.D. program. The broad aim of the program is to nurture professionals who can train researchers and take leadership in planning and implementation of national and international strategies and policies in the field of water-related risk management. This program is planning to accept one to three students per year. ICHARM/PWRI employed some Ph.D. students for ICHARM Research Assistant positions.

In 2014, one student, in 2015, two students graduated from the program after three years of hard work and awarded a doctoral degree in disaster management.

As of February 2016, a total of six students are in the doctoral program, studying climate change, risk assessment and other topics.

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

In 2007, ICHARM launched a one-year master's course "Water-related Disaster Management Course of Disaster Management Policy Program" in collaboration with GRIPS and JICA. This program was designed to provide trainees from developing countries with the mastery of knowledge and technology on flood-related disasters. A Master's degree in disaster management is granted after the completion of the program. The program consists of lectures and practical assignments in the first semester, and the completion of Master's thesis concerning their flood disaster mitigation projects in the second. Field surveys are included in each semester.

In September 2014, 12 students, in September 2015, 13 students graduated from the program after one years of hard work and awarded the degree in disaster management.

As of February 2016, 13 students were enrolled and study climate change, risk assessment and other topics.

2.1.3 Follow up activities

Follow-up activities of ICHARM are intended to encourage ex-students to promote their water-related risk management projects. Especially, follow-up seminars allow ex-trainees to update their knowledge about advanced technologies in the field, to visualize issues they may face in their daily work、and discuss them among the participants.

Follow-up activities allow ICHARM to disseminate information about future training opportunities at ICHARM and to recruit new students to ICHARM training programs.

List of conducted follow-up activities

Date	Follow-up activity	Venue
Mar. 3-4, 2015	Follow up seminar in Indonesia	Jakarta, Indonesia
Mar. 2016 (Planned)	Follow up session in the Philippines	Manila, the Philippines

2.1.4 Internship

ICHARM has been actively accepting college students for short-term internship and researchers from overseas institutes, providing opportunities for them to deepen their research interests intensively. A total of 7 students and researchers used these opportunities

2.2 Research activities that directly contributed to the IHP-VIII activities
Please include research/applied projects outputs such as publications that directly contributed to the IHP-VIII and WWAP objectives

2.2.1 PWRI Grant research

Through June 2014 to March 2016, ICHARM conducted a series of research in collaboration with other institutes and organizations both in Japan and overseas to observe and assess the risk of floods due to rainfall and contribute the results to risk management in planning and implementing appropriate measures.

Six research tasks were designed and conducted under three project research schemes in the grant research category. The three project research schemes were: 1. Technological development for the prevention and mitigation of intensified water-related disaster damage due to climate change and other factors; 5. Study on technologies for the efficient use of information on disaster prevention and disaster damage; and 10. Understanding of the basin-scale behavior of substances and water-quality management technologies. The six research tasks under those schemes were: study on the impact of global warming on floods and droughts with uncertainty considerations; study on flood forecasting for extremely fast water-level increase; study on technologies for the effective use of information on disaster prevention and disaster damage; development of a basic system to support comprehensive flood and water resources management; development of satellite-based technologies to assess flood inundation area, damage and hydraulic quantity; and study on the basin-scale behavior of substances.

2.2.2 MEXT-led Program for Risk Information on Climate Change

Since 2012, ICHARM has participated in MEXT-led Program for Risk Information on Climate Change. The purpose of our task in this program is to make quantitative estimates, including uncertainty, on changes of water-related disaster risks such as floods and droughts in selected vulnerable river basins and to evaluate socio-economic impacts due to such changes.

Through June 2014 to March 2016, we took on the development of basic and advanced technologies for basin-scale impact assessment.

We conducted flood impact assessment for selected five river basins in Asia, namely Pampanga river in the Philippines, Solo river in Indonesia, Chao Phraya river in Thailand, Lower Mekong River, and Indus river in Pakistan. As for the hazard assessment, we employed the IFAS model, the RRI model, and BTOP model to analyze the relationship among rainfall, discharge and inundation and carry out frequency analysis on discharge and inundation, using different rainfall data from actual observation and MRI-AGCM3.2S (for the present and future climate conditions). Additionally, we performed flood and drought risk assessment at each basin scale.

2.2.3 Collaborative project "Preparing for Extreme And Rare events in coastaL regions (PEARL)" by grant of European Commission

A research consortium of 24 partners led by UNESCO-IHE has been awarded a grant of five million Euro for the implementation of its research proposal within the FP7 programme (EU-FP7 ENV.2013.6.4-3 Coasts at threat in Europe: tsunamis and climate-related risks – FP7-ENV-2013). The research project was entitled 'Preparing for Extreme And Rare events in coastaL regions (PEARL)'.

ICHARM is one of the beneficiaries of the project under the consortium led by UNESCO-IHE.

2.3 Training activities that directly contributed to the IHP-VIII and WWAP objectives

2.3.1 JICA Training Program: Capacity Development for Flood Risk Management

ICHARM conducted the JICA training program, "Capacity Development for Flood Risk Management with IFAS," in JFY2014 and JFY2015. The training is designed to provide opportunity for meteorologists, river administrators, and disaster managers in flood-vulnerable developing countries to learn about disaster management, including evacuation plans and flood response cases in Japan, as well as to develop an action plan for local flood management of flood-vulnerable areas in their countries. These training activities also aim to enhance individual flood-coping capacities and eventually to contribute to flood damage mitigation in their countries.

Totally forty participants in 2014 and 2015 participated the program. They mainly learned how to operate IFAS along with additional training such as disaster prevention map training in local City and some study trips.

2.3.2 International summer program with Tokyo University

ICHARM and the University of Tokyo (UTokyo) jointly organized an international summer program, "Sustainable Water Management in an Era of Big Data," from July 27 to August 7, 2015.

A total of 33 undergraduate and graduate students and young professionals of different nationalities participated in this program, which was conducted all in English.

This two-week program consisted of expert lectures and technical exercises at UTokyo and ICHARM, and excursions to river management structures near Tokyo. All activities were designed to promote problem-solving capacity for water-related problems with an interdisciplinary approach by exploiting various data and data integration functions of the Data Integration and Analysis System (DIAS) of Japan.

The participants worked individually and in groups on actual problems focusing on developing resilience to disasters under climate change, preparedness for risk of unforeseen disasters, and how to introduce this risk into social management and planning for safe and naturally rich environment.

2.3.3 IFAS Lectures and local workshops

The Integrated Flood Analysis System (IFAS) is developed in ICHARM and designed to help create a runoff analysis model easily by using topographic and land-use data which cover almost the entire globe and are available free of charge via the Internet.

Also ICHARM has conducted IFAS lectures on the occasion of JICA training in Japan and local workshops overseas through 2014 to 2016 to further promote the use of the system. A total of 273 trainees from 31 countries participated in the lectures and workshops held in Japan and overseas. Countries such as Bosnia and Herzegovina, Egypt, Singapore and Yemen sent their trainees to the workshops for the first time in 2015.

The total number of trainees who have learned the operation of IFAS in workshops, short-term training courses, and the master's course, has reached 1155 from 53 countries since the fiscal year 2007.

3 Collaboration and linkages

3.1 Participation in major international networks, programmes, partnerships with other UN or other International Agencies, media and professional bodies

3.1.1 Participation in a UNSGAB meeting

The 23rd United Nations Secretary General's Advisory Board on Water and Sanitation (UNSGAB) was held on October 29-31, 2014, in Tokyo in the presence of his Imperial Highness of Japan.

ICHARM Director Toshio Koike participated as a speaker for the technical discussion of the meeting and delivered a speech entitled "Data Integration and Analysis System (DIAS) Contributing to Disaster

Risk Deduction and Sustainable Development". In his speech, he introduced the DIAS initiative designed as part of a country-level data processing system for data archiving in order to cope with ever-increasing Earth observation data in quantity and quality. He also pointed out the importance of improving risk assessment capabilities by integration and inter-linkage of knowledge beyond disciplines, as well as the importance of co-design and co-production of good disaster management practices through collaboration between society and science and technology.

3.1.2 Participation in Third UN World Conference on Disaster Risk Reduction

UNWCDRR is an international conference hosted by the United Nations to develop global disaster risk reduction strategies. The Sendai conference is the third gathering joined by 187 of 193 UN Member States with a total participants of over 140,000. According to the United Nations Office for Disaster Risk Reduction (UNISDR), some 6,500 nations' leaders, ministers, representatives of international organizations and internationally accredited NGOs attended the intergovernmental and multi-stakeholder segments, and many more participated in related events such as public forums.

"Working Session: Risk Identification and Assessment" was about risk information, which is essential in risk identification and assessment. They discussed how the information can be used in policymaking effectively.

ICHARM participated in as one of the panelists in this session, for the need of risk assessment, which encourages prior investment to assess the effectiveness of planned structural measures (i.e., simulation on changes in damage with or without measures), and stressed the importance of data collection and management, which is critical in accurate risk assessment. He also spoke about contributions of ICHARM in international cooperation.

3.1.3 Participation and contribution to Expert Meeting on Developing Indicators for Disaster Risk Reduction by UNISDR

The United Nations Office for Disaster Risk Reduction (UNISDR) convened the Expert Meeting on Developing Indicators for Disaster Risk Reduction on July 27-29, 2015, at the UN Geneva Office. ICHARM attended the meeting.

It was organized to discuss what indicators should be developed to monitor the progress in the implementation of the seven targets and the four priority actions stated in the Sendai Framework for Disaster Risk Reduction 2015-2030, which was adopted at the 3rd UN World Conference on Disaster Risk Reduction. This time, the participants discussed the technical challenges and practical solutions for the indicators.

On September 29-30, 2015, experts nominated by their nations met at the UN Geneva Office for the first official meeting of the Open-Ended Intergovernmental Expert Working Group (OIEWG) to develop a set of possible indicators for the Sendai Framework for Disaster Risk Reduction based on the documents compiled from the expert meeting in July. ICHARM also participated in this meeting with other participants. The participants discussed issues on indicators for the seven targets, which will be followed up in the second official meeting scheduled sometime later and unofficial sessions in between.

3.1.4 Participation and contribution to the UNESCO ENHANS project in South America

ICHARM dispatched experts for the technical and scientific mission to Lima of Peru and Montevideo of Uruguay to advise UNESCO on the implementation of the project entitled "Enhancing natural Hazards resilience iN South America (ENHANS)". At the technical workshops held in Lima on September 21-22, 2015, and in Montevideo on

December 10-11, 2015, ICHARM provided a presentation on flood disaster risk assessment and identified the needs and capacities of the different aspects of natural disasters during the workshop. In Montevideo, ICHARM also informed the basic information on IFAS, or ICHARM's hydrological model to facilitate the identification for the pilot river basin in Uruguay. These contributions would be the ICHARM's next step forward in South America to strengthen the network for disaster risk reduction through science and technology.

3.1.5 High-level Experts and Leaders Panel on Water and Disasters (HELP)

The High-level Experts and Leaders Panel on Water and Disasters (HELP) was established to assist the international community, governments and stakeholders in mobilizing political will and resources.

It will promote actions to raise awareness, ensure coordination and collaboration, establish common goals and targets, monitor progress, and take effective measures aimed at addressing the issues of water and disasters.

Prof. Koike, Director, is an advisor of the Panel and joined the following meetings;

	Date	Title	Venue	Attendance from ICHARM
2014	16-17 October	Fourth High-level Experts and Leaders Panel on Water and Disasters (HELP)	Washington DC, U.S.A.	Prof. Koike, Director
2015	9-10 April	Fifth Meeting of High-level Experts and Leaders Panel on Water and Disasters (HELP)	Seoul, Republic of Korea	Prof. Takeushi, Advisor
2015	17-Nov	Sixth Meeting of High-level Experts and Leaders Panel on Water and Disasters (HELP)	New York, U.S.A.	Prof. Koike, Director

3.2 Participation in meetings related to the IHP and UNESCO (e.g. the UNESCO General Conference, the UNESCO Executive Board, the IHP Intergovernmental Council and/or other meetings organized by IHP)

3.2.1 21st Session of the IHP Intergovernmental Council

The 21st session of the Intergovernmental Council of the International Hydrological Programme (IHP) was held at the UNESCO Headquarters in Paris on June 18-20, 2014. Five delegates from Japan attended the session, including Chief Delegate Kaoru Takara of the Japanese National Commission for UNESCO and Director Kuniyoshi Takeuchi of ICHARM (now Advisor).

In this session, mentioning the progress of the project entitled "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan," former Director Takeuchi expressed his gratitude for the support provided by the IHP Secretariat, and vowed to produce expected outputs for the country in cooperation with the secretariat. In the discussion on the strategic plan for the eighth phase of IHP, the director also emphasized the importance of implementing plans and, to do so, strengthening collaboration among category I and II centers.

3.2.2 Other participations in meetings related to the IHP and UNESCO

Prof. Koike, Director, and Prof. Takeuchi, Advisor, have joined in the following meetings;

Year	Date	Title	Organizer	Venue	Attendance from ICHARM
2014	① 16-17 June ② 18-20 June	①the 11th UNESCO/IAHS Kovacs Colloquium ②the 21st session of the IHP Intergovernmental Council	①UNESCO/IAHS Kovacs Colloquium ②UNESCO IHP	Paris, France	Prof. Takeushi, Advisor
2015	4-5 March	the Regional Dialogue on Sustainability Science Policy to Support the Post-2015 Development Agenda	UNESCO IHP RSC for Southeast Asia and the Pacific	Kuala Lumpur, Malaysia	Prof. Takeushi, Advisor
2015	14-Apr	Panelists of Drought Session in WWF7 "Advances in Drought Analysis Tools and Coping Strategies"	·Coordinator : RCUWM · Co-Coordinator : IWHR)	Daegu, Republic of Korea	Prof. Koike, Director
2015	16-Apr	High-Level Panel 'Water Security and Sustainable Development: Co-operation among Disciplines and Stakeholders'	UNESCO IHD/IHP	Daegu, Republic of Korea	Prof. Takeushi, Advisor
2015	13-14 June	the International Drought Initiative (IDI) Expert Group	RCUWM	Tehran.	Prof. Koike, Director
2015	19-22 October	The 23rd IHP Regional Steering Committee Meeting for Southeast Asia and the Pacific, UNESCO-IHP	UNESCO IHP RSC for Southeast Asia and the Pacific	Medan, Indonesia	Prof. Takeushi, Advisor

3.3 Collaboration and networking with other UNESCO category 1 or 2 institutes/ centres

3.3.1 cross-appointment of directors of the category 1 or 2 institutes or centres on the governing board

Prof. Koike, Director, is appointed as a member of the following category 2 institutes and joined the following governing board;

- International Centre for Water Resources and Global Change in Koblenz, Germany
  9 June, 2015 Governing Board Meeting
- Regional Centre for Training and Water Studies of Arid and Semiarid Zones (RCTWS) in Egypt
  27 Feb, 2016, Governing Board Meeting (by Advisor Takeuchi on behalf of Director)

3.3.2 exchange of information on activities such as training/educational materials, and funding opportunities

3.3.2.1 Ceremony for signing MoU between ICHARM and RCUWM

On September 1, 2014, a ceremony for signing the memorandum of understanding between ICHARM and the Regional Centre on Urban Water Management (RCUWM) under the auspices of UNESCO in Tehran was held. Dr. Reza Nazar Ahari, the ambassador of the Islamic Republic of Iran visited PWRI for this purpose. The MoU was signed in the presence of the ambassador and the PWRI chief executive in the hope that the MoU would facilitate research exchange and technical cooperation for mutual benefits of both organizations.

3.3.3 exchange of staff, most notably professionals and students

(N/A)

3.3.4 implementation of joint activities, such as workshops, conferences, training programmes, joint projects, field visits, software and data sharing, knowledge exchange and publications

3.3.4.1 Side event of the 6th Asian Ministerial Conference on Disaster Risk Reduction (SE3)

During the 6th Asian Ministerial Conference on Disaster Risk Reduction, MLIT and ICHARM organized a side event on June 23, 2014, in Bangkok, Thailand. Under the title of "Water-Related Disaster Risk Information for Risk Reduction: Flood Forecasting, Disaster Information & Risk Assessment for Preventative Investment". This side event gathered government officers, experts and other various stakeholders in water-related disaster management.

After the opening remarks, ICHARM spoke, pointing out the importance of information in disaster management and addressing the need for the development of an archiving strategy for water-related disaster risk information. He also introduced examples of local practice led by ICHARM. A JICA expert also spoke, stating that risk information should be easily understood by not only decision makers but also the general public and that preventive investment is very effective to reduce disaster risk.

Panelists from Cambodia, Indonesia, Myanmar and Thailand introduced their current practices of collecting, compiling and managing data at various phases of water-related disaster risk management, and also stressed the importance of data and information to encourage preventive investment.

3.3.4.2 7th World Water Forum (WWF)

The 7th WWF was held on April 12-17, 2015, in Daegu and Gyeongbuk, Korea. About 41,000 participants from the government and other sectors of 168 countries met at the forum, including Japanese delegates from MLIT and other governmental agencies, universities, private corporations and NGOs.

WWF is a conference on a voluntary basis but has been drawn more global attention than other water-related meetings in terms of its scale and the diversity of participating entities. It has contributed to initiating many global actions in recent years as governments and organizations announce their new commitments in this gathering and encourage relevant groups and organizations to make their own commitments and take concrete actions in a voluntary way.

Nine members of ICHARM, including Director Toshio Koike, participated in 15 sessions as either chair or speaker.

During the WWF, the Water Showcase, which was a type of contest, was held to select good projects on water issues. A project conducted in Ambon, Indonesia, to empower residents for possible collapses of natural dams was jointly submitted for the contest by JICA local staff, residents in the affected area, and NGOs.

The project was nominated as one of the nine final candidates among from 115 projects submitted from all over the world and finally given the Outstanding Award with a trophy. The trophy was presented to ICHARM because two ICHARM staffs led the project and also because advice provided by PWRI played a key role in this successful project.

3.3.4.3 Plenary session during the international symposium entitled "Integrated Actions for Global Water and Environmental Sustainability" in conjunction with the 23rd UNESCO-IHP RSC meeting for Southeast Asia and the Pacific

ICHARM and the Regional Centre on Urban Water Management (RCUWM) organized a plenary session, "Preparatory Process for the International Initiative on Water and Disaster in the Asia Pacific Region," on October 21, 2015, in Medan, Indonesia. The session was organized during the international symposium entitled "Integrated Actions for Global Water and Environmental Sustainability" in conjunction with the 23rd UNESCO-IHP RSC meeting for Southeast Asia and the Pacific.

Prof. Koike was the moderator and explained the intention of the session. After that, Prof. Shahbaz Khan, co-moderator and the director of the UNESCO Jakarta Office, made an opening remark, which was followed by speeches and comments from representatives from ADB,

ICHARM and RCUWM.

Based on the valuable inputs from presenters and participants, Prof. Koike summarized the session, emphasizing the practice for Integrated Flood Management (IFM) through sharing information and knowledge with data by practitioners. Financing mechanism and network mobilization of science and research will be discussed later.

3.3.4.4 Technical session at the 2nd UN Special Thematic Session on Water and Disasters

On November 18, 2015, the Second United Nations Special Thematic Session on Water and Disasters took place at the UN Headquarters in New York City, the United States. ICHARM Director Toshio Koike and two other ICHARM researchers participated in the event. ICHARM and the Science Council of Japan coordinated and moderated the Science Technology Panel among its technical sessions. This high-level session gathered an audience of more than 400, which consisted of ministers and other high level government officials, and experts and leaders involved in the issues of water and disaster risk reduction worldwide.

Two technical panel sessions, Major Group Panel and Science and Technology Panel, were held and Prof. Koike moderated the Science Technology Panel. The Panel, "Science and Technology to Advance DRR on Water," inviting representatives from UNESCO, WMO and various other leading institutions promoting the advancement of science and technology for disaster risk reduction on water.

3.4 Relationships with the UNESCO field and regional office whose jurisdiction covers the country of location

(N/A)

3.5 Relationship with the UNESCO National Commission and the IHP National Committee in the country of location and with other organizations of other countries

(N/A)

3.6 Relationship with other UNESCO-related networks, such as UNESCO Clubs, ASPnet, and UNESCO chairs

3.6.1 International Flood Initiative (IFI)

ICHARM has been serving as the secretariat of the International Flood Initiative (IFI), a joint initiative with international organizations such as UNESCO (IHP), WMO, UN/ISDR, UNU, IAHS and IAHR. ICHARM manages the IFI website (http://www.ifi-home.info/) and compiles inputs, materials and tools provided by member agencies, while also providing its own outputs. With respectful contributions from participatory organizations, IFI has been making an effort to conceptualize, design and implement flood mitigation and protective actions and activities. Being intimately aware of the achievements that have been made in flood management in the last decade, IFI has also tried to foster the mobilization of resources and networks of the UN system, non-governmental organizations and so on in order to assist communities and governments in developing culturally sensitive flood management strategies and thereby addressing sustainable development, such as through IFI flagship project "to support benchmarking flood risk reduction at global, national and local levels" since 2013.

3.6.1.1 IFI plenary session at the 6th International Conference on Flood Management (ICFM6)

ICHARM organized a preliminary session on IFI with speakers from the Federal Institute of Hydrology in Germany, the China Institute of Water Resources and Hydropower Research, the U.S. Army Corps of Engineers, IFI-LAC in Mexico, the World Meteorological Organization, and UNISDR Brazil office, including three ICHARM members.

The session was well organized, attracting over 200 attendees, and created a new thrust for the IFI flagship project to further promote

benchmarking at global, national and community levels for flood risk reduction.

4 Communication

4.1 Communication and knowledge dissemination activities undertaken in the framework of IHP

(N/A)

4.2 Policy documents and advice

(N/A)

5 Update on Centre Operations

5.1 Membership of the Board of Governors between designated period

Based on the renewed agreement between the UNESCO and the Government of Japan on ICHARM, the Governing Board was established to examine and adopt ICHARM's program and work plan.

Following members are designated as the Governing Board Members for the second meeting on 3 March 2016;

Taketo Uomoto (Chairperson),
Chief Executive, Public Works Research Institute (PWRI)

Takashi Shiraishi,
President, National Graduate Institute for Policy Studies (GRIPS)

Robert Glasser,
Special Representative of the Secretary-General for Disaster Risk Reduction (ISDR)

Shinichi Kitaoka,
President, Japan International Cooperation Agency (JICA)

Kouji Ikeuchi,
Vice Minister for Engineering Affairs, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Shahbaz Khan
Director, UNESCO Regional Science Bureau for Asia and the Pacific

Korenfeld David Federman
Chairperson, UNESCO-IHP-IGC

5.2 Key decisions made (attach minutes of meetings)

(N/A)

6 Evidence of the Centre's Impacts

6.1 Science Impacts (Major contributions to the science, technology, education, and regional and/or international cooperation in the field of water)

6.1.1 16th Infrastructure Technology Development Award

Two ICHARM Researchers with one partner companies received the 16th Infrastructure Technology Development Award for the development of a system for observing river and sediment discharges by the use of an acoustic Doppler current profiler (aDcp). This aDcp system had been an important project of ICHARM for several years, and was finally recognized for its outstanding capabilities of observing undersurface phenomena highly accurately even during flooding.

The award-winning system comprises a set of technologies ranging from observation to data processing and is a result of the development of peripheral devices, integration of observational results, and creation of data algorithms. It will allow general users to perform highly accurate observation of river and sediment discharges, and assist river administrators in obtaining high-quality data if widely used for discharge observation that MLIT has been conducting across Japan.

6.1.2 ICHARM Director honored the Science Award

ICHARM Director Toshio Koike, also a professor of the University of Tokyo, was honored with the Science Award by the Japan Society of Hydrology and Water Resources on September 10, 2015. This award is granted to those who have made significant academic contribution in the field of hydrology and water resources through their outstanding academic work.

Professor Koike was awarded for his useful academic and social work through an advancement of hydrological monitoring and modeling with satellite observation, development of a hydrological data assimilation system and improvement of the understanding of the hydrological variation over the Asian monsoon region such as precipitation and runoff processes, and realization of integrated river management with the Data Integration and Analysis System (DIAS). He is currently promoting advancement in knowledge in the field of earth science and creation of social advantages as a leader of the DIAS project.

6.1.3 30th ISO/TC113 meeting in Tokyo

The 30th ISO/TC113 meeting was convened on May 25-29, 2015, at the Japan Society of Civil Engineers (JSCE) in Tokyo. The scope of ISO/TC113 is the standardization of hydrometry, or measurement of liquid flow in open channels. ICHARM participated in ISO/TC113 meetings previously held in other countries, representing JSCE, the responsible body in Japan to discuss various issues related to ISO/TC113. ICHARM prepared for this Tokyo meeting in collaboration with relevant members of JSCE and the Water and Disaster Management Bureau of MLIT. Two ICHARM members attended the SC1 meeting on velocity area methods as Japanese representatives.

In the ISO/TC113 meeting, one ICHARM member was appointed as convener to upgrade ISO/TR 24578 (Hydrometry – Acoustic Doppler profiler – Method and application for measurement of flow in open channels) to an international standard. The meeting also approved that he would be the convener for ISO/NP 24577 (Hydrometry – Use of non-contact methods for measuring water surface velocity and discharge), which had been registered as new work item proposal, and would lead the preparation of a technical report on the topic.

6.1.4 UNESCO-IHP RSC-SEAP Award

Prof. Takeuchi, Advisor, was awarded the "UNESCO-IHP RSC-SEAP Award" for his contribution and dedication to the UNESCO IHP Steering Committee for Southeast Asia and Pacific in commemoration of the 50th Anniversary of UNESCO IHD and IHP on October, 2015.

6.2 Knowledge Transfer Impacts (Major achievements in the dissemination of knowledge and technology transfer)

6.2.1 Introduction of Auto IFAS in the Philippines (ADB TA8074-REG)

As a support activity for the joint technical assistance project (TA8074-REG) organized by ADB and JAXA, the Auto Integrated Flood Analysis System (Auto IFAS), developed by ICHARM, was test-installed at the headquarters of the Philippine Atmospheric Geophysical & Astronomical Services Administration (PAGASA).

One ICHARM Researcher had been involved in the introduction of Auto IFAS until June 4-6, 2014, including giving a series of lectures on the outline and operation of the system for engineers in PAGASA. Auto IFAS is specifically designed as a real time flood forecasting system for the Cagayan River basin, where flood damage is frequent. The most important characteristic of this system is to use GSMaP, satellite rainfall data provided by JAXA, after calibrating it to ground rainfall. The forecasting results are made available at the PAGASA website on a real-time basis to assist local governments to issue evacuation orders quickly at a proper timing. The system was given a test run and calibration during the flood season in 2014, and is currently available for at the PAGASA website for policy makers.

6.2.2 Technical advice on the SAFE prototype project

Two ICHARM members participated in the kickoff meeting for the SAFE prototype project, "Deploying GSMaP for Decision Support in Transboundary Catchments in the Lower Mekong Basin," in Cambodia on September 16, 2015.

This project was organized based on the agreement between JAXA and the Mekong River Commission, aiming to assess the applicability of satellite rainfall information to flood forecasting and drought monitoring over farmland. ICHARM has joined the project to provide technical assistance.

ICHARM has been actively promoting the use of satellite rainfall correction technology coupled with IFAS with support from JAXA. ICHARM's role in this project is to assess the applicability of this technology to the lower Mekong Basin and provide technical advice to improve its applicability. It will also evaluate the validity of soil moisture estimated by the Mekong River Commission by means of LDAS-UT.

In the meeting, ICHARM researchers explained the methods for soil moisture estimation and satellite rainfall correction, which was followed by a lively discussion with local experts who showed great interests and expectations towards the use of satellite data in understanding the distribution of rainfall and soil moisture in the vast basin of the lower Mekong River. The project will be carried out for the next two years until December 2017.

6.3 Policy Impacts (advice sought by government and other bodies and evidence of inputs into policy arena)

6.3.1 UNESCO Pakistan project: Phase 2

From the fiscal 2012 to 2014, ICHARM conducted Phase 1 of the UNESCO Pakistan project, "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan." Subsequently, ICHARM has started Phase 2 of the project since the fiscal 2015.

In Phase 1, ICHARM developed the Indus-IFAS, a version of IFAS specifically tailored for the application to the large part of the Indus River. Short-term workshops were provided for Pakistani engineers to learn how to use IFAS and address other related issues. Some of them were even given participation in ICHARM's master degree program to learn more about the matter.

In Phase 2, the improvement of Indus-IFAS was planned to further upgrade its functions: specifically, a new function to calculate the impact of snowmelt in the upper Indus River basin and a new interface to use satellite rainfall after correction with ground rainfall. Expansion of the area coverage of IFAS was also planned to include the eastern tributaries of the Indus River in the joint effort with governmental agencies and universities of Pakistan. Training and participation in the master's program for Pakistani engineers were also scheduled in Phase 2. In addition, a new training program for discharge observation using acoustic Doppler current profilers was prepared in order to improve observation accuracy in river discharge and river bed profile.

6.3.2 ADB Myanmar project (TA8456): Transformation of Urban Management

An ADB-funded capacity development technical assistance project for Myanmar, "Transformation of Urban Management (TA8456)," was launched in 2014. The objective of the project was to promote sustainable urban development in Myanmar cities through the improvement of the management capacity of national and local governments. It comprised two parts: Part I for enhancing the capacity of urban public services such as water supply, waste management, and drainage and Part II for improving the capacity of flood management. ICHARM was assigned to the second component of the project to provide technical assistance in collaboration with Japanese companies. Part II was carried out specifically for the three Myanmar cities of Yangon, Mandalay and Mawlamyine.

Part II supported the Department of Meteorology and Hydrology (DMH), the Ministry of Transport, which is responsible for flood forecasting and warning. The project assisted DMH in flood and storm-surge assessment for the project area, and in the institutional capacity-building through training on the use of the Rainfall-Runoff-Inundation model and a storm-surge model. In addition, training activities were planned to improve the capacity of flood risk assessment for the central and local governments in charge of flood management.

6.3.3 Typhoon Committee

The Typhoon Committee (TC) is an inter-governmental body organized under the joint auspices of the Economic and Social Commission for Asia and the Pacific (ESCAP) and the World Meteorological Organization (WMO) in 1968 in order to promote and coordinate the planning and implementation of measures required for minimizing the loss of life and material damage caused by typhoons in Asia and the Pacific. ICHARM has been sending a chief researcher to serve as the chair of the Working Group on Hydrology (WGH).

The 10th Integrated Workshop of the ESCAP/WMO Typhoon Committee was convened on October 26-29, 2015, in Kuala rumple, Malaysia, gathering 86 participants from 14 countries.

One ICHARM Researcher attended the meeting as the chair for WGH and took part in managing the committee and the working group.

7 Future activities that will contribute directly to IHP and/or to WWAP

7.1 Operational Plan (attach if available)

7.2 Strategic Plan linked with IHP-VIII (Appendix 1). Focal areas within IHP-VIII the centre plans to contribute to and specific actions the centre will undertake to align its activities with the strategic plan for IHP-VIII

ICHARM shall contribute to the IHP-VIII activities based on the ICHARM's program and work plan which were examined and adopted by the ICHARM Governing Board.

8 Annexes

8.1 List of publications released by the centre (there can be overlap with those listed in 2.3 above)

ICHARM has been active in trying to disseminate research results or new findings through various channels, such as submission of papers to internationally recognized journals, contribution to book chapters, and publication of various reports as shown in the following table.

Table: List of Publications

	2014.4-2015.3	2015.4-2016.3
Newsletter	4	4
Journal	11	9
Paper	8	20
Abstract or Conference	11	45
Articles or Others	10	1
PWRI Technical Note/PWRI research report	2	2
Total	**42**	**81**

8.2 List of training courses conducted (there can be overlap with those listed in 2.1 above)

(See Annex 1)

Appendix 1

Overview of the Core Programme Themes of the Eighth Phase of the IHP (2014-2021)
WATER SECURITY: ADDRESSING LOCAL, REGIONAL, AND GLOBAL CHALLENGES

THEME 1: WATER-RELATED DISASTERS AND HYDROLOGICAL CHANGE

- Focal area 1.1 - Risk management as adaptation to global changes
- Focal area 1.2 - Understanding coupled human and natural processes
- Focal area 1.3 - Benefiting from global and local Earth observation systems
- Focal area 1.4 - Addressing uncertainty and improving its communication
- Focal area 1.5 - Improve scientific basis for hydrology and water sciences for preparation and response to extreme hydrological events

THEME 2: GROUNDWATER IN A CHANGING ENVIRONMENT

- Focal area 2.1 - Enhancing sustainable groundwater resources management
- Focal area 2.2 - Addressing strategies for management of aquifers recharge
- Focal area 2.3 - Adapting to the impacts of climate change on aquifer systems
- Focal area 2.4 - Promoting groundwater quality protection
- Focal area 2.5 - Promoting management of transboundary aquifers

THEME 3: ADDRESSING WATER SCARCITY AND QUALITY

- Focal area 3.1 - Improving governance, planning, management, allocation, and efficient use of water resources
- Focal area 3.2 - Dealing with present water scarcity and developing foresight to prevent undesirable trends
- Focal area 3.3 - Promoting tools for stakeholders involvement and awareness and conflict resolution
- Focal area 3.4 - Addressing water quality and pollution issues within an IWRM framework - improving legal, policy, institutional, and human capacity
- Focal area 3.5 - Promoting innovative tools for safety of water supplies and controlling pollution

THEME 4: WATER AND HUMAN SETTLEMENTS OF THE FUTURE

- Focal area 4.1 - Game changing approaches and technologies
- Focal area 4.2 - System wide changes for integrated management approaches
- Focal area 4.3 - Institution and leadership for beneficiation and integration
- Focal area 4.4 - Opportunities in emerging cities in developing countries
- Focal area 4.5 - Integrated development in rural human settlement

THEME 5: ECOHYDROLOGY, ENGINEERING HARMONY FOR A SUSTAINABLE WORLD

- Focal area 5.1 - Hydrological dimension of a catchment– identification of potential threats and opportunities for a sustainable development
- Focal area 5.2 - Shaping of the catchment ecological structure for ecosystem potential enhancement ─ biological productivity and biodiversity
- Focal area 5.3 - Ecohydrology system solution and ecological engineering for the enhancement of water and ecosystem resilience and ecosystem services
- Focal area 5.4 - Urban Ecohydrology – storm water purification and retention in the city landscape, potential for improvement of health and quality of life
- Focal area 5.5 - Ecohydrological regulation for sustaining and restoring continental to coastal connectivity and ecosystem functioning

THEME 6: WATER EDUCATION, KEY FOR WATER SECURITY

- Focal area 6.1 - Enhancing tertiary water education and professional capabilities in the water sector
- Focal area 6.2 - Addressing vocational education and training of water technicians
- Focal area 6.3 - Water education for children and youth
- Focal area 6.4 - Promoting awareness of water issues through informal water education
- Focal area 6.5 - Education for transboundary water cooperation and governance

(Annex 1)

8.2 List of training courses conducted

	1.Title of the training			2. Target audience (education level /technical/professional etc.)	3. Relation to which theme of IHP-VIII (1 to 6 themes)	4. Number of participants	5. Number of women among the participants
1	Water Related Disaster Management (Preparedness, Mitigation and Reconstruction) in Asia Region	12 May–6 June 2014	ICHARM, Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	10	4
2	Capacity Development for Flood Risk Management with IFAS	7 June–1 July 2014	ICHARM, Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	20	2
3	Short course programme on Integrated Flood Analysis System (IFAS)	30 June–4 July 2014	UNITEN, Malaysia	technical	Theme 1: Water-related Disasters and Hydrological Changes	20	9
4	Seminar at Hydrology and Water Resources Academic Meeting "Training on freeware related to Hydrology and Water Resources"	11 Jul. 2014	Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	49	7
5	Training Programme on Capacity Development for Immediate Access and Effective Utilization of Satellite Information for Disaster Management Component 2: Utilization of Satellite Data for Flood Analysis	6–10 June 2014	Jakarta, Indonesia	technical	Theme 1: Water-related Disasters and Hydrological Changes	20	7
6	IFAS & GETFLOWS training in Japan under SATREPS Program	24–27 Feb. 2015	ICHARM, Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	4	2
7	IFAS training in Viet Nam (short-term dispatch of experts)	21–23 April 2015	Hanoi, Vietnum	technical	Theme 1: Water-related Disasters and Hydrological Changes	10	3
8	"Water Related Disaster Management (Preparedness, Mitigation and Reconstruction) in Asia Region"	15–27 July 2015	ICHARM, Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	20	4
9	ICHARM and the University of Tokyo (UTokyo) jointly organized an international summer program, "Sustainable Water Management in an Era of Big Data,"	15–27 July 2015	ICHARM, Japan	technical	Theme 1: Water-related Disasters and Hydrological Changes	33	18
10	Malaysia SATREPS project general meeting	14–16 Sep. 2015	Malaysia	technical	Theme 1: Water-related Disasters and Hydrological Changes	6	4
11	Training Programme on Capacity Development for Immediate Access and Effective Utilization of Satellite Information for Disaster Management Component 2: Utilization of Satellite Data for Flood Analysis	5–9 Oct. 2015	Jakarta, Indonesia	technical	Theme 1: Water-related Disasters and Hydrological Changes	17	11
12	Training Workshop on Warning System and Geographical Information Systems Courses in News	15–16 Dec. 2015	Egypt, Cairo	technical	Theme 1: Water-related Disasters and Hydrological Changes	23	5
13	Water-related Disaster Management Course of Disaster Management Policy Program (Master's Course)	Oct.2013–Sep.2014	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	12	4
14	Water-related Disaster Management Course of Disaster Management Policy Program (Master's Course)	Oct.2014–Sep.2015	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	13	2
15	Water-related Disaster Management Course of Disaster Management Policy Program (Master's Course)	Oct.2015–Sep.2016	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	13	4
16	Ph.D Program "Disaster Management"	Oct.2011–Sep.2014	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	1	1
17	Ph.D Program "Disaster Management"	Oct.2012–Sep.2015	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	2	0
18	Ph.D Program "Disaster Management"	Oct.2013–Sep.2016	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	3	1
19	Ph.D Program "Disaster Management"	Oct.2014–Sep.2017	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	1	1

20	Ph.D Program "Disaster Management"	Oct.2015–Sep.2018	ICHARM, Japan	Education	Theme 1: Water-related Disasters and Hydrological Changes	2	0
21	WATER RELATED DISASTER MANAGEMENT (PREPAREDNESS, MITIGATION AND RECONSTRUCTION) IN ASIAN REGION	May 28th – June 3rd, 2014	ICHARM, Japan	Technical	Theme 1: Water-related Disasters and Hydrological Changes	10	4
22	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-1	19 Dec. 2014	ADB Resident Office, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	13	8
23	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-2	16 – 18 Feb. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	20	12
24	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-3	12, 13, 14(AM) May, 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	17	11
25	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-4	15, 16 Jun. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	14	9
26	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) Follow-up Training	12, 13 & 16 Oct. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	5	2
27	ICHARM and CTI jointly organized RRI Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) Follow-up Training	25 – 28 Jan. 2016	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	5	2
28	ICHARM and CTI jointly organized Storm Surge Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-2	19, 20 Feb. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	20	13
29	ICHARM and CTI jointly organized Storm Surge Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-3	14(PM) May, 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	20	14
30	ICHARM and CTI jointly organized Storm Surge Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-4	15, 16 Jun. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	7	5
31		17 Jun. 2015	DMH, Myanmar			21	14
32	ICHARM and CTI jointly organized Storm Surge Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) Follow-up Training	12, 13 & 16 Oct. 2015	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	5	4
33	ICHARM and CTI jointly organized Storm Surge Model Training (ADB TA 8456 Myanmar "Transformation of Urban Management" Part II Flood Management) TM-2	25 – 28 Jan. 2016	DMH, Myanmar	Technical	Theme 1: Water-related Disasters and Hydrological Changes	5	4
						441	191