ISSN 0386-5878
Technical Note of PWRI No. 4285

ICHARM Publication No.27

Meeting material of The 1st ICHARM Governing Board

April 2014

ICHARM

PWRI

UNESCO
United Nations Educational, Scientific and Cultural Organization

International Centre for Water Hazard and Risk Management
under the auspices of UNESCO (ICHARM)

PUBLIC WORKS RESEARCH INSTITUTE (PWRI)

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International Centre for Water Hazard and Risk Management
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INCORPORATED ADMINISTRATIVE AGENCY
PUBLIC WORKS RESEARCH INSTITUTE (PWRI)

1-6, Minamihara, Tsukuba-shi, Ibaraki-ken, 305-8516 JAPAN

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Meeting material of The 1st ICHARM Governing Board

by

International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM)

Synopsis:

水災害・リスクマネジメント国際センター（ICHARM）は、日本政府と UNESCO 間の協定に基づき、UNESCO カテゴリー2 センターとして 2006 年 3 月に（独）土木研究所の一部門として設立された。2013 年 7 月にその協定が更新されたのを受け、従来の助言委員会に代わり、協定第 6 条に基づいて 2014 年 2 月 25 日に The 1st ICHARM Governing Board（第 1 回 ICHARM 運営理事会）を開催した。理事会では、理事会の運営手続「Rules of Procedure」の審査・採択、2010 年 10 月から 2014 年 3 月まで（2014 年 2 月~3 月の予定を含む）の活動報告「ICHARM Activity Report」の審査、ICHARM の今後の 10 年あるいは 5 年間の活動プログラム「ICHARM Long-term and Mid-term Program」の審査・採択、及び 2014 年度と 2015 年度の具体的な活動計画「ICHARM Work Plan」の審査・採択が行われた。本稿はそれらを含む第 1 回 ICHARM 運営理事会の会議資料をまとめたものである。

Key Words: Water-related disaster, UNESCO, Activity Report, Programme

Meeting material of the 1st ICHARM Governing Board

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1st ICHARM Governing Board Meeting
Agenda

Date: February 25, 2014, Tuesday, 10:00-12:00

Venue: Room 310, Annex Building 3rd Floor,
Ministry of Economy, Trade and Industry (METI),
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo, Japan

Agenda:

Opening by Chairperson

Remarks from UNESCO

Remarks from MLIT

Examination and adoption of Rules of Procedure

Examination of ICHARM activity report

Examination and adoption of Long-term and mid-term programmes

Examination and adoption of Work plan

Closing

* 12:00-13:00 Photograph, Lunch and networking

1st ICHARM Governing Board Meeting
List of Participants

Takashi Shiraishi

President, National Graduate Institute for Policy Studies (GRIPS)

Johannes Cullmann

Chairperson, International Hydrological Programme (IHP) Intergovernmental Council

Margareta Wahlström

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

Masami Fuwa

Director General of Global Environment Department, on behalf of
Mr. Akihiko Tanaka, President, Japan International Cooperation Agency (JICA)

Toshiyuki Adachi

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

Taketo Uomoto (Chairperson)

Chief Executive, Public Works Research Institute (PWRI)

Blanca Jimenez-Cisneros

Director of the Division of Water Science, on behalf of
Ms. Irina Bokova, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)

(Secretariats)

Hiroshi Fujisawa, Deputy Chief Executive, PWRI

Kuniyoshi Takeuchi, Director, ICHARM

Nario Yasuda, Deputy Director, ICHARM

Kenzo Hiroki, Principal, ICHARM

Minoru Kamoto, Chief Researcher, ICHARM

Toshio Okazumi, Chief Researcher, ICHARM

Yoichi Iwami, Chief Researcher, ICHARM

Masahiko Murase, Chief Researcher, ICHARM

Rules of Procedure for ICHARM Governing Board

Article 1 Intent

These Rules of Procedure (hereinafter referred to as “the Rules”) shall state the necessary matters which shall guide proceedings of the International Centre for Water Hazard and Risk Management (ICHARM) Governing Board (hereinafter referred to as “the Governing Board”) meeting, subject to Article 6 of the agreement between the Government of Japan and the United Nations Educational, Scientific and Cultural Organization (UNESCO) regarding the International Centre for Water Hazard and Risk Management (category 2) under the auspices of UNESCO, signed on 23 July 2013 (hereinafter referred to as “the Agreement”).

Article 2 Composition

1) The members of the Governing Board will be composed as provided for by Article 6 of the Agreement. The Chief Executive of the Incorporated Administrative Agency Public Works Research Institute, Japan will be designated as Chairperson of the Governing Board.
2) The members of the Governing Board shall be appointed by the Chairperson.
3) The term of office for each Governing Board member appointed by the Chairperson shall be two years. This term may be extended by re- appointment.

Article 3 Board Meetings, Quorum, and Minutes

1) The functions of the Governing Board shall be prescribed as provided for by Article 6 of the Agreement.
2) The Chairperson shall convene the Governing Board meeting. Participation by a majority of Governing Board members shall be necessary to proceed with the Governing Board meeting.
3) The majority agreement of all attendees shall be necessary for the adoption.
4) The official language of the Governing Board meeting shall be English.
5) The secretariat of the Governing Board (referred to in Article 4) shall take minutes of the Governing Board meetings.

Article 4 Secretariat

ICHARM shall function as the secretariat of the Governing Board.

Article 5 Amendment of the Rules

The Rules may be amended during a Governing Board meeting by consent of the majority of attendees. The Chairperson can ask for electronic votes when urgent decision issues relevant to the Rules arise between meetings. The decisions in such cases shall be made by consent of the majority of the members who have voted by deadlines.

Article 6 Miscellaneous Provisions

Miscellaneous provisions necessary for the management of the Governing Board but not included in the Rules shall be decided by the Chairperson in consultation with the Governing Board members.

Supplementary Provisions

The Rules shall be enacted on 25 February 2014.

ICHARM Activity Report

[from October 2010 to March 2014]

United Nations
Educational, Scientific and
Cultural Organization

ICHARM Activity Report

[from October 2010 to March 2014]

Contents

1. Outline

1.1 History

Signing ceremony on 3rd March, 2006

In September 2004, the IHP Intergovernmental Council adopted the resolution to support the proposal of the Japanese government to establish ICHARM as a part of the Public Works Research Institute (PWRI). In October 2005, at the 33rd UNESCO General Conference in Paris, the resolution to approve the proposal was adopted by 191 member countries, which was followed by the agreements between the Japanese government and UNESCO, and the Public Works Research Institute and UNESCO on 3 March 2006. Three days later, ICHARM was officially established on 6 March 2006.

Establishment of ICHARM on 6th March, 2006

After its establishment, ICHARM has implemented various activities actively. In January 2011, ICHARM received a high evaluation from UNESCO. Accordingly, in July 2013, the agreement on the establishment of ICHARM was renewed between the Japanese government and UNESCO. Under this agreement, ICHARM continues its activities as a category II center under the auspices of UNESCO. The new agreement requires setting up the Governing Board, instead of the Advisory Board in the previous agreement, which reviews and adopts mid- and long-term plans for ICHARM.

1.2 ICHARM Three-pillar Activities

Since its official launch, ICHARM has been committed to the implementation of the Action Plan advised by the Advisory Board, which was devised with the following three pillar activities: research using advanced technology, training for local administrative officers in developing countries, and information networking for worldwide publicity to promote the presence of ICHARM.

Figure 1-1 Three-pillar of ICHARM activities

1.3 Organization

Although ICHARM is under the auspices of UNESCO as a category II center, it has been part of the Public Works Research Institute (PWRI) as an independent institute from UNESCO. Today, it is recognized as one of the four main institutes of PWRI.

ICHARM has tripled the number of research and office staff as it has expanded its activity, becoming larger than any other research group of PWRI.

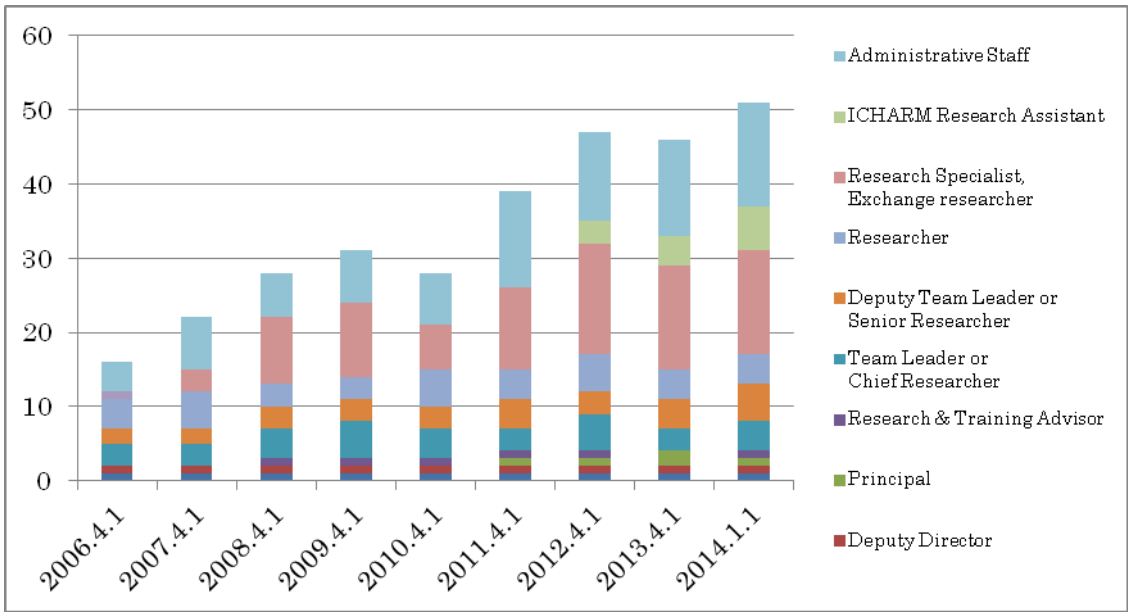


Figure 1-2 Trend of Number of ICHARM staff

1.4 Resources

The annual budget of ICHARM is funded by PWRI and other external sources. Figures 1-3 and 1-4 show changes in the ratio of the founding sources between 2006 and 2013. Although the total budget of PWRI is on a decreasing trend due to the current administrative and fiscal reform, the budget of ICHARM provided by PWRI has been on an increasing trend since its establishment in March 2006 (Fig. 1-3). Accordingly, the share of ICHARM in PWRI's budget has been on an upward trend (Fig. 1-4).

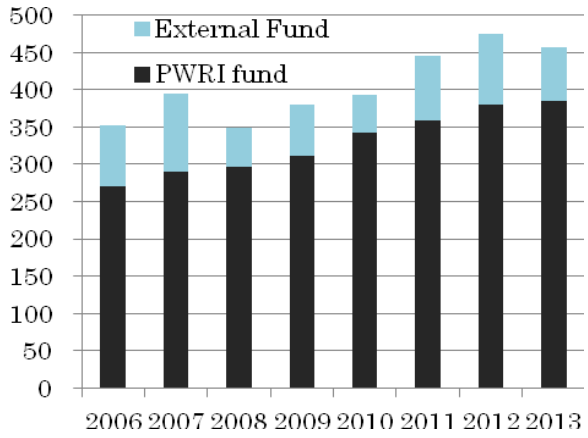


Figure 1-3 Trend of ICHARM Budget

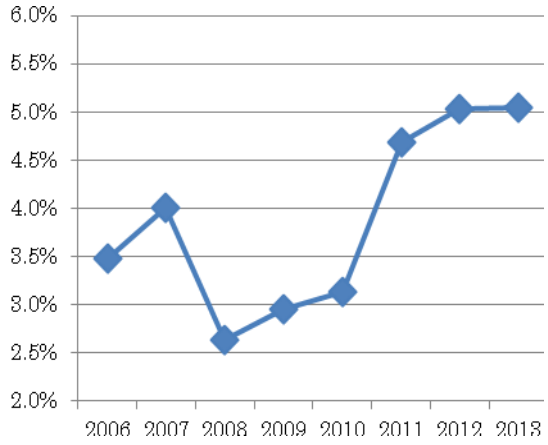


Figure 1-4 Trend of Budget Ratio (ICHARM/PWRI)

1.5 ICHARM Advisory Board and Achievement of ICHARM Action Plan

The 3rd ICHARM Advisory Board on 29th September 2010

The ICHARM Advisory Board was established based on the agreement in 2006, and 13 board members were elected. They provided advice on the ICHARM Action Plan submitted by the ICHARM Director, and reviewed the reports on the activities of the centre.

The current Action Plan 2010-2012, which was discussed in the 3rd Advisory Board, proposed its strategy to increase its capacity by quality improvement, namely, "consolidation". This consolidation sought to consolidate its activities by enriching contents in order to shift its work plan from example demonstration to substantive application.

The following concrete goals set this consolidation in detail:

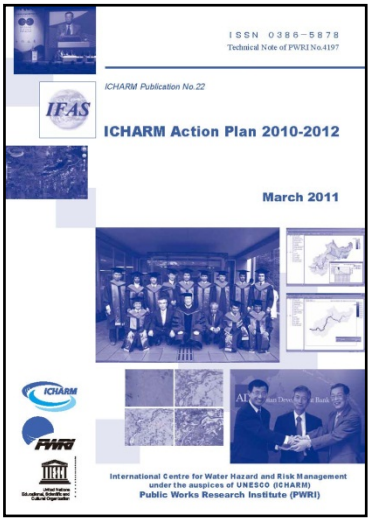


Figure 1-5
ICHARM Action Plan

Five goals presented in the last ICHARM Action Plan (2010-2012)

1. **Improvement of education programs** on water-related disaster management.
2. **System development** to deliver flood forecasts based on globally available data for any basin, at any time, and anywhere in the world.
3. **Local customization of advanced technology** in partnership with local practitioners. Especially, establishment of partnership for local use of IFAS with local engineers by integrating satellite information with ground observations.
4. **Support of local disaster risk assessment and preparedness**. Especially for functioning as the Asia Pacific Knowledge Hub on Water and Disaster in collaboration with ADB, JICA and other funding agencies.
5. **Other collaborative engagement** on the activities of IFI, WWF, APWF, UNSGAB-HLEP, IRDR etc.

Goal 1: Educational and training programs have been improved annually to put more emphasis on local needs and localism by linking those programs more closely to issues that training participants face as an administrative officer in a developing country. In addition, in response to a higher level of research needs that cannot be met by a master's-level program, a doctoral program was launched in 2010 and graduated the first student in 2013.

Goal 2: ICHARM has been working on upgrading of IFAS and the RRI model. To increase their applicability to all types of river basins worldwide, further research and development of the systems are necessary.

Goal 3: In Indonesia, ICHARM applied an upgraded IFAS to improve flood forecasting in the Solo River basin. In Pakistan, it assisted local engineers in flood control by implementing Indus-IFAS in collaboration with the Meteorological Agency of Pakistan and other local agencies with support from UNESCO. In Thailand, in response to a request from JICA, it provided technical assistance in development of a master disaster management plan after the 2011 Chao Phraya flood, and reproduced the actual flood by means of the RRI model. In Bangladesh, with the support of the Asian Development Bank, ICHARM participated in the joint effort with the government of Bangladesh in development of a basic policy for a flood forecasting and warning system.

Goal 4: ICHARM assisted Cambodia in disaster risk assessment with the support of the Asian Development Bank. Particularly, as a member of the Asia Pacific Knowledge Hub, it provided the government of Cambodia with technological assistance for community-based flood control by developing a flood vulnerability assessment method applicable to the Mekong River flood plain. It also developed the Flood Disaster Preparedness Indices to assess disaster preparedness at the community level and applied them to local communities in cooperation with the Typhoon Committee.

Goal 5: ICHARM has been making efforts in enhancing worldwide collaboration with more organizations. It hosted ICFM5 in 2011 and has been active in addressing the mainstreaming of disaster risk reduction in the international community. It has also concluded an agreement with institutes in Iran and Russia to cover a wider range of water issues such as those in cold regions and droughts.

In recognition of these achievements, the MLIT Evaluation Committee for Incorporated Administrative Agencies graded ICHARM as an S on a five-grade evaluation from SS to C for its excellent international contribution. ICHARM researchers have been awarded for their outstanding accomplishments as well.

The following sections outline the projects of ICHARM between October 2010 and March 2014 in each of the three pillar activity areas, i.e., research, training and information networking. It is noted that this report includes the projects scheduled as and when it has been published in February 2014.

2. Research –Advanced Technology-

2.1 Overview

The basic policy for ICHARM's research activities is to reduce damage induced by water-related disasters around the world. More specifically, it has prioritized research needed to implement water-related risk management in developing countries. When the center was first established, the focus was more on research to understand rainfall and runoff characteristics, which is essential to assess flood risk. In recent years, however, it has been expanding the research scope covering assessment of flood damage risk and risk management including development and implementation of effective countermeasures.

The following describes main research achievements of ICHARM.

2.2 Development and dissemination of Integrated Flood Analysis System (IFAS)

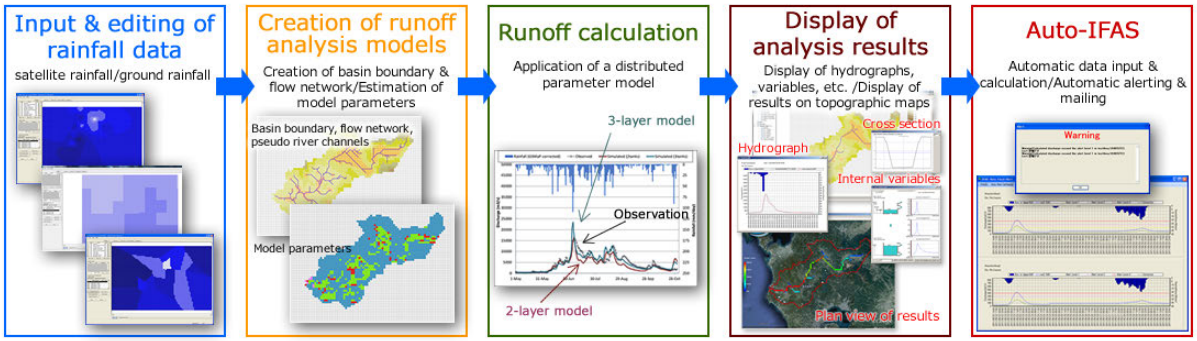


Figure 2-1 Calculation flow of IFAS

The Integrated Flood Analysis System (IFAS) is 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.

With IFAS alone, users can conduct a series of tasks necessary for runoff analysis including data acquisition, model creation, rainfall-runoff analysis and result display. With an additional module named Auto-IFAS, the system is capable of executing automatic functions such as downloading satellite rainfall information, loading ground rainfall information, performing runoff calculation, issuing a warning, etc. With these automatic functions, users can built a real-time flood forecasting and warning system though the functions are minimal as a device for such a purpose.

IFAS with this additional module is very useful even in areas with limited Internet access. It can perform calculation while collecting data regularly according to a predetermined time schedule. In this way, the network and the computer can avoid being overloaded with information processing, which thus enables fast runoff calculation and quick flood forecasting and warning.

The IFAS execute file is downloadable free of charge on the ICHARM website at

http://www.icharm.pwri.go.jp/research/ifas/

Since the official launch in December 2008, the traffic to this download site has been increasing every year as IFAS has gone through several upgrades.

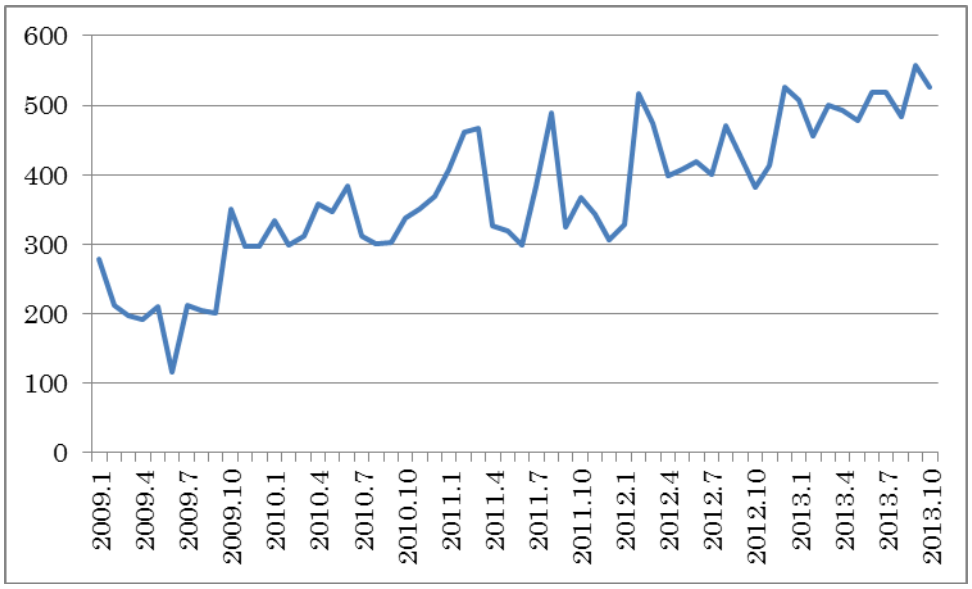


Figure 2-2 Changes in the number of access to the IFAS website

ICHARM has been conducted not only its development, but also its desemmination throughout the world on several occasions. In the duration of this report (October 2010-March 2014) ICHARM trained IFAS to about 560 participant out of total number of about 800.

IFAS trainng class in M.Sc. program

IFAS trainng class in Philippines

2.3 Development of RRI model

Conventional flood prediction models, which mainly focus on rainfall-runoff processes in mountainous areas, have difficulties in simulating floods on low-lying areas with large-scale

inundations, such as the 2010 Pakistan and 2011 Thailand floods. In addition, although it is important to quickly simulate a large-scale behavior of floodwaters in global-scale flood risk assessment and large-scale flood prediction, conventional models are not capable of quickly estimating river discharge and flooding from rainfall information. They can only predict river discharge.

To overcome this disadvantage, ICHARM has been developing a new numerical model called the Rainfall-Runoff-Inundation (RRI) model. The model simulates various hydrologic processes including rainfall-runoff, stream-flow propagation, and inundation over floodplains in an integrated manner.

By using the RRI model, we can assess future flood risks for different regions under different climate conditions including climate change. The model may also be applied to large-scale flood prediction on a near real-time basis by using satellite-based topography, land-use and rainfall information in a similar manner to the IFAS procedure.

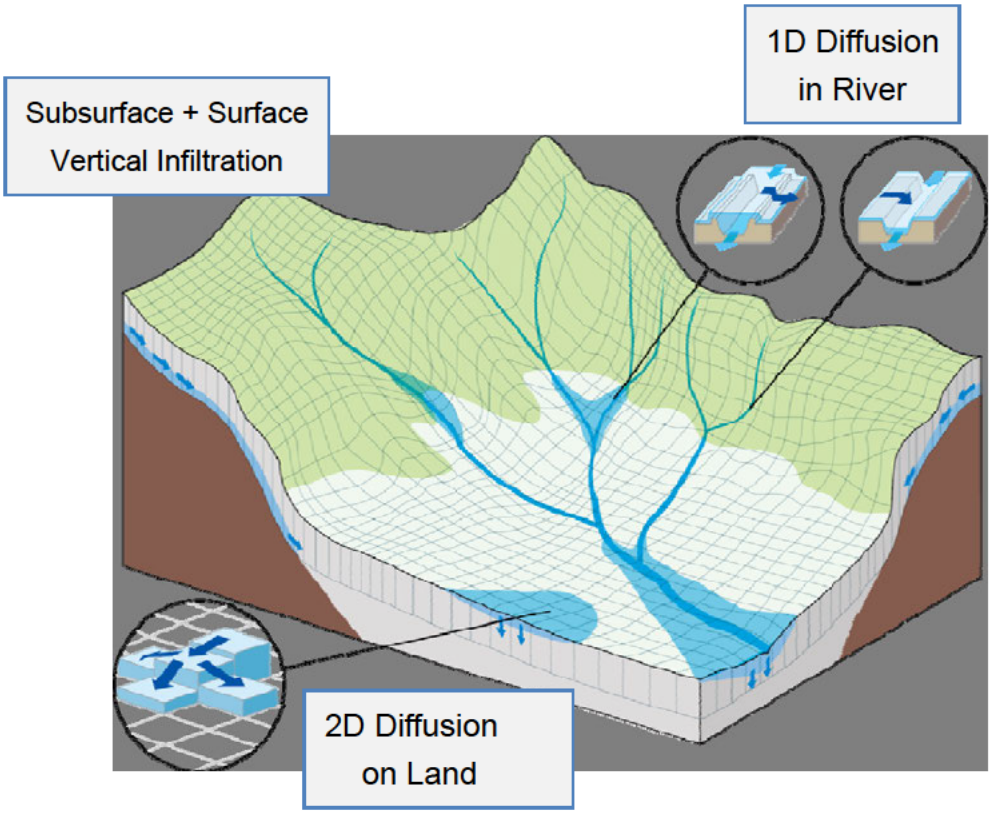


Figure 2-3 Schematic diagram of RRI Model

2.4 Contribution to MEXT research program (KAKUSHIN, SOSEI)

2.4.1 KAKUSHIN Program (FY2007 - 2011)

The Ministry of Education, Culture, Sports, Science, and Technology (MEXT) launched a five-year (FY2007 - 2011) initiative called the Innovative Program of Climate Change

Projection for the 21st Century (KAKUSHIN Program) in 2007. The program used the Earth Simulator (ES) to address emerging research challenges and was expected to contribute to the Fifth Assessment Report (AR5) to be published by the Intergovernmental Panel on Climate Change (IPCC).

ICHARM was a member institute of one of the three major projects, entitled the Extreme Event Projection, led by the Meteorological Research Institute (MRI). ICHARM's subject was the "assessment of the impact of climate change on flood disaster risk and its reduction measures over the globe and specific vulnerable areas."

ICAHRM developed the following products in the program.

1. Statistical bias correction method of daily precipitation simulated in climate models, such as MRI-AGCM (atmospheric GCM developed by MRI of JMA).
2. Scale-free hydrographical river basin dataset for hydrological simulation over small to large scale basins, which will be eventually made applicable over the entire globe with little scale effect regardless of grid-size selection.
3. Block-wise TOPMODEL (BTOP) as a hydrological model applicable to small to large basins on the globe using the scale-free hydrographical river basin dataset.
4. New flood risk evaluation method using geological and socio-economic datasets and knowledge in combination with extreme river discharge from BTOP simulation conducted based on present, near-future, and future climate simulation using MRI-AGCM.
5. The assessment of flood-induced agricultural and property damage under the present conditions and also under the future conditions based on climate change scenarios

2.4.2 SOUSEI program (FY2012 – 2016)

MEXT has launched the Program for Risk Information on Climate Change (SOUSEI program), which carries on the work of KAKUSHIN program. This project began in FY2012 and will continue for five years. The aim of this program is to generate information to evaluate the probability of the occurrence of the extreme climate changes and the risk of various scenarios, disasters, damage, etc., and to play a role in risk management.

The project's specific research is divided into five themes. ICHARM is a member institute of Theme D: Precise impact assessments on climate change. ICHARM's subject is the "Development of risk assessment and adaptation strategies for water-related disaster in Asia."

ICHARM is working on the quantitative projection of how flood and drought risks may change around the world, mainly in Asia, as global warming progresses in consideration with projection uncertainties. This will eventually lead to the development of a methodology for socio-economic impact assessment, which will include methods for the global- and basin-scale assessment of flood and drought hazards as well as for the assessment of social vulnerability to those hazards. Coupled with multiple scenarios of the fifth-generation CMIP and

GCM-based climate projections, the methods will make such assessments viable by improving previously-developed technologies for bias correction, global flood runoff analysis and inundation hazard analysis.

2.5 River discharge measurement

ICHARM is developing and disseminating a next-generation discharge measurement system that ensures highly reliable measurements while requiring less labor and cost. The system under development is unique in that automated measurement using fixed current meters such as non-contact current meters (radio current meters) is combined with an acoustic Doppler current profiler (ADCP) for accuracy control. Through observational experiments, the system has been proven applicable even to severe flow regimes, typically seen in Japanese steep rivers. We are further exploring methods to observe river bed fluctuations by use of this advanced automated system.

ADCP experience

2.6 Development of Water and Energy Transfer Processes (WEP) model

The Water and Energy Transfer Processes (WEP) model was originally developed as a basin-scale water cycle model. Responding to the recent need for the management of nutrient load and runoff in closed water bodies, ICHARM has been further improving the WEP model into a basin-scale water/material cycle model by adding the function of simulating the behavior of nitrogen and phosphorus in both dissolved and particulate forms.

2.7 Flood Risk Assessment

Risk assessment is generally conducted through a series of analyses on possible hazards, vulnerability to and countermeasures for the hazards. ICHARM carries out risk assessment, based on one of the most important institute principles: localism. We started the process with thorough local investigation in each target basin to understand its physical, social and economic conditions, while also using advanced hydrological and hydraulic modeling technology. We then assess the impact of socioeconomic risk on a basin and propose effective countermeasures to cope with such risk.

2.8 ICHARM Research & Development (R&D) Seminars

The ICHARM R&D Seminar is a series of seminars irregularly held to improve ICHARM's activities and update the expertise of its research staff. As many as 18 R&D seminars were organized from October 2010 to March 2014 as tabulated in the Table 2-1.

Table 2-1　List of ICHARM R&D Seminar

No.	Date	Lecturer	Position	Lecture Title
30	12-Nov-10	Prof. Shoji Fukuoka	Professor, Chuo University	Adaptation of River technology for climate change
31	25-Nov-10	Asso. Prof. Hiroshi Takebayashi	Associate Professor, Disaster Prevention Research Institute, Kyoto University	Application of bed deformation analysis on natural rivers
32	7-Feb-11	Asso. Prof. Frank van der Meulen	Associate Professor, UNESCO-IHE	Climate change and adaptation in Europe
33	13-Apr-11	Prof. Toshio Koike	Professor, University of Tokyo	Integrated Earth Observations and Predictions toward Flood and Water Use under the Climate Change
34	21-Jun-11	Dr. Rabindra Osti	Senior Researcher, ICHARM	Special lecture for ICHARM BEST PAPER AWARD
35	21-Sep-11	Prof. Djoko Legono	Gajah Mada University , Yogyakarta, Indonesia	THE TRUE COLLABORATIVE-BASED LAHAR FLOW MONITORING SYSTEM IN A CHAOTIC CONDITION
36	17-Oct-11	Asso. Prof. Pat Yeh	Special-appointed Associate, Institute of Insustrial Science, The University of Tokyo	Estimation of Evaporation and Terrestrial Water Storage Change over Global Large River Basins
37	13-Dec-11	Prof. Toshio Koike	Professor, University of Tokyo	GEOSS Water Cycle Integrator An Innovative Tool Contributing to Integrated Human Security and Green Growth
38	13-Dec-11	Prof. Takashi Asaeda	Professor, Department of Environmental Science, Saitama University	Ecological knowledge for natural disasters
39	28-May-12	Mr.Kenzo Hiroki	Principal, ICHARM	Water, Disasters, and Green Economy
40	11-Jun-12	1. Mr. Eisa Bozorgzadeh 2. Dr. Saied Yousefi	1. Deputy of technical and research affairs, 2. Sr. Technical Expert, IWPCO	1.Analytical Study of Drought Management: Remarks and Points 2. Forensic Management of Water Resources for Generating Hydropower in IWPCO
41	11-Sep-12	Mr. Imbe Masahiro	Executive, Association for Rainwater Storage and Infiltration Technology	Implementation of Well-balanced Hydrological System for the Development along the Tsukuba Express Line
42	26-Feb-13	Prof.Andras Szollosi-Nagy	Rector, UNESCO-IHE	How should a (flood) early warning system be developed in data poor nations?
43	27-May-13	Dr.Takahiro Sayama	Researcher, ICHARM	Rainfall-Runoff-Inundation of Large Scale Flooding：From Prediction to Process Understanding
44	12-Jun-13	Mr. Takezumi Ban	President, Association for World Peace Japan	Earthquake Disaster and Poverty Prevention – Work of Toyohiko Kagawa
45	18-Oct-13	Mr. Wouter T. Lincklaen Arriens	Leadership Coach and Advisor, UNESCO-IHE	Expectation for Japan for improvement in the water security in Asia
46	13-Dec-13	Mr. Hayato Nakamura	Project Formulation Advisor (DRM), JICA Philippine Office	Typhoon Yolanda: Gap between Philippine DRRM and Mega Disaster
47	16-Jan-14	Dr. Anthony Kiem	Hydroclimatologist/Senior Lecturer, Faculty of Science and IT, University of Newcastle	Understanding and Adapting to Hydroclimatic Variability and Change in the Asia-Pacific Region

3. Training -Capacity Development-

3.1 Overview

To cope with major water-related disasters like floods, it is important to empower not only individuals but also organizations involved in disaster management because there is a limit to what each individual can do.

Well aware of this, ICHARM provided many kinds of training programs that help improve both individual problem-solving capacity and organizational coping capacity in disaster management. After the courses, ICHARM has held follow-up activities such as seminars for ex-trainees, grasped their facing issues, and established new training courses. Most of these programs were intended for practitioners (i.e. for those with a certain level of field experience after college education) involved in river management and water resource development in developing countries. They are expected to disseminate the results of the training in their home countries.

In the duration from October 2010 to March 2014, ICHARM offered the following training program as shown in the table 3-1. The detailed number of the alumni is shown in the ANNEX 1.

Table 3-1 List of conducted training programs

Category	Course title	Duration	Num. of Participant	Collaboration
Ph.D. Program (3 years)	Disaster Management	2010.10-2013.9	1	GRIPS
		2011.10-2014.9	3 (2 were dropped out)	
		2012.10-2015.9	2	
		2013.10-2016.9	3	
M.Sc. Program (1 year)	Water-related Disaster Management Policy Program	2010.10-2011.9	12	JICA, GRIPS
		2011.10-2012.9	19	
		2012.10-2013.9	12	
		2013.10-2014.9	12	
Short Training Course/Workshop (several weeks)	Capacity Development for Integrated Flood Risk Management in Pakistan	2012.5	6	UNESCO
		2013.5	5	
	Capacity Development for Flood Risk Management with IFAS	2012.7-8,	13	JICA
		2012.12	7	
		2013.7-8	16	
	Local Emergency Operation Plan with Flood Hazard Map	2011,1-2	12	JICA, ADB
		2011.7-8	11	
	Capacity development for Adaptation to Climate Change in Asia	2011.2-3	7	JICA

3.2 Ph.D. Program

In October 2010, ICHARM and GRIPS jointly launched the Ph.D. program. This was the first and challenging attempt since PWRI establishment. 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. The program examines and selects candidates who have motivation and capabilities for doctoral level work, and are willing to take the lead for implementing water-related risk management learned at ICHARM after completion of this program. Until now, one Japanese student has graduated, and six students are in the program.

ICHARM/PWRI employed some Ph.D. students for ICHARM Research Assistant positions. This provides an excellent opportunity for them to learn and experience the practical work of ICHARM while they carry out their own research.

3.3 M.Sc. 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.

Graduation ceremony at GRIPS (Sep. 2013)

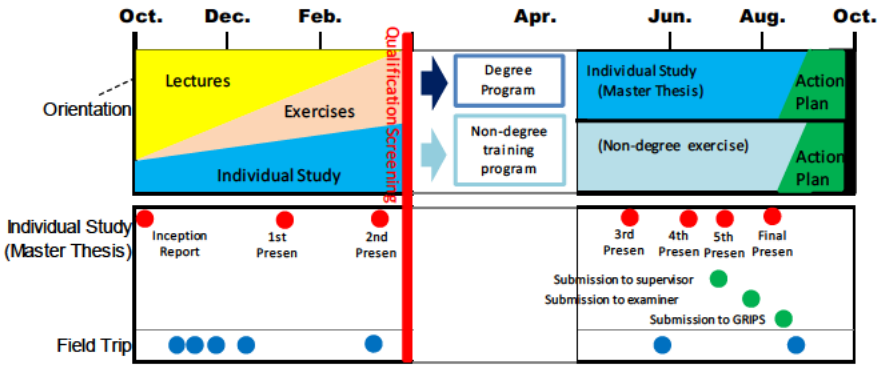


Figure 3-1 Outline of the annual schedule

From October 2010 to March 2014, ICHARM implemented four batches of the

program and 43 students in total have conferred a Master's degree. Training programs has been improved annually. Based on the results of the post-training evaluation by students, the 2012-2013 course was the most satisfying of all conducted in the past five years.

3.4 Short-term training/workshop program

Short-term training programs were mainly conducted jointly with JICA. Participants learnt knowledge and technologies relevant to water-related disaster risk management for a period of several weeks. ICHARM has made efforts to recognize the latest water-related problems in developing countries and improve course contents and teaching staff to meet the needs of trainees.

Site visit at a local city office

3.4.1 JICA training program "Local Emergency Operation Plan with Flood Hazard Map" (JFY2009- JFY 2011)

The ultimate goal of the program was to increase local flood resilience through the development of local emergency operation plans combined with flood hazard maps and flood forecasting and warning systems and thereby reduce flood damage in the project-target countries. To achieve the goal, the contents were arranged to give the trainees many opportunities to think about what was lacking in their countries to provide emergency information that promotes timely evacuation and also about what they could do to fill such gaps in local emergency operation plans.

Town watching exercise

3.4.2 JICA training program "Capacity Development for Adaptation to Climate Change" (JFY2010)

The purpose of the program was to strengthen the abilities of government officials in developing countries to evaluate the impacts of climate change on rivers and to design adaptation strategies to them.

Closing ceremony

Seven trainees participated in the training; one each from Bangladesh, Thailand, the Philippines, Viet Nam and three from Indonesia.

In the post-training evaluation, five out of the seven trainees listed training on IFAS, PCM

and Trend Analysis as the most useful of all subjects. Evaluation results like this have been reflected in other short-term training opportunities conducted after this.

3.4.3 JICA training program "Capacity Development for Flood Risk Management with IFAS" (JFY2012- JFY 2014)

The program was designed to enhance individual flood-coping capacities and eventually to contribute to flood damage mitigation in their countries. To create as great synergy as possible with JICA's current and future local flood projects, the following two conditions were considered:

- The target basins were those also selected for JICA local projects.
- The target participants were selected from three categories of responsible personnel (meteorologists, river administrators, disaster management officials for public evacuation) who are currently working at organizations involved in the JICA local projects.

Project Cycle Management (PCM) exercise

IFAS training

Questionnaire by the participants found the following activities particularly useful:

- Lecture on a river information system in Japan,
- Application practices of PCM,
- Application practices of IFAS,
- Application practices of Town Watching ,and
- Study trip to the Shinanogawa River basin

They are expected to share knowledge and experience they acquired in this training with others at their respective organizations through lectures and workshops.

3.4.4 Short-term workshop "Capacity Development for Integrated Flood Risk Management in Pakistan" (JFY 2012 and 2013)

The workshop was originally organized as part of a project, "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan," which was launched in response to the 2010 severe flood event in Pakistan. The project was funded by the Japanese government through UNESCO. In 2012 and 2013, ICHARM welcomed totally 11 participants of middle- to high-ranking officials of the Pakistani government.

Watarase retarding basin

The participants praised the workshop for its excellent contents and organization. They were particularly impressed with river management in Japan, including how steadily plans are put into action. They also commented that retarding basins like the one they saw at Watarase retarding basin should be effective for flood control in the Indus River basin.

3.5 Follow-up activity

Follow-up activities of ICHARM are intended to encourage ex-trainees 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.

For these reasons, ICHARM has conducted three follow-up seminars as shown in the Table 3-2.

Short course "Early warning system for flood disaster mitigation"

Seminar on Sediment Hydraulics and River Management

3.6 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 14 students and researchers used these opportunities between October 2010 and March 2014.

Table 3-2　List of conducted follow-up activities

Date	Follow-up activity	Venue
Nov. 6-7, 2010	Short course "Early warning system for flood disaster mitigation"	Hanoi, Viet Nam
Feb. 20-23, 2012	Follow-up discussion (on the occasion of The Southeast Asia Flood Risk Reduction Forum)	Bangkok, Thailand
Feb.13-14, 2013	Seminar on Sediment Hydraulics and River Management	Dhaka, Bangladesh

4. Information networking

4.1 Outline

ICHARM promotes many types of information networks to disseminate research results and strengthen partnership with relevant organizations. The following introduces main networking activities.

4.2 International Flood Initiative (IFI)

IFI is a framework to promote collaboration in flood management among international organizations such as UNESCO, WMO, UNU and UNISDR. IFI focuses on research, information networking, education and training, community empowerment, and technical assistance in various areas including integrated flood management. ICHARM has been serving as its secretariat.

4.3 5th International Conference on Flood Management (ICFM5)

ICHARM organized ICFM5 in Tokyo on 27-29 September 2011. More than 450 people from 41 countries participated. Under its main theme, "Floods: From Risk To Opportunity," the participants had productive discussions on five topic areas including flood risk management. The conference finally adopted the ICFM5 declaration crafted based on the discussion results of each topic-area (http://www.ifi-home.info/icfm-icharm/icfm5.html). Selected papers presented at the conference have been published in the Red Book No.357, Journal of Disaster Research 7 (5), and a special issue of the Journal of Flood Risk Management (December 2012) .

Plenary Session

Special Session

4.4 Asia-Pacific Knowledge hub

In June 2008, the Asia-Pacific Water Forum (APWF) officially acknowledged ICHARM as a Knowledge Hub with particular focus on disaster risk reduction and flood management. As a Knowledge Hub, ICHARM is expected to promote local application of high value-added know-how and research results in order to realize water security in the Asia-Pacific region under the framework of the APWF.

4.5 Typhoon committee

The Typhoon Committee 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 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. Mr. Minoru Kamoto, chief researcher of ICHARM, took a role of the chairperson of the hydrology working group.

ICHARM implemented a project of the Flood Disaster Preparedness Indices (FDPI), which can measure the capacity of disaster preparedness by communities, and reported in 2012.

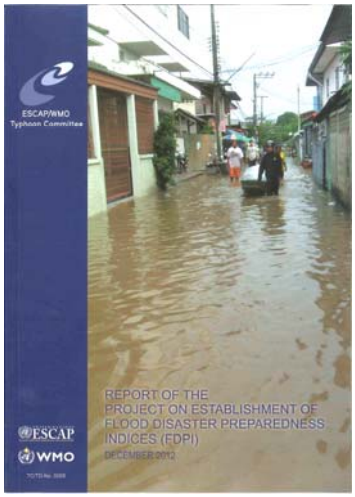


Figure 4-1 Report of the Project on Establishment of FDPI (December 2012)

4.6 Contribution to UNSGAB

United Nations Secretary-Generals' Advisory Board on Water & Sanitation (UNSGAB)

The United Nations Secretary General's Advisory Board on Water and Sanitation (UNSGAB) is an independent body established in March 2004 by United Nations Secretary-General, Mr. Kofi Annan, to give him advice as well as to galvanize action on water and sanitation issues.

Mr. Kenzo Hiroki, ICHARM principal and a member of the UNSGAB, has contributed to the activities jointly with MLIT. As a part of the activities, on March 6, 2013, ICHARM supported a special high-level session on water and disasters, convened by the UN Secretary-General H.E. Mr. Ban Ki-moon. This event marked the first high-level UN thematic event discussing issues at the nexus of water and disasters.

"Special high-level session on water and disasters" (March, 2013)

4.7 Agreement with organizations

Since its establishment, ICHARM has signed a research partnership agreement with 13 overseas institutes (Table 4-1) to make collaborative efforts to address water issues around

the world.

In 2013, to include droughts and other water issues in cold regions, it concluded such an agreement with research institutes in Iran and Russia.

Table 4-1 List of ICHARM partners

1	Korea	Korea Disaster Prevention Association(KDPA)
2	U.S.A.	Bureau of Reclamation of the Department of the Interior of the United States of America
3	Netherlands	UNESCO-IHE Institute for Water Education(UNESCO-IHE)
4	Iran	Regional Centre on Urban Water Management(RCUWM-TEHRAN)
5	Philippines	Flood Control and Sabo Engineering Center (FCSEC)
6	Japan	Yamanashi University
7	CHINA	International Research and Training Center on Erosion and Sedimentation (IRTCES)
8	Brazil	HydroEx
9	Indonesia	Tsunami & Disaster Mitigation Research Center (TDMRC)
10	Japan	Kyoto University
11	Lao PDR	Mekong River Commission (MRC)
12	Iran	The Iran water and power resources development company(IWPC), Ministry of Energy, Tehran, I.R.IRAN
13	Russia	State Hydrological Institute (SHI)

4.8 Overseas business trip

To promote international activities described above and local practices explained below, ICHARM has sent roughly 440 staff members in total to overseas countries since October

2010 (Fig. 4-2). Particularly, overseas business trips dramatically increased due to the launch of the UNESCO Pakistan Project in 2011 (see 5-3 for more information). Participation in field studies, conferences and committees held abroad has been also on the rise as local projects progress further and ICHARM increases its presence worldwide.

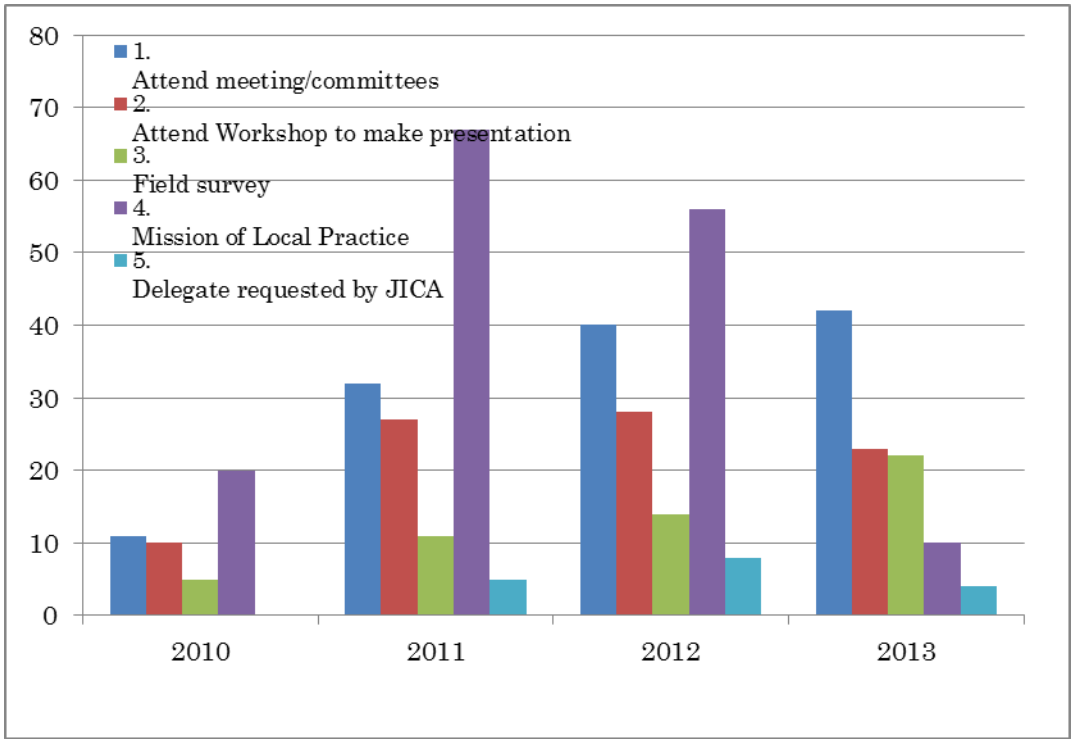


Figure 4-2　Trend of Overseas business trip

5. Local Practices -Localism-

5.1 Outline

ICHARM has participated in local projects organized by ADB and UNESCO and implemented activities in cooperation with local administrative and research organizations in order to test applicability of several models developed by ICHARM to local basins. Those projects have been successfully implemented despite difficulties in arrangement with local offices and problems in the actual implementation process. The following describes the outline of each project.

5.2 ADB Project: Technical Assistance No. 7276, Supporting Investments for Water-Related Disaster Management

Signing a collaborative agreement with ADB in November 2009, ICHARM conducted a project, "Regional Technical Assistance (RETA) 7276: Supporting Investment in Water-Related Disaster Management (TA7276)," which ended in March 2013. This project was planned to build an environment to encourage investment in disaster management in developing countries. In the 1st Asia-Pacific Water Forum in 2007, ICHARM was the lead organization of the water disaster session and assigned as a Knowledge Hub on disaster risk reduction and flood management. ICHARM's involvement in this project was part of the responsibilities as a Knowledge Hub. This was the first international project that the Public Works Research Institute (PWRI) had ever conducted under a collaborative agreement, and it was a major challenge for ICHARM to broaden its scope of activity as an international organization.

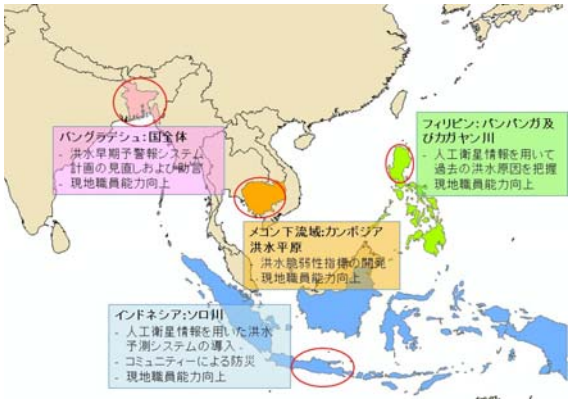
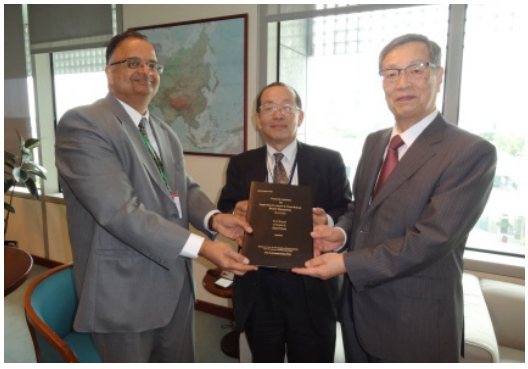


Figure 5-1 Target Project



Final Report to ADB
On 12th March, 2013

In this project, ICHARM first conducted field investigations to collect a wide variety of local data on past inundations, observation systems, livelihood on hinterland, urbanization in basins before flood prediction and flood risk assessment. Complying with our principal policy of localism, we proposed solutions that were considered best suited to target localities based on the needs and conditions confirmed from the field investigations.

ICHARM was involved in the following five projects:

1. Bangladesh: Development of a basic plan for a new flood forecasting and warning

system

2. Indonesia: Implementation of a satellite-based flood forecasting system in the Solo River
3. Cambodia: Development of a flood vulnerability assessment method for the Mekong flood plain
4. Philippines: Implementation of flood management training using a satellite-based runoff model in the Pampanga and Cagayan rivers.
5. Development of the prototype of flood risk assessment indices for the Asian region

Projects 1 to 4 are efforts to contribute to national flood risk reduction while Project 5 contributes to regional flood risk reduction. The results of TA7276 are very promising, for the technologies and concepts produced for the projects can be applied to other river basins with some technological customization based on local basin characteristics.

In March 2013, Taketo Uomoto, the chief executive of PWRI, and Kuniyoshi Takeuchi, the director of ICHARM, visited Seethapathy Chander, the director general of the ADB Regional and Sustainable Development Department to report the results of the TA7276 project. Mr. Chander expressed deep gratitude and highly praised ICHARM for its achievements and hoped for its involvement in future projects as well. Convinced that the strong trust built between ICHARM and the counterpart countries through this technical assistance is indispensible, we will continue our commitment to water-related disaster risk reduction in the Asia-Pacific region, maximizing our strong technological advantage and adequate experience in disaster risk reduction and flood management as a Knowledge Hub.

5.3 UNESCO-Pakistan project

In late July 2010, the monsoon brought a record rainfall over northern Pakistan and caused the worst flood in the past 80 years. The flood had serious damage on the area, affecting 20.3 million people in total, killing 1,985 and damaging or destroying 19 million houses (Pakistan 2010 Annual report, National Disaster Management Authority).

Training in August 2013 with three ICHARM M.Sc. Alumni

As a part of the restoration effort from this flood disaster, UNESCO started a project called “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan” in July 2011. This comprehensive project consisted of three components, and ICHARM has been assigned to two of these components: technical assistance and capacity development. In the first component, ICHARM assists Pakistani government in the development and implementation of “Indus-IFAS” and the production of flood hazard maps. Indus-IFAS is specifically designed to fit the conditions and needs of the Indus River basin by

combining IFAS and the RRI model. In the other component, ICHARM has provided the opportunity to participate in its M.Sc. program and short-term training programs for government administrators such as the Pakistan Meteorological Department, the Pakistan Space and Upper Atmosphere Research Commission and other agencies.

5.4 Thai Flood simulation

From July to November in 2011, a large-scale flood occurred in the Chao Phraya River basin of Thailand, causing tremendous damage to livelihood, businesses, and farming of local people. In mid-October, ICHARM started flood simulation with the Rainfall-Runoff-Inundation (RRI) model as part of emergency response in order to understand the prospective development of the flood in the basin. With the RRI model, it is possible to predict the progress of a flood, holistically considering the effects of discharge and inundation. In the case of simulation during emergency response, topographical information and estimated rainfall supplied by satellites are often used for simulation, because real-time local information is hardly available during a disaster. The Thai flood was simulated for the extent and duration of inundation by using estimated rainfall as input data. Part of the results were released to the public in a press conference held jointly with MLIT, and also provided to governmental agencies and media organizations, which drew a lot of media and public attention to ICHARM and the new technology.

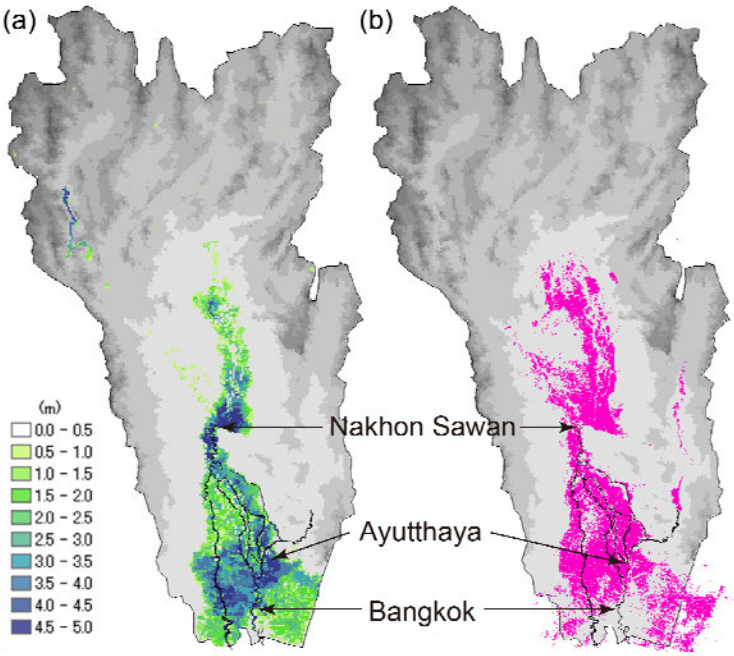


Figure 5-2 Inundation extent in the Chao Phraya River basin estimated (a) by the emergency response-type simulation and (b) by satellite remote sensing (provided by UNOSAT) for 2011 Thailand Flooding as of October 13, 2011

In response to this huge flood, JICA decided to provide assistance for the Thai government through the "Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin." ICHARM supported this effort by offering technical advice as a member of the advisory committee formed within Japan for this project.

6. Public Relationship

6.1 Website

As a means of public relations, ICHARM disseminates up-to-date information through its website at http://www.icharm.pwri.go.jp/index.html. In recent years, our website has been accessed 5,000 to 6,000 times monthly.

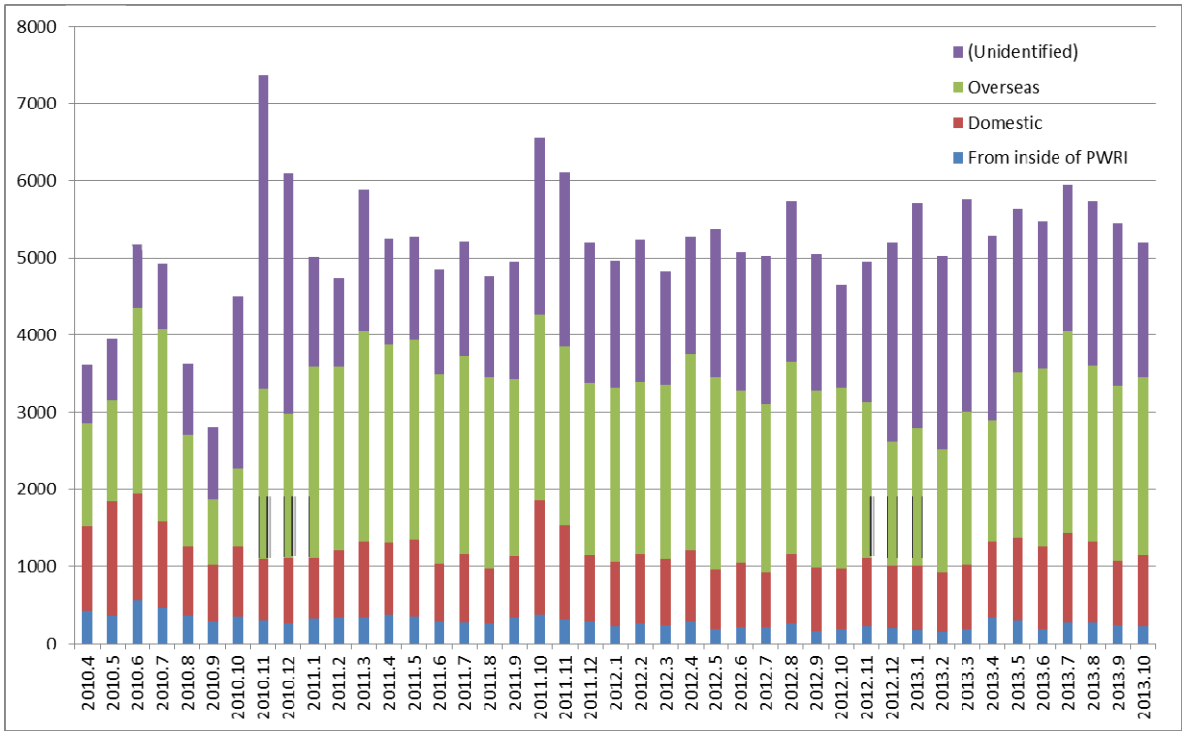


Figure 6-1 Trend of Access number of ICHARM web site

6.2 ICHARM Newsletter

ICHARM regularly publishes ICHARM newsletters on quarterly basis, to registered subscribers, and through other channels. ICHARM newsletters contain a variety of news and other articles such as message from Director, special topics, report of international meetings and seminars, visitors to ICHARM, ongoing research, training activities, and projects, etc.

Since the ICHARM establishment a total of 31 volumes of newsletters have been issued and of which 14 newsletters were published during the reporting period.

ICHARM Newsletter is available at http://www.icharm.pwri.go.jp/publication/index.html.

Newsletter

Volume 8 No. 4
Issue No. 31

January 2014

ICHARM

International Centre for Water Hazard and Risk Management
under the auspices of UNESCO

Contents

Message from Director

ICHARM has started the year 2014 with a refreshed enthusiasm under a renewed agreement between UNESCO and the government of Japan signed last July. The new agreement requires us to establish the Governing Board, which was the Advisory Board in the previous agreement. We expect that the Governing Board of top international executives will examine ICHARM's activity plan to ensure proactive implementation. We are making our best effort to prepare for the first board meeting, scheduled on February 25.

Near the turn of the year, we had another devastating disaster, when storm surges by Typhoon Haiyan (locally called Yolanda) hit Leyte Island of the Philippines on November 8. It was reportedly the strongest typhoon ever recorded among the landed. Many houses and towns were completely swept out, and more than 6,000 people were killed. It was only 7 years ago when Leyte experienced a giant landslide, which occurred after weeks of heavy rains and killed more than ten thousand people. Meanwhile, in Japan, people in Oshima Island were still at a loss after a deadly debris flow, unable to make any plans yet for recovery. Right after the turn of the year, we also saw many pictures of floods in Southwest England and Wales. Indeed, extreme hydro-met phenomena have been increasing.

Wallingford, England
photo by John Rodda 2014.1.11

Under such circumstances, the role of ICHARM is growing. One of the reasons is that it assumes the responsibility of the most critical part of disaster prevention; that is, as Chinese philosopher Sun Tzu says, "If you know the enemy and know yourself, you need no fear even against a hundred battles." In disaster prevention, to know the enemy is to know the characteristics of the hazards and their forecasts, and to know yourself is to assess exposure and vulnerability of human activities, coping capacities and institutional arrangements.

ICHARM, together with foreign students, is concentrating on acquisition and production of such knowledge on hazards and society in combination with capacity development programs, and apply the research results to local practices by helping practitioners of national and regional governments. Based on such substantive experiences, ICHARM also takes part in international efforts of policy and strategy making.

We hope ICHARM receives even further cooperation and support from the world to continue activities under the renewed agreement.

31 January 2014
Kuniyoshi Takeuchi
Director of ICHARM

East Samar, Leyte Island
photo by Mamoru Miyamoto 2013.12.13

ユネスコのカテゴリー2センターに関わるルールの見直しに伴い、昨年7月、ユネスコ・日本政府間の協定も改定されました。したがって2014年は、ICHARMにとって新協定下での新年になります。センター員一同、気持ちも新たに活動を開始しました。新協定では、従来の諮問委員会に代り、運営理事会にICHARMの運営を審査頂くことになります。理事会には内外関係機関のトップを迎え、大所高所からの審査とご指導を期待しています。第一回理事会は2月25日に開催の予定で、それに向けた準備を進めています。

昨年末には、また悲惨な災害が起きました。11月8日にレイテ島を中心に襲ったサイクロン・ハイヤン(台風30号)による高潮で、多くの町が壊滅し6000人以上の方々が亡くなりました。上陸した台風としては観測史上最大規模だったと報じられています。レイテ島ではわずか7年前、巨大地すべりで1000人以上の方が亡くなったところです。日本ではこれに先立つ台風26号で、大島の土石流災害により50人近くの方が亡くなり、避難された方々の帰還の計画も立たない時期でした。新年早々にはイギリスから、暮れからの雨で各地で洪水が発生したニュースが届けられています。気象の極端事象は進化の一途をたどっています。

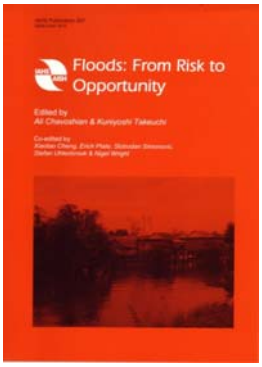
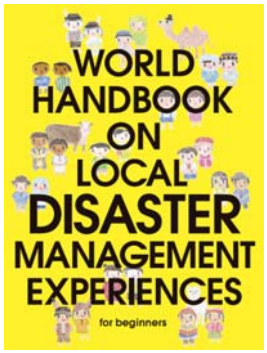
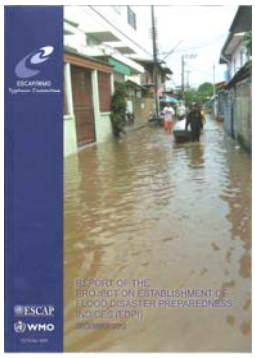
そんな中でICHARMへの期待はますます高まっています。水防災という戦いの中で最も重要な、「敵を知り己を知れば百戦危うからず」と言うところを分担しているからです。敵を知るのはハザードの特性研究、予報であり、己を知るのは人間活動の暴露と脆弱性の評価です。対策や社会の仕組みの評価も含まれます。これら敵と己を知る技術の研究を、能力開発プログラムを一体に、留学生と一緒に研究し、その成果を現地の実務者を通じて実践に移しています。その上で、リスク削減の国際政策や体制作りにも参加しています。

新しい協定の下でのICHARMの発展に、一層のご支援をお願いします。

6.3 Publication

ICHARM has published the following books and leaflets related to water disasters.

Table 6-1 List of Publication

IAHS Red Book "Floods: From Risk to Opportunity"	HANDBOOK on Local Disaster	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI)	Large-scale Floods Report
			
IAHS Publication No. 357 (2013), ISBN 978-1-907161-35-3, 480 pages	Leaflet, 2013, 38 Pages	Typhoon Committee, Leaflet, 2012 26 Pages	Book, 2011, 232 Pages
Dr. Ali Chavoshian, Dr. Kuniyoshi Takeuchi, Mr. Minoru Kamoto	Dr. Megumi Sugimoto	Mr. Tadashi Nakasu, Mr. Toshio Okadumi, Mr. Yoshikazu Shimizu	Dr. Ali Chavoshian, Dr. Kuniyoshi Takeuchi

6.4 Paper list

ICHARM members have 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 table 6-2. The list of these activities are shown in the Annex 2.

Table 6-2　List of Papers

	2013	2012	2011	2010
Book	1	1	1	1
Journal	12	4	8	4
Paper	12	8	6	10
Abstract or Conference	10	18	45	27
Articles or Others	4	7	14	9
PWRI Technical Note/PWRI research report	2	4	2	3
Total	**41**	**42**	**76**	**54**

7. Award

ICHARM researchers have been awarded several times since 2010 in recognition of their excellent work.

Awardee	Award	(reason)
Dr. Kamimera	Award from the Ministry of Natural Resources and Environment (MONRE) of Vietnam, 2013	Contribution to the development of hydrometeorology in Viet Nam
Dr. Sayama	15th Infrastructure Technology Development Award, July 5, 2013	Development of the Rainfall-Runoff-Inundation (RRI) model
Mr. Tatebe, Dr. Sayama, Dr. Tanaka	Best Research Exchange Award in 2013 SAT, Jan, 22, 2013	Flood simulation for emergency response in the case study of the 2011 Thai flood
Dr. Sayama	Young Scientists' Prize by the Minister of Education, Culture, Sports, Science and Technology , Apr, 2013	Development of the Rainfall-Runoff-Inundation (RRI) model
Dr. Takeuchi	International Hydrology Prize, Oct. 23, 2012	Outstanding contribution to hydrology internationally

8. External Evaluation

ICHARM has been evaluated for its achievements by external organizations such as the PWRI External Committee and the MLIT Evaluation Committee for independent administrative agencies. ICHARM has also evaluated recently by UNESCO for the renewal of the agreement between the Japanese government and UNESCO. Table 8-1 lists the evaluations and their results.

The MLIT Evaluation Committee awarded PWRI with three or five S's for its activities in the past three years, and one of the S's was always given to ICHARM in the three consecutive years, showing that the committee recognizes its high-quality international contributions.

Table 8-1 List of external evaluation

Month Year	Evaluator	Evaluation Result
Aug. 2013	MLIT 2012 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 3 out of 15 evaluation items. **ICHARM contributed to one of the three**. (i.e., training and educational programs, the International Hydrology Award received by ICHARM director, etc.)
Sep. 2012	MLIT 2011 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 3 out of 15 evaluation items. **ICHARM contributed to one of the three**. (i.e., training and educational programs, contribution to flood control measures in the Chao Phraya River of Thailand, etc.)
Sep. 2011	MLIT 2010 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 5 out of 23 evaluation items. **ICHARM contributed to one of the five**. (i.e., training and educational programs, launch of the doctoral program, implementation of ADB projects, etc.)
Jan. 2011	UNESCO Evaluation Team	ICHARM was evaluated as **the most active** among the UNESCO water centers around the world.
Aug. 2010	Audit Report on the Division of Water Sciences of the UNESCO Natural Science Sector (UNESCO external auditors) [185 EX/32 Part II – page 14]	"…One characteristic of the field of water sciences is that there are 13 category 2 institutes or centres. **One of the most active is ICHARM,** which serves as the secretariat for the International Flood Initiative (IFI)."… http://unesdoc.unesco.org/images/0018/001888/188888e.pdf

ANNEX

Number of Alumni of ICHARM training program (as of February, 2014)

Ph.D. Program "Disaster Management"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
2010-												1																			1
2011-							1											1	1												3
2012-	1								1																						2
2013-	2								1																						3
Total	**3**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**

M.Sc. Program "Water-related Disaster Management Course of Disaster Management Policy Program"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total	(Number of students conferred Master's degree)
2007-2008	2			3						1		3						1													10	10
2008-2009	2			2			1				1							1									2				9	7
2009-2010	2			1			1				3	1					1					1			2		1				13	12
2010-2011	2			2	1				1		1						1	3			1										12	12
2011-2012	2			2				1			2							2			6	1			1			1		1	19	19
2012-2013	2				1										2		1	1		1			1	1	1				1		12	12
2013-2014	2			1		1							1				1				1	2			2				1		12	
Total	**14**	**0**	**0**	**11**	**2**	**1**	**2**	**1**	**1**	**1**	**7**	**4**	**1**	**0**	**2**	**0**	**4**	**8**	**0**	**1**	**8**	**4**	**1**	**1**	**6**	**0**	**3**	**1**	**2**	**1**	**87**	**72**

JICA training program "Flood Hazard Mapping"

2004			2	2							2			3	2							2					2			1	16
2005			2	2							2			2	2							3					1			2	16
2006			2	2							2			2	2							2					2			2	16
2007			2	2							3			2	3							2			1		3			2	20
2008			1	2							0			2	2							1					1			1	10
Total			**9**	**10**							**9**			**11**	**11**							**10**			**1**		**9**			**8**	**78**

JICA training program "Local Emergency Operation Plan with Flood Hazard Map"

2009	1	1								2			1			1				1				1	1	1				10
2010	1	2								2			1			1	1			1				1	1	1				12
2011	1	2								2			2			1				1				1	1					11
Total	**3**	**5**								**6**			**4**			**3**	**1**			**3**				**3**	**3**	**2**				**33**

JICA training program "Capacity Development for Flood Risk Management with IFAS"

2012	3												3							2		2					3				13
2013	3												3							2		3					2			3	16
Total	**6**												**6**							**4**		**5**					**5**			**3**	**29**

JICA training program "Capacity Development for Flood Risk Management with IFAS (B)"

2012																													**7**	**7**

JICA training program "Capacity Development for Adaptation to Climate Change"

2010	**1**										**3**										**1**					**1**			**1**	**7**

UN/ISDR Training course "Comprehensive Tsunami Disaster Prevention"

2008										**2**	**4**					**2**								**3**					**11**

UNESCO Pakistan Project workshop

2012																					6									6
2013																					5									5
Total																					**11**									**11**

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
Total	**27**	**5**	**9**	**21**	**2**	**1**	**3**	**1**	**3**	**3**	**29**	**5**	**7**	**15**	**13**	**2**	**7**	**10**	**1**	**5**	**22**	**20**	**1**	**1**	**13**	**3**	**20**	**1**	**2**	**20**	**272**

ICHARM Publication List FY2010

	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Forms of community participation in disaster risk management practices		Rabindra Osti	Katsuhito Miyake				Forms of community participation in disaster risk management practices	NOVA Science Publisher			
2	Journal	Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		Rabindra Osti	Tara Nidhi BHATTARAI	Katsuhito Miyake			Natural Hazards	Springer	Vol 58, Issue 3	1209	1223
3		Flood-Related Disaster Vulnerability: an impending crisis of megacities in Asia		Yoganath Adikari	Rabindra Osti	Tomoyuki Noro			Journal of Flood Risk Management	Wily Interscience	Vol.3, Issue 3	185	191
4		Field Assessment of Tam Pokhari Glacial Lake Outburst Flood in Khumbu Reguon, Nepal		Rabindra Osti	Shinji Egashira	Katsuhito Miyake	Tara Nidhi BHATTARAI		Journal of Disaster Research	Fuji Technology Press Ltd	Vol.5, No. 3	264	273
5		環境社会学における自然災害研究の視角ー開発・環境・災害の因果サイクルモデルの視点からー	A Research Perspective on Natural Disasters and Environmental Sociology: Viewpoints on the Cause and Effect Cycle Model of Development-Environment-Disaster	中須正 Tadashi Nakasu					環境社会学研究 Journal of Environmental Sociology	有斐閣 Yuhikaku Publishing Co., LTD.	16	65	78
6	Paper	Development of a statistical bias correction method for daily precipitation data of GCM20		Hironori Inomata	Kuniyoshi Takeuchi	Kazuhiko Fukami			土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	247	252
7		Applicability of GSMaP correction Method to Typohoon "Morakot" in Taiwan		小澤剛 Go Ozawa	猪股広典 Hironori Inomata	白石 良樹 Yoshiki Shiraishi	深見和彦 Kazuhiko Fukami		土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	445	450
8		降雨流出氾濫モデルによるサイクロンナルギス高潮氾濫シミュレーション Storm Surge Inundation Simulation of Cyclon Nargis with a Rainfall-Runoff-Inundation Mode		佐山敬洋 Takahiro Sayama	Nay Myo Lin	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka	竹内邦良 Kuniyoshi Takeushi	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	529	534
9		実河川における掃流砂量の計測手法に関するー提案 PROPOSAL OF BEDLOAD-DISCHARGE OBSERVATION IN ACTUAL RIVERS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1171	1176
10		河川モニタリング動画を用いた非接触型流量計測法の精度検証と準リアルタイム計測システムの構築 MEASUREMENT ACCURACY OF NON-CONTACT DISCHARGE MEASUREMENT METHOD USING RIVER MONITORING MOVIE AND DEVELOPMENT OF QUASI REAL TIME MEASUREMENT SYSTEM		藤田一郎 Ichiro Fujita	原浩気 Hiroki Hara	萬矢敦啓 Atsuiro Yorozuya			土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1177	1182
11		ADCPを用いた洪水流観測の計測精度評価に関する総合的検討 DISCUSSION OF ACCURACY EVALUATION METHODS OF TOWING FLOOD FLOW OBSERVATION DATA MEASURED BY ADCP		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1183	1188
12		非接触型電波式流速計を用いた洪水流量自動観測手法の一考察 A STUDY OF AN AUTOMATIC WATER DISCHARGE MEASUREMENT SYSTEM USING A NON-CONTACT CURRENT METER		萬矢敦啓 Atsuiro Yorozuya	大平一典 Kazunori Odaira	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	53	58
13		高速流におけるADCP観測のための橋上操作艇に関する提案 PROPOSAL OF TETHERED ADCP PLATFORM FOR HIGH-SPEED FLOW MEASUREMNTS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	59	64
14		A Global Outlook of Sediment-Related Disasters in the Context of Water-Related Disasters		Yoganath Adikari	Tomoyuki Noro				International Journal of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol3, No1	110	116
15		Development of automatic water discharge measurement system		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira		Environmental Hydraulics	Christodoulou & Stamou (eds) @ 2010 Taylor & Francis Group		839	844

16	Abstract	GSMaP補正手法の適用性に関する研究―マイクロ波放射計による観測頻度がGSMaP補正手法の精度に与える影響―	Applicability of a GSMaP correction method — Effect of frequency of microwave-radiometer observation on accuracy of a GSMaP correction method —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
17		流域貯水量の推定に基づく流域分類 Catchment classification based on storage estimations at the catchment scale		佐山敬洋 Takahiro Sayama	Jeff McDonnell				日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
18		衛星リモートセンシングによる土砂災害監視の可能性について Applicability for urgent monitoring of sediment-related disaster by the satellite remotesensing		清水孝一 Yoshikazu Shimizu	林真一郎 Shinichiro Hayashi	小山内信智 Nobutomo Osanai	西真佐人 Masato Nishi		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		36	37
19		多時期衛星画像解析及び数値計算による2004年スラウェシ島パワカラエン山で発生した巨大崩壊の土塊の侵食過程	Analysis of the erosion process of the soil mass from a 2004 large-scale landslide at Mt. Bawakaraeng in Sulawesi Island by using multi-temporal satellite images and numerical calculation	清水武志 Takeshi Shimizu	山越隆雄 Takao Yamakoshi	田村圭司 Keiji Tamura	清水孝一 Yoshikazu Shimizu		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		448	449
20		ALOS(だいち)による崩壊地の抽出手法について	Extraction of landslide areas by using ALOS	吉川和男 Kazuo Yoshikawa	小山内信智 Nobutomo Osanai	清水孝一 Yoshikazu Shimizu			平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		490	491
21		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering			
22		局地的豪雨早期予測・探知のための高速降雨予測モデルの検討	Development of a fast rainfall-prediction model for early forecasting and detection of localized downpour	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		569	570
23		GPS基盤整備の乏しい地域におけるADCP観測の一考察	Proposal of ADCP observation in areas lacking GPS infrastructure	菅野裕也 Yuya Kanno	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		41	42
24		死者ゼロに向けた「早期避難」についての一考察	Study on early evacuation for zero causalities	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		101	102
25		人工衛星観測雨量でみた2010年メコン川渇水の検討	Analysis of the 2010 Mekong drought based on satellite rainfall data	川上貴宏 Takahiro Kawakami	鍋坂誠志 Seishi Nabesaka	小澤剛 Go Ozawa	深見和彦 Kazuhiko Fukami	竹内邦良 Kuniyoshi Takeushi	第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		105	106
26		Application of Artificial Neural Networks and Wavelet Analysis in Prediction of Water Level in Nan River of Thailand		Somchit AMNATSAN	Daisuke Kuribayashi	A. W. JAYAWARDENA			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
27		マイクロ波放射計による観測頻度がGSMaP補正値の誤差に与える影響 ―国内河川流域での事例解析―	Effect of frequency of microwave-radiometer observation on errors of GSMaP corrected values — Case analysis of rivers in Japan —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		16	17
28		Flood Characteristics Analysis of Ganges-Brahmaputra-Meghna River system inside Bangladesh		Partha Pratim Saha	Shigenobu Tanaka	Mamoru Miyamoto			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		18	19
29		広域降雨流出浸水予測モデルの開発 Development of a Rainfall-Runoff-Inundation Model		佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami	田中茂信	竹内邦良 Kuniyoshi Takeushi		水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		20	21
30		GIS 及びALOS 衛星観測データによる氾濫域の流量算定 The estimation of overflow volume using GIS and ALOS Image Data: A Case study in Indus River Basin, Pakistan		郭 栄珠 Youngjoo Kwak	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			第49回(平成22年度秋季) 日本リモートセンシング学会 学術講演会 Presentation at the 49th conference of Remote Sensing Society of Japan	日本リモートセンシング学会 Remote Sensing Society of Japan		93	94
31		Bed-load discharge measurement by ADCP in actual rivers		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		River Flow 2010	Dittrich, Koll, Aberle & Geisenhainer (eds) – © 2010 Bundesanstalt für Wasserbau		1687	1692
32		Experimental application of flood forecasting system (IFAS) using satellite-based rainfall		Tomonobu Sugiura	Takahiro Kawakami	Go Ozawa	Jun Magome	Kazuhiko Fukami	9th International Conference on Hydroinformatics, Beijing, Chin				

33		Rainfall-Runoff-Inundation Analysis for Flood Risk Asessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi]		5th Conference of Asia Pacific Association of Hydrology and Water Resources (APHW)	APHW		568	576
34		Comparison of MRI-AGCM precipitation output with ground observation and propose of a simple statistical bias correction method		Hironori Inomata	Kuniyoshi Takeuchi]	Kazuhiko Fukami			3rd International Workshop on Global Change Projection: Modeling, Intercomparison, and Impact Assessment				
35		Bedload discharge measurement in developing counties		Atsuhiro Yorozuya	Shoji Okada	Yuya Kanno	Kazuhiko Fukami		4th International Perspective on Current & Future State of Water Resources & the Environment				
36		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	Proceedings of the Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering			
37		Rainfall-Runoff-Inundation Analysis for Flood Risk Assessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi		Proceedings of Symposium on Robust and Resilient Society against Natural Hazards & Environmental Disasters and the Third AUN/Seed-Net Regional Conference on Geo-Disaster Mitigation			24	26
38		Recent Flood Disasters in Asia: the case of Typhoon Ketsana		Yoganath Adikari	Yoshiyuki Imamura	Katsuhito Miyake			Proceedings of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
39		Coastal Vegetation Characteristics for Tsunami Disaster Mitigation at Southern Coast of Java Indonesia		Dinar Istiyanto	Shigenobu Tanaka	Daisuke Kuribayashi	Katsuhito Miyake		Proceeding of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
40		Storage excess: A new conceptual framework for subsurface water collection, storage and discharge at the watershed scale		Takahiro Sayama	Jeff McDonnell	Kate Sullivan			American Geophysical Union, Fall Meeting 2010	American Geophysical Union			
41		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Kwak Youngjoo	Hasegawa Akira	Inomata Hironori	Kazuhiko Fukami		Geophysical Research Absract	EGU			
42		Integrated Flood Analysis Sytem (IFAS) as an efficiency tool to implement floof forecasting/warning sytem		Kazuhiko Fukami	Tomonori SUGIURA	Go Ozawa	Takahiro KAWAKAMI		CGCM COE UNITEN-Technical Report	Universiti Tenaga Nasional (UNITEN), Malaysia	7		
43	Article. Others	2009 Typhoon Ondoy and Pepeng Disasters in the Philippines		Tadashi Nakasu	Teruko Sato	Takashi Inokuchi	Shinya Shimokawa	Akiko Watanabe	防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	9	16
44		Landslide Disaster around Baguio City caused by Typhoon Pepeng in 2009		Takashi INOKUCHI	Tadashi NAKASU	Teruko Sato			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	35	42
45		2009 Typhoon Ondoy Flood Disasters in Metro Manila		Teruko Sato	Tadashi NAKASU				防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	64	74
46		Representations over a Tropical Storm Disaster and the Restoration of Everyday Lives for Urban Poor Victims in the Philippines：The Case of Typhoon Ondoy		Akiko Watanabe	Tadashi NAKASU	Takaashi Inokuchi			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	81	86
47		The Exacerbation of Human Suffering and Disaster Response Caused by Tropical Storm Ondoy and Typhoon Pepeng Disasters: Cases of NCR and Baguio City		Tadashi Nakasu					防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	97	104
48		河川実務者の観点から見たADCPによる流量観測技術開発の論点 Key points for developing water discharge measurement techniques using ADCP from field engineers' perspective		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources		46	55
49		Study on applicability of ALOS data for flood inundation simulation		Kazuhiko Fukami	Shigenobu Tanaka	Inomata Hironori	Hideo YAMASHITA		ALOS PI Report	Japan Aerospace Exploration Agency (JAXA)	PI NO.397	1	9

50		ラグナ湖の洪水貯留量を利用した低落差発電 Laguna Lake Low-Head Power Generation by using Flood Discharge Detention Volume		加本実 Minoru Kamoto					都市計画 Urban planning	(公社)日本都市計画学会 City Planning Institute of Japan	Vol 59, No.6	53	56
51		衛星リモートセンシング技術の土砂災害への応用	Satellite remote sensing technologies applied to sediment disaster countermeasures	水野正樹 Masaki Mizuno	林真一郎 Shinichiro Hayashi	清水孝一 Yoshikazu Shimizu	小山内信智 Nobutomo Osanai		土木技術資料 Civil Engineering Journal	土木研究センター Public Works Research Center	Vol53, No1	20	23
52	PWRI Publication	Planning and Design of Tsunami-mitigative Coastal Vegetation Belts		Shigenobu Tanaka	Dinar Istiyanto	Daisuke Kuribayashi			PWRI Technical Note	Public Works Research Institute	4177		
53		2009-2010 修士課程「防災政策プログラム水災害リスクマネジメントコース」実施報告書	Project report on the 2009-2010 Water-related Disaster Management Course of Disaster Management Policy Program	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4182		
54		Report on 2009-2010 Master's Program, "Water-related Disaster Management Course of Disaster Management Policy Program		Daisuke Kuribayashi	Kei Kudo	Shigenobu Tanaka			PWRI Technical Note	Public Works Research Institute	4190		

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	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Large-scale Flood Report		Ali Chavoshian					ICHARM Book Series	ICHARM		1	207
2	Journal	Lessons learned from statistical comparison of flood impact factors among southern and eastern Asian countries		R. Osti	S. Hishinuma	K. Miyake	H. Inomata		Journal of Flood Risk Management	WileyInterscience	Vol.4, Issue 3	203	215
3		Development of reservoir control optimization simulator by integrating a distributed-rainfall-runoff-model and dynamic programming		Takahiro Sayama	Yasuto Tachikawa	Hiroki Kanno	Kaoru Takara		Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol. 29	33	45
4		How much water can a watershed store?		Takahiro Sayama	Jeffrey J. McDonnell	Amod Dhakal	Kate Sulivan		Hydrological Processes	John Wiley & Sons, Ltd	Vol. 25, Issue 25	3899	3908
5		Prediction and assessment of multiple glacial lake outburst floods scenario in Pho Chu River Basin, Bhutan		R. Osti	Shinji Egashira	Adikari Yoganath			Hydrological Processes	John Wiley & Sons, Ltd	Vol. 27, Issue 2	262	274
6		Rainfall-runoff-inundation analysis of the 2010 Pakistan flood in the Kabul River Basin		Takahiro Sayama	Go Ozawa	Takahiro Kawakami	Seishi Nabesaka	Kazuhiko Fukami	Hydrological Science Journal	IAHS	Vol. 57, Issue 2	298	312
7		Driftwood deposition from debris flows at slit-check dams and fans		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Natural Hazards	Springer	Vol. 61, Issue 2	577	602
8		Assessment of flood hazard, vulnerability and risk of mid-eastern Dhaka using DEM and 1D hydrodynamic model		Muhammad Masood	Kuniyoshi Takeuchi				Natural Hazards	Springer	Vol. 61, Issue 2	757	770
9		Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		R. Osti	Tara Nidhi Bhattarai	Katsuhito Miyake			Natural Hazards	Springer	Vol. 58, Issue 3	1209	1223
10	Paper	X-band MPレーダーとC-bandレーダーを併用した 降雨推定手法の開発 QPE BY COMBINED USE OF X-BAND MP RADAR AND CONVENTIONAL C-BAND RADAR FOR SEAMLESS RAINFALL DISTRIBUTION		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vo. 68, No.4	349	354
11		インダス川全流域を対象とした2010年パキスタン洪水の降雨流出氾濫解析 RAINFALL-RUNOFF-INUNDATION ANALYSIS OF PAKISTAN FLOOD 2010 FOR THE ENTIRE INDUS RIVER BASIN		佐山敬洋 Takahiro Sayama	藤岡 奨 Susumu Fujioka	牛山朋來 Tomoki Ushiyama	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol.68, No.4,	493	498
12		X-band MPレーダー情報を用いたC-bandレーダー降水強度の改善手法の開発 A method to improve C-band radar rainfall by utilizing X-band MP radar information		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	Japan Society of Civil Engineering	17	11	16
13		外部コンパスを併用したADCP観測に関する提案 PROPOSAL OF ADCP MEASUREMENT USING A EXTERNAL COMPASS		菅野裕也 Yuya Kanno	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda	井上拓也 Takuya Inoue	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	Japan Society of Civil Engineering	17	35	40
14		気候変動による世界の水需給変化と社会的影響予測 Predicted World Water Supply and Demand Changes and Social Effects Attributable to Climate Change		三石真也 Shinya Mitsuishi	唐澤仁士 Hitoshi Karasawa	新井勝明 Katsuaki Arai			水文・水資源学会誌 Journal of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources	VOL.25 NO.2	103	112
15		Analysis of Hydrodynamic Characteristics of Potential Outburst Floods from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		Nepal Engineers' Association Japan Center (NEA-JC) Newsletter	Nepal Engineers' Association Japan Center (NEA-JC)	Vol. 5, No. 1	10	14

16	Abstract	GCMの極端および月降水量の同時バイアス補正手法の全球陸域への適用 An application of a statistical bias correction to express both seasonal pattern and extremes to GCM precipitation on the land surface of the globe		長谷川聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	43	43
17		2010 年7 月5 日に発生した板橋豪雨の数値シミュレーション Numerical simulation of severe rainfall in Itabashi on 5 July 2010		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	67	67
18		MRI-AGCM3.1Sおよび3.2Sにおける気候変動に伴う日降水量の変化と統計的バイアス補正 Daily Precipitation change in MRI-AGCM simulations associated with climate change and a statistical bias correction aimed to reproduce both seasonal pattern and extreme values		長谷川　聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami		極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		8	8
19		全球における気候変動に伴う洪水リスクの影響評価 Global-scale Assessment of Flood Disaster Risk under Climate Change		郭栄珠 Youngjoo Kwak	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		27	27
20		特定脆弱地域における気候変化に伴う洪水変化の影響評価 Evaluation of the Impact caused by Flood Situation Change along with Climate Change in Specific Vulnerable Areas		竹内邦良 Kuniyoshi Takeuchi	三宅且仁 Katsuhito Miyake	中須正 Tadashi Nakasu			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		28	28
21		超高解像度大気モデルMRI-AGCM3.1SならびにCMIP3 AOGCMsによる渇水の将来変化予測 Future Global Drought Changes Projected by MRI-AGCM3.1S and CMIP3 AOGCMs		菱沼志朗 Shiro Hishinuma	竹内邦良 Kuniyoshi Takeuchi	佐山敬洋 Takahiro Sayama			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		29	29
22		山地流域における雨水貯留と流出機構に関する研究 Watershed storages and runoff processes in mountainous river basins		Takahiro Sayama	Jeffrey J. McDonnell				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
23		Global-scale Assessment of Flood Disaster Risk under Climate Change		Youngjoo KWAK	Fukami Kazuhiko	Kuniyoshi Takeuchi			水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		92	93
24		Global Drought Changes Projection by MRI-AGCM3.1S and Other AOGCMs		Shiro Hishinuma	Kuniyoshi Takeuchi				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		94	95
25		Identifying Physical Components to Compose Flood Vulnerability Index Considering Micro-Topographical Effect		Shigenobu Tanaka	Katsuhito Miyake	Youngjoo Kwak	Shigenobu Hibino		水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		168	169
26		Development of Early Warning System based on IFAS		Seishi NABESAKA	Takahiro KAWAKAMI	Mamoru MIYAMOTO	Kazuhiko FUKAMI	Katsuhito MIYAKE	水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		234	235
27		インダス川全流域を対象とした2次元降雨流出氾濫解析 Rainfall-Runoff-Inundation Analysis in the Indus River Basin		佐山敬洋 Takahiro Sayama	鍋坂誠志	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	171	171
28		WRF による再現雨量を用いたパキスタン・カブール川洪水シミュレーション Streamflow simulation for Kabul River basin flood, Pakistan, by using forecast rainfall by WRF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	179	179
29		津波災害からの復興過程と地域社会：三陸沿岸部の高地移転	Restoration from the tsunami disaster and local communities: Relocation to higher ground in Sanriku coastal areas	中須正 Tadashi Nakasu	田中茂信 Shigenobu Tanaka	三宅且仁 Katsuhito Miyake			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	IV	67	68
30		On Tsunami Elevation Variation in Narrow Bays During the East Japan Great Tsunami Disaster 3.11 Event		Dinar Istiyanto	Shigenobu Tanaka	Yoshikazu Shimizu	Katsuhito Miyake		JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		103	106
31		Assessment of Future Changes in Precipitation and Discharge in Motagua River Basin Using High Resolution Climate Model		Rodrigo Fernandez	Shigenobu Tanaka				JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		111	114
32		A Comparative Study on Disaster Recovery Process : Disaster Recovery Begins before the Disaster		Tadashi Nakasu	Kuniyoshi Takeuchi				5th International Conference on Flood Management (ICFM5)	ICFM5		23	23

33	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	5th International Conference on Flood Management (ICFM5)	ICFM5		117	117
34	Proposal of water discharge measureemnt with ADCP in mountainous area and accuracy evaluation methods		Shoji Okada	Atsuhiro Yorozuya	Takashi Kitsuda	Kazuhiko Fukami		5th International Conference on Flood Management (ICFM5)	ICFM5		147	147
35	FLOOD FORECASTING AND RIVER FLOW MODELING IN MOUNTAINOUS BASIN WITH SIGNIFICANT CONTRIBUTION OF SNOWMELT RUNOFF		Amin Nazari	Nasiri Saleh	Ali Chavoshian			5th International Conference on Flood Management (ICFM5)	ICFM5		151	151
36	NUMERICAL PREDICTION OF FLOOD RAINFALL IN PAKISTAN		Tomoki Ushiyama	Takahiro Sayama	Yuya Tatebe	Susumu Fujioka	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		155	155
37	Automatic water discharge measurement for mountainous areas		Atsuhiro Yorozuya	Kazuhiko Fukami	Kazunori Odaira			5th International Conference on Flood Management (ICFM5)	ICFM5		157	157
38	Large Scale Rainfall-Runoff-Inundation Analysis in the Indus River Basin		Takahiro Sayama	Susumu Fujioka	Tomoki Ushiyama	Yuya Tatebe	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		160	160
39	Nation-wide Flood Risk Assessment Using Inundation Level Model and MODIS Time-series Images		Youngjoo KWAK	Jonggeol Park	Fukami Kazuhiko			IEEE-IGARSS 2011	IEEE		4395	4398
40	A New Assessment Methodology for Flood Risk: A Case Study in the Indus River Basin Risk in Water Resources Management		Youngjoo KWAK	Hasegawa Akira	Inomata Hironori	Jun Magome	Fukami Kazuhiko	Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	55	60
41	Determination of Inundation Area Based on Flood Hazard for a Global Water Risk Assessment		Jonggeol Park	Kwak Youngjoo				Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	61	64
42	人工衛星情報の土砂災害への活用について Sediment-related Disaster through Satellite Observation		Yoshikazu SHIMIZU					GIS-Landslide Workshop 3	GIS-Landslid研究会		8	8
43	Assessment of Debris Flow and Flood Inundation Hazards from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	The IHP Symposium on Extreme Events "Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future"	Regional Steering Committee for Southeast Asia and the Pacific UNESCO IHP		1	12
44	Hydrodynamic Characteristics of Potential Outburst Flood from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	30th Annual Meeting of the Japan Society for Natural Disaster Science	Japan Society for Natural Disaster Science		89	90
45	Towards Better Mitigation of Tsunami Disaster in Indonesia		Dinar C. Istiyanto	Shigenobu Tanaka	Toshio OKAZUMI			International Symposium on Engineering Lessons Learned from the Giant Earthquake	JAEE		556	567
46	Meta and Longitudinal Analyses of High Death Rates of Some Particular Municipalities in GEJET		Tadashi NAKASU	Kuniyoshi Takeuchi	Shigenobu Tanaka	Ken Yoneyama	Naoki Fujiwara	Integrated Research on Disaster Risk (IRDR) Conference 2011	IRDR		15	15
47	Development of rainfall observation with C-band radar combining with X-band MP radar		Tomoki Ushiyama	Atsuhiro YOROZUYA	Yuya KANNO	Kazuhiko FUKAMI		International Symposium on Weather Radar and Hydrology (WRaH 2011)	Weather Radar and Hydrology (WRaH) Scientific Committee			
48	2010年7月5日に板橋区で発生した局地的豪雨の数値実験 Numerical simulation of severe rainfall in Itabashi on 5 July 2010		Tomoki Ushiyama					第13回非静力学モデルワークショップ The 13th nonhydrostatic model workshop	社団法人　日本気象学会 Meteorological Society of Japan			
49	QPE by combined use of X-band MP radar and conventional C-band radar for seamless rainfall distribution		Tomoki Ushiyama					X-band Weather Radar Workshop	Delft University of Technology			

50		Challenge for sustainable water management		A.W.Jayawardena					International Symposium on Advances in Civil and Environmental Engineering Practices for Sustainable Development (ACEPS-2012)	Faculty of Engineering, University of Ruhuna, Galle, Sri Lanka			
51		Development and Application of Flood Disaster Preparedness Indices		Tadashi NAKASU					Working Group of Hydrology of 44rd Annual Meeting of Typhoon Committee	44rd Annual Meeting of Typhoon Committee			
52		Identification of Tsunami Wave Energy Damping Process by Coastal Vegetation Belt at Laboratory Scale Model Experiment		Dinar C. ISTIYANTO	Karuniadi S. UTOMO	Shigenobu TANAKA	Katsuhito MIYAKE		International Sessions in Conference o n Coastal Engineering	Japan Society of Civil Engineering	Vol. 2		
53		Aftermath of the 3/11 tsunami in Tohoku Region of Japan		A.W.Jayawardena					6th International Conference on Asian and Pacific Coasts	University of Hong Kong			
54		Suggestion for an Advanced Early Warning System Based on Flood Forecasting in Bengawan Solo River Basin, Indonesia		Mamoru MIYAMOTO	Ai SUGIURA	Toshio OKAZUMI	Shigenobu TANAKA	Kazuhiko FUKAMI	10th International Conference on Hydroinformatics				
55		Pollution Loading Modeling of Nutrient Salts and Application to Small-scale Semi-urbanized Basin		Mamoru MIYAMOTO	Hemantha RAJAPAKSE	Kazuhiko FUKAMI			5th international perspective on water resource & the environment	ASCE	34		
56		Analysis of potential outburst flood from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa				7th NESAJ Knowledge Transfer Symposium	Nepalese Students' Association in Japan (NESAJ)			
57		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Youngjoo KWAK	Akira HASEGAWA	Hironori INOMATA	Kazuhiko FUKAM		European Geosciences Union General Assembly 2011 (EGU2011)	EGU	vol. 13		
58		A Critical Cause Analysis of Human Loss Exacerbation Caused by the 2011 GEJET Disaster – The Case of Rikuzentakata City in Iwate Prefecture		Tadashi NAKASU					2012 Advanced Institute on Forensic Investigations of Disasters				
59		Internationalization of SABO- Importance, Concept, Evolution and Internalization		Adikari Yoganath					International Sabo Forum 2011				
60		Flood Management: a lesson to be learned from Arakawa river, Japan		Narayan P. Gautam					Revo Science	Revo Science Media			
61	Article, others	伊勢湾台風災害と災害対策基本法の成立:その意味と教訓(Typhoon Isewan Disaster and Disaster Countermeasures Basic Act: Their Meaning and Lessons)		Tadashi NAKASU	三宅且仁 Katsuhito Miyake	清水孝一 Yoshikazu Shimizu			水利科学 (Water Science)	社団法人 日本治山治水協会 Japan Society of forest conservation and flood control	Vol. 55	100	119
62		降雨予測を活用したダム洪水調節におけるリスク管理に関する研究 Research on Risk Management of Dam Flood Control by Utilizing Rainfall Prediction		三石真也 Shinya Mitsuishi	角 哲也 Tetsuya Sumi	尾関敏久 Toshihisa Ozeki	矢神卓也 Takuya Yagami		ダム工学 Journal of Japan Society of Dam Engineers	ダム工学会 Japan Society of Dam Engineers	Vol.21 No.4	242	250
63		貯水池の連携運用等による効率的な発電の実施に向けて	Implementation of effective power generation through integrated reservoir operation	三石真也 Shinya Mitsuishi	豊田忠宏 Tadahiro Toyoda	猪股広典 Hironori Inomata			ダム技術 Engineering for Dams	ダム技術センター Japan Dam Engineering Cecter	No.301	34	42
64		Lower Mekong Basin -Existing environment and development needs-		加本実 Minoru Kamoto	M. Juntopas				Human and Natural Environment for the Mekong River	TERRAPUB, Tokyo		25	42
65		Dynamics of hydrometeorological and environmental hazards, Environmental Hazards		A. W. Jayawardena					The Fluid Dynamics and Geophysics of Extreme Events, Lecture notes series, Institute for Mathematical Sciences	National University of Singapore	Vol. 21	229	267
66		Dynamics of Hydro-Meteorological and Environmental Hazards		A. W. Jayawardena					Asia Pacific Mathematics Newsletter	World Scientific Publishing	Volume 1 No 4	32	36

67		Chapter 8: Adaptation Measures for Climate Change in Japan		Toshio OKAZUMI	Eiji Otsuki				Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		125	129
68		Chapter 13: Integrated Flood Analysys System: An Efficient Tool to Imolement Flood Forecasting and Warning Systems		Kazuhiko Fukami	Tomonobu Sugiura	Go Ozawa	Jun Magome	Takahiro Kawakami	Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		178	195
69		日本におけるADCPを用いた高水流量観測手法 Method of water discharge measurement during flood using Acoustic Doppler Current Profiler in Japan		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	深見和彦 Kazuhiko Fukami		河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	34	41
70		日本におけるADCPを用いた流量観測データの品質管理手法の考察 QUALITY-ASSURANCE PLAN FOR DISCHARGE MEASUREMENTS USING ADCP IN JAPANESE RIVERS		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	28	33
71		洪水時の流量観測手法における新しい動向	A new trend in discharge observation during flooding	深見和彦 Kazuhiko Fukami					地質と調査 Geology and Survey	(一社)全国地質調査業協会連合会 Japan Geotechnical Consultants Association	No.131	22	28
72		復興理論と東日本大震災	復興理論と東日本大震災	中須正 Tadashi Nakasu					雑誌河川 Monthly magazine "Rivers"	(公社)日本河川協会 Japan River Association	Vol. 68, No.1	94	99
73		大規模水災害の減災に向けて －低頻度大規模水災害への対応－	Countermeasures for infrequent large-scale flood	田中茂信 Shigenobu Tanaka					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		28	31
74		洪水流量観測手法における新しい潮流	A new trend for flood river flow discharge measurement techniques	深見和彦 Kazuhiko Fukami					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		14	17
75	PWRI Publication	Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		ICHARM					PWRI Technical Note	Public Works Research Institute	4215		
76		2010-2011 修士課程「防災政策プログラム水災害リスクマネジメントコース」実施報告書	Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"	ICHARM					土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4209		

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	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			ESCAP/WMO Typhoon Committee	ESCAP/WMO Typhoon Committee		1	26
2	Journal	Future Changes in Low Precipitation Patterns Projected by the Super-high-resolution MRIAGCM3.1S and CMIP3 AOGCMs		Shiro HISHINUMA	Kuniyoshi TAKEUCHI				Hydrological processes	Wiley	Vol. 27, Issue 23	3319	3331
3		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lake		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Volume 10, Issue 3	299	313
4		Glacila and sediment hazards in the Rolwaling valley, Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		International Journal of Erosion Control Engineering	Japan Society of Erosion Control Engineering	Vol.5, No.2	123	133
5		Changes in Flood Risk under Global Warming Estimated Using MIROC5 and the Discharge Probability Index		Atsushi Okazaki	Pat YEH	Kei Yoshimura	Masahiro Watanabe	Masahide Kimoto	Journal of the Meteorological Society of Japan	Meteorological Society of Japan	Vol. 90, No. 4	509	524
6	Paper	Effect of density of gauges on accuracy of merged GSMAP: case study of typhoon Morakot		Go OZAWA	Hironori INOMATA	Kazuhiko FUKAMI			IAHS Publication	International Association of Hydrological Sciences	357	350	356
7		A New Approach to Flood Risk Assessment in Asia-Pacific Region Based on MRI-AGCM Outputs		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Hydrological Research Letters	Japan Society of Hydrology and Water Resources	6	70	75
8		Climate change impact study on FLOOD Risk in lower West Rapti River basin using MRI-AGCM outputs		Edangodage Duminda Pradeep PERERA	Akiko HIROE	Kazuhiko FUKAMI	Toshiya UENOYAMA	Shigenobu TANAKA	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol. 69, No.4	451	456
9		Development of flood vulnerability indices for Lower Mekong Basin in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol.69, No.5	1	6
10		ALOS(だいち)合成開口レーダーを用いた崩壊地抽出手法と適用性 Applicability of methods for detecting landslides by using synthetic aperture radar of ALOS(Daichi)		林真一郎 Shin-ichiro Hayashi	水野正樹 Masaki Mizuno	小山内 信智 Nobutomo Osanai	西真佐人 Masato Nishi	清水孝一 Yoshikazu Shimizu	砂防学会誌 Journal of Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol. 65, No.4	3	14
11		タイにおける洪水災害に対する地域防災力評価指標の開発：ウボンラーチャタニー及びハートヤイの事例を中心に (Development of Flood Disaster Preparedness Indices (FDPI) in Thailand :Focus on the Cases of Ubon Rachathani and Hat Yai)		中須正 Tadashi Nakasu	岡積敏雄 Toshio Okazumi	清水孝一 Yoshikazu Shimizu			年報 タイ研究 The Journal of Thai Studies	日本タイ学会(The Japanese Society of Thai Studies)	12	65	81
12		記憶と解放、記憶と伝承ーインドネシア・アチェの津波経験を踏まえてー Memory and Release, Memory and Lore through tsunami disaster experience in Aceh, Indonesia		杉本めぐみ Megumi Sugimoto					情報知識学会誌 Journal of Japan Society of Information and Knowledge	情報知識学会 Japan Society of Information and Knowledge	Vol. 22, No.4	355	364
13		The Multiple Contributions of Dams and Reservoirs after the 2011 Great East Japan Earthquake		Toshio Okazumi	NAKANE, Tatsuto	KAMADAI, Takeshi	FUKUWATARI, Takashi		International Symposium on DAMS FOR A CHANGING WORLD	Organizing Committee, ICOLD 2012 Kyoto, JAPAN COMISSION ON LARGE DAMS		2-87	2-92

14	Abstract	LETKFを用いた2010年7月5日豪雨の再現実験 Forecast experiment of severe rainfall in 5 July 2010 by using LETKF		牛山朋來 Tomoki Ushiyama	深見和彦 Kazuhiko Fukami				日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	314	314
15		2010年パキスタン洪水をもたらした豪雨のダウンスケール再現実験 Forecasting experiment for severe rainfall causing Pakistan flood in 2010.		牛山朋來 Tomoki Ushiyama	Atif Rana Muhammad	佐山 敬洋 Takahiro Sayama	建部 祐哉 Yuya Tatebe	藤岡 奨 Susumu Fujioka	日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	379	379
16		OTT ParsivelとJoss-Waldvogelディスドロメータの雨滴粒径分布検証 Evaluation of raindrop size distribution observed by OTT Parsivel and Joss-Waldvogel disdrometer		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	450	450
17		統計的バイアス補正されたMRI-AGCM3.2Hの降水量の気候変化 A Statistical Bias-Corrected Precipitation Change of MRI-AGCM3.2H due to Climate Change		長谷川聡 Akira Hasegawa	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	548	548
18		Prediction of potential outburst floods from Tsho Rolpa Glacial Lake of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Toshio Okazumi	Kenji Kawaike	Yasuyuki Baba	第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-031	61	62
19		MODIS時系列データによる広域の洪水氾濫域抽出： タイ国チャオプラヤ川流域2011洪水の事例 Detection of large flood inundation area using MODIS time series: A Case study of 2011 flood in Chao Praya River basin		郭 栄珠 Youngjoo Kwak	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-049	97	98
20		東北地方太平洋沖地震津波による過去の津波記念碑の被害と災害教訓の伝承	Tsunami damage to monuments of past tsunamis during the 2011 off the Pacific coast of Tohoku earthquake and lessons from the disaster to learn and to pass on to future generations	杉本めぐみ Megumi Sugimoto	岡積敏雄 Toshio Okazumi				第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS10-019	37	38
21		ネパール西ラプティ川において気候変動が洪水流出量に与える影響の検討	Study on the effect of climate change on flood discharge of the West Rapti River in Nepal	廣江亜紀子 Akiko Hiroe	深見和彦 Kazuhiko Fukami	上野山智也 Toshiya Uenoyama	長谷川聡 Akira Hasegawa		第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		139	139
22		海外における広域土砂災害危険度推定の試み －衛星観測降雨情報を用いて－	Application of wide-area landslide prediction to overseas cases - Using satellite rainfall information -	清水孝一 Yoshikazu Shimizu	Badri Shrestha	岡積敏雄 Toshio Okazumi	小山内　信智 Nobutomo Osanai	石塚忠範 Tadanori Ishizuka	日本災害情報学会　第14回研究発表大会 The 14th meeting of Japan Society for Disaster Information Studies	日本災害情報学会 Japan Society for Disaster Information Studies	14	320	323
23		デジタル地形情報の洪水氾濫解析への利用～ICHARMにおける取り組み～	Applications of digital topographical information to flood and inundation analysis - researches at ICHARM -	深見和彦 Kazuhiko Fukami					平成24年度特別講演およびシンポジウム予稿集 Proceedings of the 2012 meeting of Japan Society of Engineering Geology	一般社団法人　日本応用地質学会 Japan Society of Engineering Geology		38	46
24		衛星観測雨量を用いた土砂災害の危険度推定に関する研究 Study on prediction of landslides through the satellite rainfall data		清水孝一 Yoshikazu Shimizu					第4 回GIS-Landslide and Natural Hazard 研究集会 The 4th meeting of the GIS-Landslide and Natural Hazard study group	GIS-Landslide 研究会 GIS-Landslide study group			
25		衛星観測雨量を用いた海外における土砂災害の危険度評価に関する可能性	Applicability of landslide prediction using satellite rainfall data to overseas cases	清水孝一 Yoshikazu Shimizu					2012東京大学空間情報科学研究センター全国共同利用研究発表会 The 2012 national meeting on joint usage and research	東京大学空間情報科学研究センター Center for Spatial Information Science, the University of Tokyo		8	8
26		Early warning and early evacuation from tsunamis, floods, volcano and other hazards		Megumi Sugimoto	Toshio Okazumi				American Geophysical Union 2012 Fall meeting	American Geophysical Union			
27		SUGGESTION FOR AN ADVANCED EARLY WARNING SYSTEM BASED ON FLOOD FORECASTING IN BENGAWAN SOLO RIVER BASIN, INDONESIA		Mamoru Miyamoto	Ai Sugiura	Toshio Okazumi	Shigenobu Tanaka	Seishi Nabesaka	Proceedings of 10th International Conference on Hydroinformatics	IWA IAHR	10	-	-
28		Estimation of flood volume in Chao Phraya river basin, Thailand from MODIS images coupled with flood Inundation level		Kwak Youngjoo	Jonggeol Park	Atsuhiro Yorozuya	K. Fukami		the 32nd annual IGARSS symposium 2012	IEEE Geoscience and Remote Sensing Society		887	890

29		Assessment of Flood Risk and Future Change due to Climate Change in Asia-Pacific Region Based on MRI-GCM Model		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Geophysical Research Absract	EGU General Assembly	14	-	-
30		Application of a Distributed Hydrological Model in the Karun River Basin, Iran		Shiro HISHINUMA					IAHS PUB symposium 2012	IAHS			
31		A study of ground-based, satellite-estimated and radar rainfall relationships at downstream of Shinano River, Japan		Narayan P. Gautam					4th TRMM and GPM International Science Conference	JAXA and NASA			
32	Article, others	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Floods: from Risk to Opportunity	IAHS Red book Series, IAHS	Vol.57	241	252
33		巨大津波後のアウターライズでの地震から露呈した津波防災の課題とまだ隠れている課題	Issues on tsunami disaster management exposed by outerrise earthquakes after the mega tsunamis and other hidden issues	杉本めぐみ Megumi Sugimoto					巨大津波災害に関する合同研究集会 Joint meeting on mega tsunami disasters				
34		生きる防災　アチェの誓い―津波被害のインドネシアで調査・教育に奔走―	Practical disaster management: Promise of Aceh – Strong commitment to research and education in tsunami-ridden Indonesia –	杉本めぐみ Megumi Sugimoto					日本経済新聞2012年12月25日 Nihon Keizai Shimbun (Dec. 25, 2012) *a Japanese newspaper	日本経済新聞 Nihon Keizai Shimbun Inc.		32	
35		水文・水理現象に関する調査 Investigation on Hydrology and Hydraulics		深見和彦 Kazuhiko Fukami	吉谷純一 Junichi Yoshitani				雑誌河川2012年9月号 Monthly magazine "Rivers" (Sep. 2012)	(公社)日本河川協会 Japan River Association	No.794	16	19
36		総合洪水解析システム(IFAS)による水文データ不足流域における洪水予測	Flood forecasting in poorly-gauged river basin using Integrated Flood Analysis System (IFAS)	深見和彦 Kazuhiko Fukami					2012年度(第48回)水工学に関する夏期研修会講義集 Proceedings of the 2012 summer meeting on hydraulic engineering	土木学会水工学委員会・海岸工学委員会 Coastal engineering committee of hydraulic committee, JSCE	48	A-2-1	A-2-19
37		災害調査と東日本大震災	Disaster Research and Great East Japan Earthquake and Tsunami Disaster	中須正 Tadashi Nakasu					社会と調査 Society and Survey	有斐閣 Yuhikaku Publishing Co., LTD.	12	64	69
38		工業団地の設立と新しいリスクマネジメント:2011年タイ、チャオプラヤ川洪水における連鎖的経済被害と地域社会	Development of industrial parks and new risk management: Chain reaction of economic damage during the 2011 Chao Phraya flood in Thailand and local communities	中須正 Tadashi Nakasu	Munetaka Kurahara				都市社会研究 Research on urban society	せたがや自治政策研究所 Setagaya center for policy studies	5	159	168
39	PWRI Publication	2011-2012修士課程「防災政策プログラム「水災害リスクマネジメントコース」実施報告書 Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		栗林大輔 Daisuke Kuribayashi					土木研究所資料第4245号 PWRI Technical Note No. 4245	土木研究所 Public Works Research Institute	4245		
40		洪水災害準備体制指標の開発 Development of Flood Disaster Preparedness Indices (FDPI)		中須正 Tadashi Nakasu	Toshio Okazumi	Yoshikazu Shimizu			土木研究所資料第4246号 PWRI Technical Note No. 4246	土木研究所 Public Works Research Institute	4246		
41		Development of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			Technical note of PWRI No.4247	Public Works Research Institute	4247		
42		Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi					Technical note of PWRI No.4251	Public Works Research Institute	4251		

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	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	IAHS Red Book on "Floods: From Risk to Opportunity"		Ali Chavoshian	Kuniyoshi TAKEUCHI					IAHS	357		
2	Journal	Method for evaluating flood disaster reduction measures in alluvial plains		K. Taki	T. Matsuda	E. Ukai	T. Nishijima	S. Egashira	Journal of Flood Risk Management	Wiley	Vol.6	210	218
3		Reply to comment by Henriette I. Jager and Ryan McManamay on "Cumulative biophysical impact of small and large hydropower development in Nu River, China"		Kelly Kibler	Desiree Tullos				Water Resources Research	Wiley	49		
4		International comparison of measures taken for vulnerable people in disaster risk management laws		Karina Vink	Kuniyoshi TAKEUCHI				International Journal of Disaster Risk Reduction	Elsevier	4	63	70
5		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lak		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Vol.10	299	313
6		Approach to estimate the flood damage in Sukhothai Province using flood simulation		Anurak Sriariyawat	Kwanchai Pakoksung	Takahiro Sayama	Shigenobu Tanaka	Sucharit Koontanakulvong	Journal of Disaster Research	Fuji Technology Press	Vol. 8, No. 3	406	414
7		Numerical simulation of 2010 Pakistan flood in the Kabul River basin by using lagged ensemble rainfall forecasting		Tomoki Ushiyama	Takahiro Sayama	Susumu Fujioka	Yuya Tatebe	Kazuhiko Fukami	Journaof of Hydrometeorology	American Meteorological Society	15	193	211
8		Influence of Jamuna Bridge on River Morphology		Atsuhiro Yorozuya	Md.S. Islam	M. Kamoto	S. Egashira		Advances in River Sediment Research	Taylor & Francis Group		299	308
9		Influence of river bed evolution on inundation processes at Narayani River in Nepal		Atsuhiro Yorozuya	Krishna Prasad Rajbanshi	S. Egashira			Advances in River Sediment Research	Taylor & Francis Group		2043	2048
10		Effect of contemporary forest harvesting practices on headwater stream temperatures: Initial response of the Hinkle Creek catchment, Pacific Northwest, USA		Kelly Kibler	Arne Skaugset	Lisa Ganio	Manuela Huso		Journal of Forest Ecology and Management	Elsevier	310	680	691
11		Biophysical, Socioeconomic, and Geopolitical Vulnerabilities to Hydropower Development on the Nu River, China		Desiree Tullos	Eric Foster-Moore	Darrin Magee	Aaron Wolf	Kelly Kibler	Ecology and Society	Resilience Alliance	Vol. 18, No. 3	–	–
12		Flood vulnerability assessment in the light of rice cultivation characteristics in Mekong River flood plain in Cambodia		Toshio OKAZUMI	Shigenobu TANAKA	Youngjoo KWAK	Badri Bhakta SHRESTHA	Ai SUGIURA	Paddy and Water Environment	Springer	–	–	–
13		Investigating the impact of climate change on future runoff of river Satluj		Narayan P Gautam	Manohar Arora	N.K. Goel	A.R.S. Kumar		Journal of Hydrology and Meteorology	SOHAM-Nepal	Vol. 8	10	21
14	Paper	2011年タイ洪水を対象にした緊急対応の降雨流出氾濫予測 An Emergency Response-Type Rainfall-Runoff-Inundation Prediction for 2011 Thailand Flood		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	萬矢敦啓 Atsuhiro Yorozuya	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 1	14	29
15		レーダ雨量の不確実性を反映した降雨場の生成に関する研究	Stochastic rainfall field generation representing uncertainty in radar rainfall estimates	藤岡奨 Susumu Fujioka	佐山敬洋 Takahiro Sayama	三浦祐司 Yuji Miura	越田智喜 Tomoki Koshida	深見和彦 Kazuhiko Fukami	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_319	I_324

16		チャオプラヤ川流域における長期降雨流出氾濫解析	Long-term analysis of rainfall, runoff and inundation over the Chao Phraya River basin	建部祐哉 Yuya Tatebe	佐山敬洋 Takahiro Sayama	牛山朋來 Tomoki Ushiyama	藤岡奨 Susumu Fujioka	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_457	I_462
17		大規模洪水氾濫の時空間起源分析に関する研究 Analysis on Spatio-Temporal Sources of Large-scale Flooding		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	牛山朋來 Tomoki Ushiyama	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_463	I_481
18		河床変動及び強風を伴う河川表面流速の特性と風による影響の補正に関する検討 STUDY ON CHARACTERISTIC OF SURFACE VELOCITY IN RIVERS WITH RIVER BED CHANGE AND STRONG WIND AND REVISION OF WIND EFFECT		本永良樹 Yoshiki Motonaga					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_745	I_750
19		氾濫解析のためのPRISM DSMの活用とGPSを用いたその修正方法に関する研究 Study on PRISM DSM Application to inundation analysis and its modification method		萬矢敦啓 Atsuhiro Yorozuya					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_1549	I_1554
20		途上国へ適用可能な洪水リスク評価技術(総説) Applicable Methodologies for Flood Risk Assessment in the River Basin in Developing Countries		岡積敏雄 Toshio Okazumi	田中茂信 Shigenobu Tanaka				河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	17	20
21		メコン川下流域を対象にした家屋洪水被害推定手法の検証 Validation of a method for estimating flood damage to houses in the Lower Mekong Basin		上米良 秀行 Hideyuki Kamimera					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	51	56
22		異なる河床変動特性に応じた流速補正係数に関する考察 STUDY ABOUT VELOCITY INDEX ABOVE DIFFERENT RIVERBED CONDITION		本永良樹 Yoshiki Motonaga					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	195	198
23		アンサンブルカルマンフィルターを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using EnKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	319	324
24		人工衛星データを用いた洪水氾濫水位の算出手法の検討～メコン川下流域を例として～ Study about Estimation of Water Surface Elevation on Inundated Area Applying Satellite Based Information		萬矢敦啓 Atsuhiro Yorozuya					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	341	344
25		Monthly adjustment of Global Satellite Mapping of Precipitation (GSMaP) data over the VuGia-ThuBon River basin in central Vietnam using an artificial neural network		T. Ngo-Duc	J. Matsumoto	H. Kamimera			Hydrological Research Letters	Japan Society of Hydrology and Water Resources	7	85	90
26	Abstract	WRF-LETKFを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using WRF-LETKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	日本気象学会2013年度春季大会予稿集 Proceedings of the 2013 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	103	344	344
27		衛星雨量による土砂災害の危険度推定に関する事例研究 Feasibility study on prediction of sediment-related disaster risk by the satellite rainfall data		清水孝一 Yoshikazu Shimizu	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			第52回日本地すべり学会研究発表会講演集 Proceedings of the 52nd meeting of Japan Landslide Society	(公社) 日本地すべり学会 Japan Landslide Society		58	59
28		衛星観測降雨の土砂災害への適用に関する基礎的検討 Fondamental study on prediction of sediment-related disaster risk by the Satellite rainfall data		Yoshikazu SHIMIZU	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			平成25年度砂防学会研究発表会概要集B Proceedings of the 2013 meeting of Japan Society of Erosion Control Engineering	(公社) 砂防学会 Japan Society of Erosion Control Engineering		B210	B211
29		インドネシア国アンボン島の天然ダム決壊災害の減災はなぜ成功したか Good practice on evacuation from landslide dam break desaster on Ambon island, Indonesia		清水孝一 Yoshikazu Shimizu	森田耕司 Koji Morita	岡積敏雄 Toshio Okazumi			第5回GIS-Landslide研究集会 The 5th meeting of GIS-Landslide study group	GIS-Landslide研究集会 GIS-Landslide study group			
30		Importance of riverbed evolution in predicting inundation process		Shinji EGASHIRA	A. Yorozuya	E. K. P. Rajbanshi			Proc. HYDRO 2013 International	Indian Institute of Technology (IIT) Madras		646	654
31		Minimizing geopolitically ungauged catchment area of transboundary river basins to support disaster risk reduction		Kelly Kibler					7th Global FRIEND-Water Conference: Hydrology in a Changing World: Environmental and Human Dimensions	UNESCO-IHP, etc.	363		
32		Prediction on sediment related disaster through the satellite rainfall data		Yoshikazu SHIMIZU	Toshio OKAZUMI	Tadanori ISHIZUKA			USMCA 2013	USMCA2013			

33		Ensemble forecasts of rainfall and discharge in Japan for typhoon TALAS and ROKE in 2011 using EnKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	AOGS2013	AOGS			
34		Assessment of Flood Hazards and Vulnerability in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	6th International Conference on Water Resources and Environment Research	German research programme KLIWAS and the European sediment network SedNet			
35		Lessons Learnt From Two Unprecedented Disasters in 2011: Great East Japan Earthquake and Tsunami in Japan and Chao Phraya River flood in Thailand		Toshio OKAZUMI	Tadashi NAKASU	Megumi SUGIMOTO	Yoganath ADIKARI		Global Assessment Report on Disaster Risk Reduction 2013	UNISDR			
36	Article, others	Numerical Approach to Analyze Natural Dam Failure by Seepage Flow		Badri Bhakta Shrestha					NEA-JC Newsletter	Nepal Engineers' Association, Japan Center	Vol.6	13	18
37		世界の大規模洪水を監視・予測する先端技術 -2011年タイ洪水を事例に-	Advanced technology for monitoring and forecasting large-scale floods around the world - Application to the 2011 Thai flood -	佐山敬洋 Takahiro Sayama					河川文化 River culture	(公社)日本河川協会 Japan River Association	39	93	127
38		光学衛星画像による大規模崩壊の土砂移動状況の経年把握	The yearly monitoring of sediment movement by optical satellite images after a large-scale collapse	水野正樹 Masaki Mizuno	江川真史 Masafumi Ekawa	清水孝一 Yoshikazu Shimizu	筒井 健 Ken Tsutsui		土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-12	38	41
39		アジア開発銀行との連携協定による地域技術協力プロジェクト (ADB TA7276)最終報告	Final report on the ADB-ICHARM regional technical assistance project (ADB TA7276)	日比野繁信 Shigenobu Hibino	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha	鍋坂誠志 Seishi Nabesaka	宮本守 Mamoru Miyamoto	土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-6	38	43
40	PWRI publication	Report on 2012-2013 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi	Minoru Kamoto	Shun Kudo			PWRI Technical Note	Public Works Research Institute	4278		
41		2012-2013 修士課程「防災政策プログラム 水災害リスクマネジメントコース」実施報告書	Project report on the 2012-2013 Water-related Disaster Management Course of Disaster Management Policy Program	栗林 大輔, Daisuke Kuribayashi	加本実 Minoru Kamoto	工藤俊 Shun Kudo			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4271		

ICHARM Program

1. Mission of ICHARM

The mission of ICHARM is to serve as the Global **Centre of Excellence** for Water Hazard and Risk Management by, inter alia, observing and analyzing natural and social phenomena, developing methodologies and tools, building capacities, creating knowledge networks, and disseminating lessons and information in order to help governments and all stakeholders manage risks of water-related hazards at global, national, and community levels. The hazards to be addressed include floods, droughts, landslides, debris flows, tsunamis, storm surges, water contamination, and snow and ice disasters.

We envision a Center of Excellence housing a group of leading people, superior facilities, and a knowledge base which enables conducting i) innovative research, ii) effective capacity building, and iii) efficient information networking. Based on these three pillars, ICHARM will globally serve as a knowledge hub for best national/local practices and an advisor in policy making.

2. Long-term Programme (around 10 years)

ICHARM will engage in the following activities in order to fulfill the Mission, keeping in mind *localism*, a principle that takes into account local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends:

(i) Innovative research

High-quality research outcomes and a wide scope of knowledge relevant to water-related risk management establish ICHARM as a global leader and resourceful partner for promoting water-related risk management world-wide.

(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.

(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.

(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.

(ii) Effective capacity building

Local capacity is essential to sound management of water-related risks. Through provision of cutting-edge training which emphasizes development and application of advanced knowledge and solutions, ICHARM supports a global network of exemplary practitioners of water-related hazard and risk management.

(4) Foster the development of solution-oriented practitioners 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.
(5) 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.

(iii) Efficient information networking

ICHARM's broad knowledge base and primary research findings support powerful and comprehensive opinions which guide water-related hazard and risk management solutions from global to local scales.

(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.
(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.

3. Mid-term Programme (around 5 years)

In order to achieve the mission above, we will focus ICHARM activities in the next 5 years to:

(i) Innovative research:

(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.

Flood observation: River discharge and river-bed dynamics during flood events are often not adequately or accurately measured. ICHARM will conduct monitoring and validation of river-bed dynamics and river-bed roughness coefficients for more systematic basin-wide flood management. Towards this goal, ICHARM will develop an automatic observation system for river discharge which simultaneously monitors water depth, flow velocity, and discharge. Particularly for areas where ground observation of river conditions is difficult, ICHARM will pioneer and validate new technology for satellite image analysis capable of identifying potential inundation extent and affected houses.

Flood prediction and analysis: ICHARM will upgrade its Integrated Flood Analysis System (IFAS) to better simulate evapotranspiration, multiple-dam operations and snow melt. With this enhanced flexibility and accuracy, IFAS will be applied to flood forecasting and water resources management both in and outside Japan, including at the Japanese Common Modeling Platform (Common MP) for water-material circulation analysis by MLIT et al.

The Rainfall-Runoff-Inundation (RRI) model, which simulates various hydrologic processes including rainfall-runoff, stream-flow propagation and inundation over floodplains in an

integrated manner, will be upgraded to encompass groundwater analysis and improve long-term accuracy, and will be validated at small- and medium-scale basins in Japan.

The Block-wise topographical (BTOP) model will be combined with the Flood-Inundation-Depth (FID) method to assess flood hazard and exposure globally, with initial focus to Asia.

In order to increase lead time of predicted flood-causing precipitation from several hours to several days, ICHARM will develop new techniques for meso-scale ensemble precipitation forecasting, and predicted precipitation will feed into hydrologic run-off models.

Further efforts on the analysis of the impact of climate change to the flood hazard at some river basins in Asia and around the world will be made to develop a bias correction method through statistical or physical downscaling of climate data projected in the Coupled Model Inter-comparison Project Phase 5(CMIP5) of IPCC Fifth Assessment Report (AR5) process.

Drought: ICHARM will upgrade the BTOP model to support more accurate, elaborate modeling of some river basins, additionally considering dam operations and water withdrawals. Additionally, ICHARM will pioneer a water demand model capable of factoring socio-economic conditions, facilitating assessment of socio-economic impacts of droughts on both global and basin scales.

Sediment-related disasters: ICHARM has developed a sediment-related disaster forecasting model based on technologies available in Japan, which uses satellite information available in developing countries. The model aims to identify disaster risk areas and their risk levels by using satellite observation. ICHARM will promote dissemination of this model for risk assessment related to landslides and debris flows.

Tsunami & storm surge: ICHARM will survey the fields affected by tsunami and storm-surge hazards in developing countries. The storm-surge disasters will be forecasted by the model available in the ADB Myanmar project, which is working for storm surge risk assessment in coastal area in Myanmar.

Water contamination: Few studies document the dynamic runoff mechanisms which influence sources and transport of diffuse water pollution during runoff events. ICHARM will upgrade the Water and Energy Transfer Processes (WEP) model to support finer resolution of simulated runoff loads of suspended solids (SS), nitrogen (N) and phosphorus (P) during runoff events. This research direction will eventually clarify understanding of relationships between basin management and water quality, for instance involving urban, forestry and agricultural areas.

(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.

Global Risk Indices will be developed, improved and disseminated to quantify water-related disaster risk for vulnerable basins in Asia, including Japan. A risk assessment model for smaller basins and communities will also be developed at a finer resolution. The communication methods will be explored to show the effectiveness of risk reduction measures in an easier-to-understand manner.

(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.

Policy tools for comprehensive risk management will be evaluated and applied, with initial focus in Asia. Some examples include pre-event disaster management, analysis of effectiveness of risk reduction measures such as disaster information and evacuation policies, and flood preparedness indices.

(ii) Effective capacity building

(4) Foster the development of solution-oriented practitioners 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.

In stronger collaboration with GRIPS and JICA, ICHARM will continue to build and improve its Master's and PhD programs in Water-related Disaster Management, as well as its short-term capacity development trainings and mentoring program for interns. Training schedules and programs, particularly at the PhD level, will be integrated seamlessly with ICHARM research activities, creating new opportunities for student involvement in a greater scope of research topics and methods, and supporting mentorship from a wider range of ICHARM researchers. New approaches will be explored to offer training programs as a module/package, or through e-learning/remote style that can contribute to more flexible and efficient training.

(5) 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.

As graduates from ICHARM training programs circulate across the globe, carrying with them the skills and knowledge they have acquired in their training, they become water hazard and risk management leaders in their own localities. The next generation of ICHARM capacity development will continue to support individuals in their pursuit of academic excellence and successful application of learned skills. However, ICHARM will

also broaden focus to joint development of individual and institutional capacity, so as to enable supportive spaces in which ICHARM alumni are able to realize their potential. Support of ICHARM alumni networks are a key resource for former participants, which will be encouraged and facilitated through follow-up meetings for former participants and their colleagues, to be hosted within the local offices and agencies that employ ICHARM graduates. Such meetings will help ICHARM to build and strengthen a global network of experts and organizations, to maintain research and training directions which are attuned to the needs of participant agencies, and to continue building capacities and collaborations within key organizations.

(iii) Efficient information networking

(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.

ICHARM, as the global knowledge center for water hazards will develop a database archiving information about water disasters. In order to collect and organize reliable data, ICHARM will strengthen partnerships with centers capable of archiving information related to water disasters. Meta-data collected from countries through ICHARM research and training will be sorted and accumulated, and (with permission from source organizations) a list (portal site) of disaster studies will be open to the public. To collect and disseminate the latest information about water disasters around the world, regular workshops will be held with their results published.

(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.

ICHARM will continue its contribution to worldwide efforts in mainstreaming disaster risk reduction in post-Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs), and post-Hyogo Framework for Actions (HFA), and immediately towards the 3rd World Conference on Disaster Risk Reduction in March 2015. ICHARM will strive to strengthen partnerships with other organizations also through its leadership in the 7th World Water Forum scheduled in April 2015 and future Asia-Pacific Water Forum meetings. Effective interaction between ICHARM research and training activities will make it possible to engage a broad institutional network, including international agencies, national and local governments, and civil society stakeholders at all levels. Primary research and information networking undertaken at ICHARM will underpin policy recommendations regarding water-related hazard and risk management.

ICHARM Work Plan for FY 2014 (2014.4-2015.3) and FY 2015 (2015.4-2016.3)

Category	Content	Activities and Expected result in FY2014	Activities and Expected result in FY2015
(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.			
1.1 Flood observation: River discharge and river-bed dynamics during flood events are often not adequately or accurately measured. ICHARM will conduct monitoring and validation of river-bed dynamics and river-bed roughness coefficients for more systematic basin-wide flood management. Towards this goal, ICHARM will develop an automatic observation system for river discharge which simultaneously monitors water depth, flow velocity, and discharge. Particularly for areas where ground observation of river conditions is difficult, ICHARM will pioneer and validate new technology for satellite image analysis capable of identifying potential inundation extent and affected houses.			
Development of technology of hydrological observation and prediction	Developing a next-generation discharge measurement system requiring less labor and cost	● Analysis and accumulation of observed data by ADCP and movie. ● Domestically technology diffusion. ● Publication of the manual about the water discharge measurement with new technology.	● Republication of the manual ● Domestically technology diffusion ● Study about the H-Q relationship without discharge measurement
1.2 Flood prediction and analysis: ICHARM will upgrade its Integrated Flood Analysis System (IFAS) to better simulate evapotranspiration, multiple-dam operations and snow melt. With this enhanced flexibility and accuracy, IFAS will be applied to flood forecasting and water resources management both in and outside Japan, including at the Japanese Common Modeling Platform (Common MP) for water-material circulation analysis by MLIT et al. The Rainfall-Runoff-Inundation (RRI) model, which simulates various hydrologic processes including rainfall-runoff, stream-flow propagation and inundation over floodplains in an integrated manner, will be upgraded to encompass groundwater analysis and improve long-term accuracy, and will be validated at small- and medium-scale basins in Japan. The Block-wise topographical (BTOP) model will be combined with the Flood-Inundation-Depth (FID) method to assess flood hazard and exposure at a global level, with initial focus to Asia.			
Development of models/systems for flood analysis and water resource management	Development of the Integrated Flood Analysis System (IFAS) to help create a runoff analysis model easily by using satellite data	● Standardization of a parameter-setting method for modeling hydrological processes in consideration of main climate zones and land conditions. ● Development of modules for low-water analysis and long-term runoff calculation.	● Development of a module capable of handling the effect of operation of advanced flood-control and water-use facilities and structures ● Development of a module capable of runoff analysis for low-lying areas in consideration of the effect of inundation and tide levels ● Enhancement of compatibility of IFAS with

			Common MP
	Development of Rainfall-Runoff-Inundation (RRI) Model	Improvement particularly in the subsurface flow module for better representation of hydrologic processes.	Integrate ensemble WRF predictions and the RRI simulation for ensemble flood predictions with quantified uncertainty information. The performance will be assessed also in data limited regions in Asian countries
	Development of a method for estimating large flood area, volume and damage using remote sensing data	Development of an algorithm for estimating building loss, its location in inundation area by using image fusion of multi temporal data combining high resolution SAR images with optical images.	● Development of a method for estimating flood volume ● Review of a practical application system for support restoration activity
	Research on flood prediction applicable to flash floods -Quantitative Precipitation Forecasting-	Application of Ensemble Kalman Filter (EnKF) for a weather forecasting model (WRF model) and validate the performance with various storm events including in Japanese River basins.	Application and validation of EnKF with WRF model. In particular, the performance of the system will be tested in data limited humid-tropical regions.
1.3 In order to increase lead time of predicted flood-causing precipitation from several hours to several days, ICHARM will develop new techniques for meso-scale ensemble precipitation forecasting, and predicted precipitation will feed into hydrologic run-off models. Further efforts on the analysis of the impact of climate change to the flood hazard at some river basins in Asia and around the world will be made to develop a bias correction method through statistical or physical downscaling of climate data projected in the Coupled Model Inter-comparison Project Phase 5(CMIP5) of IPCC Fifth Assessment Report (AR5) process.			
Estimate of the change of discharge by global warming	Research on the impact of global warming on flood and drought characteristics in consideration of uncertainty	● Development of a method for estimating changes in precipitation extremes in selected areas in consideration of uncertainty ● Estimation of changes in flood and drought characteristics in major river basins around the world in consideration of uncertainty	Estimation of changes in flood and drought characteristics in selected rivers in consideration of uncertainty
1.4 Drought: ICHARM will upgrade the BTOP model to support more accurate, elaborate modeling of some river basins, additionally considering dam operations and water withdrawals. Additionally, ICHARM will pioneer a water demand model capable of factoring socio-economic conditions, facilitating assessment of socio-economic impacts of droughts on both global and basin scales.			
Drought	Estimate of drought risk by development of Block-wise	Further calibration of the global BTOP model Development of a simulation model additionally	Further calibration of the global BTOP model Development of a BTOP model additionally

	TOPMODEL(BTOP)	capable of considering dam operations with 0.5 km mesh to apply to pilot study basins among the selected flood-vulnerable basins. This model will be used to estimate drought risk.	capable of considering dam operations with 0.5 km mesh to apply to other selected flood-vulnerable basins. This model will also be used to estimate drought risk.
1.5 Sediment-related disasters: ICHARM has developed a sediment-related disaster forecasting model based on technologies available in Japan, which uses satellite information available in developing countries. The model aims to identify disaster risk areas and their risk levels by using satellite observation. ICHARM will promote dissemination of this model for risk assessment related to landslides and debris flows.			
Sediment-related disasters	Development of a method to identify sediment disaster risk areas and a model to identify their risk levels	Study on a method to identify sediment disaster risk areas as technology using satellite information available in developing countries. Study on a model to identify sediment disaster risk levels by using long-term precipitation indices and satellite information.	Test application of the method described on the left to the Pampanga River in the Philippines Further study on the risk-level identification model by using locally observed data
1.6 Tsunami & storm surge: ICHARM will survey the fields affected by tsunami and storm-surge hazards in developing countries. The storm-surge disasters will be forecasted by the model available in the ADB Myanmar project, which is working for storm surge risk assessment in coastal area in Myanmar.			
Tsunami and storm surge	Development of storm surge hazard model	Test and calibration of the developed storm-surge model. Planning of the development of a storm-surge risk assessment mode.	Development of a storm-surge risk assessment model using the developed storm-surge model described on the left
	Contribution to PEARL project	Participation in the Preparing for Extreme And Rare events in coastal regions (PEARL) project led by UNESCO-IHE, contributing Japan's knowledge and experience regarding the Great East Japan Earthquake and increasing partnership with other research institutes.	(continue)
1.7 Water contamination: Few studies document the dynamic runoff mechanisms which influence sources and transport of diffuse water pollution during runoff events. ICHARM will upgrade the Water and Energy Transfer Processes (WEP) model to support finer resolution of simulated runoff loads of suspended solids (SS), nitrogen (N) and phosphorus (P) during runoff events. This research direction will eventually clarify understanding of relationships between basin management and water quality, for instance involving urban, forestry and agricultural areas.			

Water contamination	Understanding of the management of nutrient load and runoff in closed water bodies	Improvement of Water and Energy Transfer Processes (WEP) model.	Validation of the WEP model for water pollution loads in relation to basin land use such as urban and forestry areas
(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.			
Global Risk Indices will be developed, improved and disseminated to quantify water-related disaster risk for vulnerable basins in Asia, including Japan. A risk assessment model for smaller basins and communities will also be developed at a finer resolution. The communication methods will be explored to show the effectiveness of risk reduction measures in an easier-to-understand manner.			
2.1 Development of global risk indices to compare risks among different basins	Development of a flood risk assessment method	Research on the correlation between damage types and floods based on existing studies and development of the prototype of a flood risk assessment method. Development of global risk indices for international contribution including mainstreaming of disaster risk reduction.	Further improvement of the developed indices for more accuracy Restructuring of the organizational arrangement to start risk monitoring
	Development of a drought risk assessment method	Review of the existing drought model and development of a water-demand prediction model Development of a drought risk assessment method based on analysis of the correlation between damage and droughts by using the drought and water-demand models. Development of global risk indices as a global risk model.	Further development of the global risk indices
2.2 Development of risk indices for selected river basins	Development of a flood risk assessment method	Development of the prototype of a flood risk assessment method based on analysis of the correlation between damage and floods after reproduction of flood hazards.	Application of the developed method to other flood-vulnerable basins Generalization and uncertainty assessment of the developed method
	Development of a drought risk assessment method	Study on results of high-resolution BTOP model simulation. Study on water demand models for domestic and industrial water use based on the water demand	Development of high-resolution BTOP models for other basins Study on water-demand projections for agricultural, domestic and industrial water use

			model for agricultural water use.	and development of a water-stress assessment model for selected drought-vulnerable areas Development of a socio-economic impact model using the water stress model
		Development of basin flood/drought risk indices	Planning of study on basin-scale risk indices based on social impact assessment using the flood and drought risk assessment models.	Study on basin-scale risk indices by using the flood and drought risk assessment models
	2.3 Collaboration with other research programs	MEXT Program for Risk Information on Climate Change (FY2012-)	Development of a quantitative risk assessment method for five river basins in Asia and the globe in consideration of uncertainty, using climate data projected in the Coupled Model Inter-comparison Project Phase 5 (CMIP5) of IPCC Fifth Assessment Report (AR5) process.	(continue)
(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.				
	Policy tools for comprehensive risk management will be evaluated and applied, with initial focus in Asia. Some examples include pre-event disaster management, analysis of effectiveness of risk reduction measures such as disaster information and evacuation policies, and flood preparedness indices.			
	3.1 Study on comprehensive risk management	Study on pre-event disaster management and emergency restoration response	Development of a collaborative research system with local organizations for producing a new emergency restoration plan for model basins and planning of simulation using a basic model.	Review of the rough plan of emergency restoration and discussion on the plan with local organizations Preparation of a draft emergency restoration plan to propose with additional review considering application to other basins
		Study on disaster information and evacuation	Hearings on disaster information and evacuation at local communities affected by disasters in the past Review of information important during disaster including how and when it should be provided based on analysis of the results from the hearings.	Study on disaster information as a non-structural measure The results should be presented to be useful for future discussions on the development of indices and quantification of the effect of non-structural measures
		Study on disaster preparedness	Review of past studies on flood disaster	Review of past studies on FDPI to promote their

		indices	preparedness indices (FDPI) for wider application to future research.	use for visualization of the effectiveness of non-structural measures
	3.2 Local practices to implement the results of research	ADB Myanmar Project –Risk assessment of Urban management in Myanmar- (Yangon, Mandalay, Mawlamyaing)	Collection of hydrological, meteorological, damage and social data and information.	Collection of additional data and information
			Application of a flood model (RRI) and a storm-surge model to local areas.	Use of the models for simulation and the development of a risk model
			Collection and analysis of basic information on a risk evaluation model.	Development of a risk evaluation model
			Design, planning, arrangement and preparation of capacity development training programs.	Implementation of the training programs and technical assistance in operation of the training programs
		UNESCO Pakistan Project -2nd phase-	(now planning with UNESCO)	(now planning with UNESCO)
		JST-JICA Malaysia project	Further implementation of the IFAS project in Malaysia.	(continue)
(4) Foster the development of solution-oriented practitioners 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.				
	In stronger collaboration with GRIPS and JICA, ICHARM will continue to build and improve its Master's and PhD programs in Water-related Disaster Management, as well as its short-term capacity development trainings and mentoring program for interns. Training schedules and programs, particularly at the PhD level, will be integrated seamlessly with ICHARM research activities, creating new opportunities for student involvement in a greater scope of research topics and methods, and supporting mentorship from a wider range of ICHARM researchers. New approaches will be explored to offer training programs as a module/package, or through e-learning/remote style that can contribute to more flexible and efficient training.			
	4.1 Nurture professionals who can train researchers and take leadership	Doctor Course "Disaster Management"	2-3 students (2014-2017)	2-3 students (2015-2018)
	4.2 Development of the participant's capacity to practically manage	Master Course "Water-related Disaster Management, Disaster Management Policy Program"	10-15 students from candidate countries: Thailand, Brazil, Pakistan, Philippines, India, Malaysia, Bangladesh, Ethiopia, Sri Lanka,	10-15 students Candidate countries to be decided consulting with JICA

	the problems and issues concerning water-related disasters in local levels		Myanmar, Kenya, Jamaica, Nigeria, Nicaragua, Sudan, Colombia, East Timor, Fiji, Guyana	
	4.3 Training to learn knowledge and technologies relevant to water-related disaster risk management for a period of several days or weeks	JICA training program "Flood Risk Management with IFAS"	14-21 person from candidate countries: Nigeria, Thailand, Bangladesh, Philippines, Vietnam, Kenya, Bhutan	
		2nd Phase JICA training program "Flood Risk Management with IFAS"		Candidate countries to be decided consulting with JICA
		Workshop for high rank officers	From Pakistan (5-6 person), Afghanistan	
		Technical training for working level officers		Pakistan (5 person (to be confirmed))
(5) 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.				
	As graduates from ICHARM training programs circulate across the globe, carrying with them the skills and knowledge they have acquired in their training, they become water hazard and risk management leaders in their own localities. The next generation of ICHARM capacity development will continue to support individuals in their pursuit of academic excellence and successful application of learned skills. However, ICHARM will also broaden focus to joint development of individual and institutional capacity, so as to enable supportive spaces in which ICHARM alumni are able to realize their potential. Support of ICHARM alumni networks are a key resource for former participants, which will be encouraged and facilitated through follow-up meetings for former participants and their colleagues, to be hosted within the local offices and agencies that employ ICHARM graduates. Such meetings will help ICHARM to build and strengthen a global network of experts and organizations, to maintain research and training directions which are attuned to the needs of participant agencies, and to continue building capacities and collaborations within key organizations.			
	5.1 Follow up and encouragement for ex- trainees	Seminar in ex-trainees country	• Make and maintain list of graduates • Implement internet networking • Organize follow up session	(continue)
(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.				

ICHARM, as the global knowledge center for water hazards will develop a database archiving information about water disasters. In order to collect and organize reliable data, ICHARM will strengthen partnerships with centers capable of archiving information related to water disasters. Meta-data collected from countries through ICHARM research and training will be sorted and accumulated, and (with permission from source organizations) a list (portal site) of disaster studies will be open to the public. To collect and disseminate the latest information about water disasters around the world, regular workshops will be held with their results published.			
6.1 Accumulate disaster archives	Workshop and publication for Large-Scale Floods	Organize the Workshop and invite 4-5 resource person after major floods.	Publish the Large-scale floods report
	Disaster information	Collect information and set up meta-archives.	(continue)
6.2 Collaboration	To make network with institute or organization related water disaster archives	Collaborate with other UNESCO center and international organization (UNISDR, Red cross etc.) for usable disaster archives.	(continue)
(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.			
ICHARM will continue its contribution to worldwide efforts in mainstreaming disaster risk reduction in post-Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs), and post-Hyogo Framework for Actions (HFA), and immediately towards the 3rd World Conference on Disaster Risk Reduction in March 2015. ICHARM will strive to strengthen partnerships with other organizations also through its leadership in the 7th World Water Forum scheduled in April 2015 and future Asia-Pacific Water Forum meetings. Effective interaction between ICHARM research and training activities will make it possible to engage a broad institutional network, including international agencies, national and local governments, and civil society stakeholders at all levels. Primary research and information networking undertaken at ICHARM will underpin policy recommendations regarding water-related hazard and risk management.			
7.1 Collaboration with relevant organizations	International Flood Initiative (IFI)	Function of its secretariat in collaboration with relevant organizations.	
	Strengthen relationship with International framework (Typhoon Committee, International Flood Network (IF-Net), Japan Water Forum (JWF), Network of Asian River Basin Organizations (NARBO), etc.)	< Contribution to Typhoon Committee > ● Chair Working Group of Hydrology in Typhoon Committee and to implement ● Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	
7.2 Mainstreaming of disaster	United Nations Secretary-General's Advisory Board (UNSGAB)	Contribution to worldwide efforts in mainstreaming disaster risk reduction through participation and advice as special advisor in international meetings.	
	UNISDR Asia Consultation	Further research on global risk indices, whose progress was reported in Dec. 2013, as	Maintenance of the institutional network with UNISDR and further research on global risk

	management		contribution to UNISDR Asia.	indices to prepare for continued consultation
		6th Asian Ministerial Conference on Disaster Risk Reduction: AMCDRR	Creation of occasions to present results of the risk index study previously reported in Dec. 2013 to show a high reliability of the indices underpinned by advanced technology.	(continue)
		3rd World Conference on Disaster Risk Reduction: WCDRR (14-18 March, 2015)	Continue the efforts described above based on the GAR15 paper and use The 3rd WCDRR as an occasion to emphasize the effectiveness of the indices by claiming a high technological capability of ICHARM. Also continue preparation for HFA2, in which the final decisions on important international goals will be made, to make tangible contribution to the decision-making process.	
		7th World Water Forum (12-17 April, 2015)	Activities from the preparation stage to become a primary actor in the forum.	
		Asia-Pacific Water Forum (APWF)	Appeal ICHARM activities on the occasion of its Governing Council.	
	7.3 Synergy effects	Alumni networking	● Continue to update ICHARM Alumni List ● Continue to keep in touch with ex-trainees by disseminating ICHARM newsletter, etc.	
	7.4 Public relations	ICHARM web site	Continue updating	
		ICHARM Newsletter	Publish four times a year (January, April, July, and October)	

Annex

AGREEMENT BETWEEN THE GOVERNMENT OF JAPAN AND THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO) REGARDING THE INTERNATIONAL CENTRE FOR WATER HAZARD AND RISK MANAGEMENT (ICHARM) (CATEGORY 2) UNDER THE AUSPICES OF UNESCO

The Government of Japan (hereinafter referred to as "the Government") and the United Nations Educational, Scientific and Cultural Organization (hereinafter referred to as "UNESCO"),

Recalling that the *Agreement between the Government of Japan and the United Nations Educational, Scientific and Cultural Organization (UNESCO) concerning the Establishment of the International Centre for Water Hazard and Risk Management (ICHARM) under the Auspices of UNESCO* (hereinafter referred to as the "2006 Agreement") was signed in Paris on 3 March 2006,

Considering that the 2006 Agreement had expired at the end of the fifth year following the signature of it,

Desirous of concluding a new agreement,

HAVE AGREED AS FOLLOWS:

Article 1
Definitions

In this Agreement:
1. "Parties" means the Government and UNESCO.
2. "IHP" means the International Hydrological Programme of UNESCO.

Article 2
Establishment

The Government agrees to take, within the limits of the laws and regulations of Japan, the appropriate measures that may be required for the establishment of the International Centre for Water Hazard and Risk Management (hereinafter referred to as "the Centre") under the auspices of UNESCO, within the Incorporated Administrative Agency Public Works Research Institute, Japan (hereinafter referred to as "PWRI") as provided for under this Agreement.

Article 3
Purpose of the Agreement

The purpose of this Agreement is to define the terms and conditions governing the collaboration between the Parties with respect to the Centre and their related rights and obligations.

Article 4
Legal Status

1. The Centre shall be independent of UNESCO.
2. The Centre shall be an integral part of PWRI which enjoys, in accordance with the laws and regulations of Japan, the legal personality and capacity necessary for the exercise of its functions, including the capacity to contract, to acquire and dispose of movable and immovable property and to institute legal proceedings, in relation to the activities of the Centre.

Article 5
Objectives and Functions

1. The objectives of the Centre shall be to conduct research, capacity-building and information networking activities in the field of the water-related hazards and their risk management at the local, national, regional and global level in order to prevent and mitigate their impacts with a view of sustainable and integrated river basin management.

2. In order to achieve the above objectives, the functions of the Centre shall be:

(a) to promote scientific research and undertake effective capacity-building activities at institutional and professional levels;

(b) to create and reinforce networks for the exchange of scientific, technical and policy information among institutions and individuals;

(c) to develop and coordinate cooperative research activities, taking advantage particularly of the installed scientific and professional capacity of the relevant IHP networks, World Water Assessment Programme, International Flood Initiative/Programme and the relevant programmes of non-governmental organizations and involving international institutions and networks under those auspices;

(d) to conduct international training courses especially for the practitioners and researchers of the world;

(e) to organize knowledge and information transfer activities including international symposia or workshops, and to engage in appropriate awareness-raising activities targeted at various audiences including the general public;

(f) to develop a strong programme of information and communication technology;

(g) to provide technical consulting services; and

(h) to produce technical publications and other media items related to the activities of the Centre.

3. The Centre shall pursue the above objectives and functions in close coordination with IHP.

Article 6
Governing Board

1. The Governing Board for the Centre shall be established.

2. The Governing Board, which will be renewed regularly, will be composed of:

(a) the Chief Executive of PWRI, as the Chairperson;

(b) a representative of the Government or his or her appointed representative;

(c) up to five representatives of institutes or organizations relating to the activities of the Centre that shall be appointed by the Chairperson;

(d) a representative of the Director-General of UNESCO; and

(e) a representative of the IHP Intergovernmental Council, if it wishes.

3. The Governing Board shall:

(a) examine and adopt the long-term and medium-term programmes of the Centre submitted by the Director of the Centre, subject to paragraph 4 below;

(b) examine and adopt the work plan of the Centre submitted by the Director of the Centre, subject to paragraph 4 below;

(c) examine the reports on the Centre's activities submitted by the Director of the Centre; and

(d) examine and adopt any necessary internal regulations of the Centre, subject to paragraph 4 below.

4. The long-term and medium-term programmes, the work plan, and any necessary internal regulations of the Centre shall satisfy the relevant legislative and regulatory requirements relating to PWRI.

5. The Governing Board shall meet in ordinary session at regular intervals, at least once every two Japanese fiscal years; it shall meet in extraordinary session if convened by its Chairperson, either on his or her own initiative or at the request of the Director-General of UNESCO or of the majority of its members.

6. The Governing Board shall adopt its own rules of procedure. For its first meeting the procedure shall be established by the Chief Executive of PWRI in consultation with the Parties.

Article 7
Staff

1. The Centre shall consist of a Director and staff necessary for the activities of the Centre.

2. The Director shall be appointed by the Chief Executive of PWRI and direct the work of the

Centre.
3. The Centre's staff includes:
(a) the members employed by the Chief Executive of PWRI; and
(b) researchers or professionals appointed and/or invited by the Chief Executive of PWRI to contribute to the Centre's activities.

Article 8
Contribution of UNESCO

1. UNESCO may provide assistance, as needed, in the form of technical assistance for the activities of the Centre, in accordance with the strategic goals and objectives of UNESCO. Such assistance may include:
(a) providing the assistance of its experts in the specialized fields of the Centre;
(b) engaging in temporary staff exchanges when appropriate, whereby the staff concerned will remain on the payroll of the dispatching organizations; and
(c) seconding members of its staff temporarily, as may be decided by the Director-General on an exceptional basis if justified by the implementation of a joint activity or project within a strategic programme priority area of UNESCO.
2. In all cases listed above, the assistance shall only be undertaken when it is provided for in the UNESCO's programme and budget, and UNESCO will provide Member States with accounts relating to the use of its staff and associated costs.

Article 9
Financial Matters

1. The Government shall take appropriate measures, in accordance with its laws and regulations, which may be required for the Centre to receive adequate funds.
2. The Centre's resources shall derive from sums allotted by PWRI, from such contributions as it may receive from any governmental, intergovernmental or non-governmental organizations, and from payments for services rendered.

Article 10
Participation

1. The Centre shall encourage the participation of Member States and Associate Members of UNESCO which, by their common interest in the objectives of the Centre, desire to cooperate with the Centre.
2. Member States and Associate Members of UNESCO wishing to participate in the Centre's activities, as provided for under this Agreement, may send to the Director of the Centre notification to this effect. The Director shall inform the Parties to the Agreement and other Member States of the receipt of such notifications.

Article 11
Responsibility of UNESCO

As the Centre is legally separated from UNESCO, the latter shall not be legally responsible for the acts or omissions of the Centre and shall bear no liabilities of any kind, be they financial or otherwise, unless otherwise expressly provided for.

Article 12
Evaluation

1. UNESCO may, at any time, carry out an evaluation of the activities of the Centre in order to ascertain:
(a) whether the Centre contributes to the strategic goals of UNESCO; and
(b) whether the activities effectively pursued by the Centre are in conformity with those set out in this Agreement.
2. UNESCO undertakes to submit to the Government, at the earliest opportunity, a report on any

evaluation conducted.
3. The Government has a right to comment on and to request the revision of the UNESCO's report on the evaluation.

Article 13
Use of UNESCO Name and Logo

1. The Centre may mention its affiliation with UNESCO. It may therefore use after its title the mention "under the auspices of UNESCO".
2. The Centre is authorized to use the UNESCO logo or a version thereof on its letterheaded paper and documents including electronic documents and websites in accordance with the conditions established by the governing bodies of UNESCO.

Article14
Entry into Force

This Agreement shall enter into force upon its signature.

Article 15
Duration

This Agreement shall remain in force for a period of six years as from its entry into force, and shall be deemed renewed unless otherwise expressly denounced by either Party as provided for in Article 16.

Article 16
Denunciation

Notwithstanding Article 15 above, either Party may terminate this Agreement at any time by giving six months prior written notice to the other.

Article 17
Revision

This Agreement may be revised by agreement between the Parties.

Article 18
Settlement of Disputes

Any dispute between the Parties regarding the interpretation or application of this Agreement shall be resolved through negotiation or any other appropriate method to be mutually agreed upon by the Parties.

IN WITNESS WHEREOF, the undersigned, duly authorized thereto, have signed this Agreement,

DONE in Paris, this twenty-third day of July, 2013, in duplicate in the English language.

For the Government of Japan:
For the United Nations Educational, Scientific and Cultural Organization:

Rules of Procedure for the 1st ICHARM Governing Board

As of 6th December 2013

Article 1 Intent

This Statement shall state the necessary rules of procedure which shall guide proceedings of the first ICHARM Governing Board (hereinafter referred to as "the Governing Board") meeting, subject to Article 6 of the agreement between the Government of Japan and the United Nations Educational, Scientific and Cultural Organization (UNESCO) regarding the International Centre for Water Hazard and Risk Management (category 2) under the auspices of UNESCO, signed on 23 July 2013.

Article 2 Composition

On the occasion of its first meeting, the Governing Board will be composed of:

a) the Chief Executive of PWRI, as the Chairperson;
b) the Vice Minister for Engineering Affairs of the Ministry of Land, Infrastructure, Transport and Tourism;
c) the President of the Japan International Cooperation Agency;
d) the Rector of the National Graduate Institute for Policy Studies;
e) the Special Representative of the Secretary-General for Disaster Risk Reduction
f) a representative of the Director-General of UNESCO; and
g) a representative of the Intergovernmental Council of International Hydrological Programme of UNESCO

Article 3 Board Meetings, Quorum, and Minutes

1) The first Governing Board meeting shall be convened by the Chief Executive of PWRI. The majority of Governing Board members shall be necessary to hold the Governing Board meeting.
2) The first Board meeting shall examine and adopt the Board's General Rules of Procedure, which shall guide proceedings of subsequent Governing Board meetings.
3) The majority of all attendees shall be necessary to adopt the Governing Board's General Rules of Procedure.
4) The official language of the first Governing Board meeting shall be English.
5) The secretariat of the Governing Board (referred to in Article 4) shall take minutes of the Governing Board meetings.

Article 4 Secretariat

ICHARM shall function as the secretariat of the Governing Board.

Article 5 Duration of Statement

This Statement shall be effective until the adoption of the Governing Board's General Rules of Procedure at the first Board meeting.

Article 6 Miscellaneous Provisions

Miscellaneous provisions necessary for the effective management of the Governing Board but not included in this Statement shall be decided by the Chairperson in consultation with the Governing Board members.

Supplementary Provisions

This Statement shall be enacted on 6 December 2013.

ICHARM 1st Governing Board Meeting
25 February, 2014

United Nations Educational, Scientific and Cultural Organization

ICHARM Activity Report

from October 2010 to March 2014

ICHARM members (January.2014)

Total 47 staff + 6 PhD students

Contents

- Outline
- Training
- Research
- Information Networking
- Local Practices

ICHARM

PWRI ICHARM UNESCO United Nations Educational, Scientific and Cultural Organization

ICHARM

International Center for Water Hazard and Risk Management

under the auspices of UNESCO

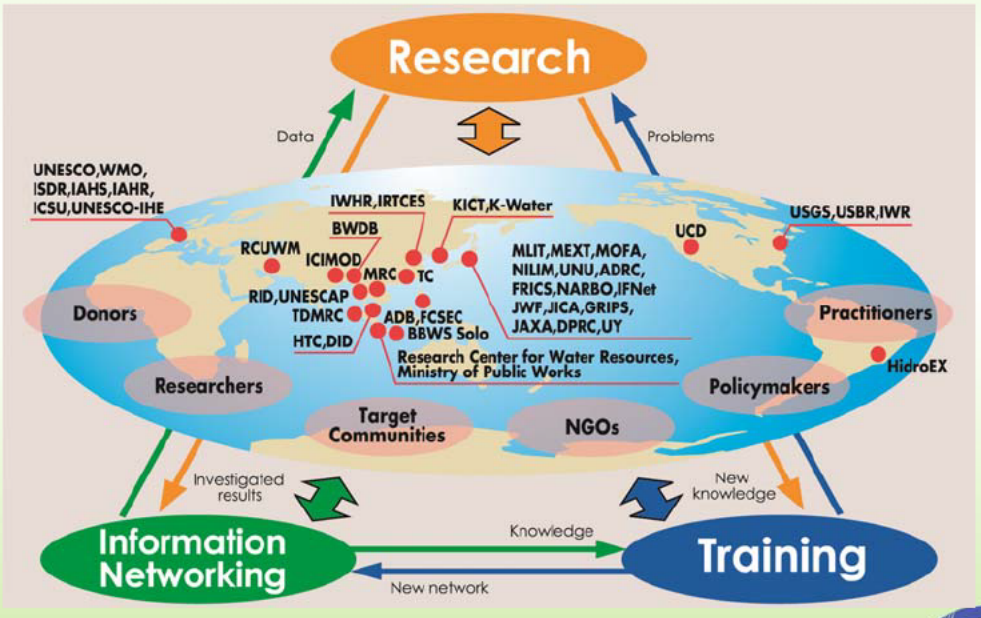
hosted by PWRI, Tsukuba

ICHARM Objective

International Centre for Water Hazard and Risk Management

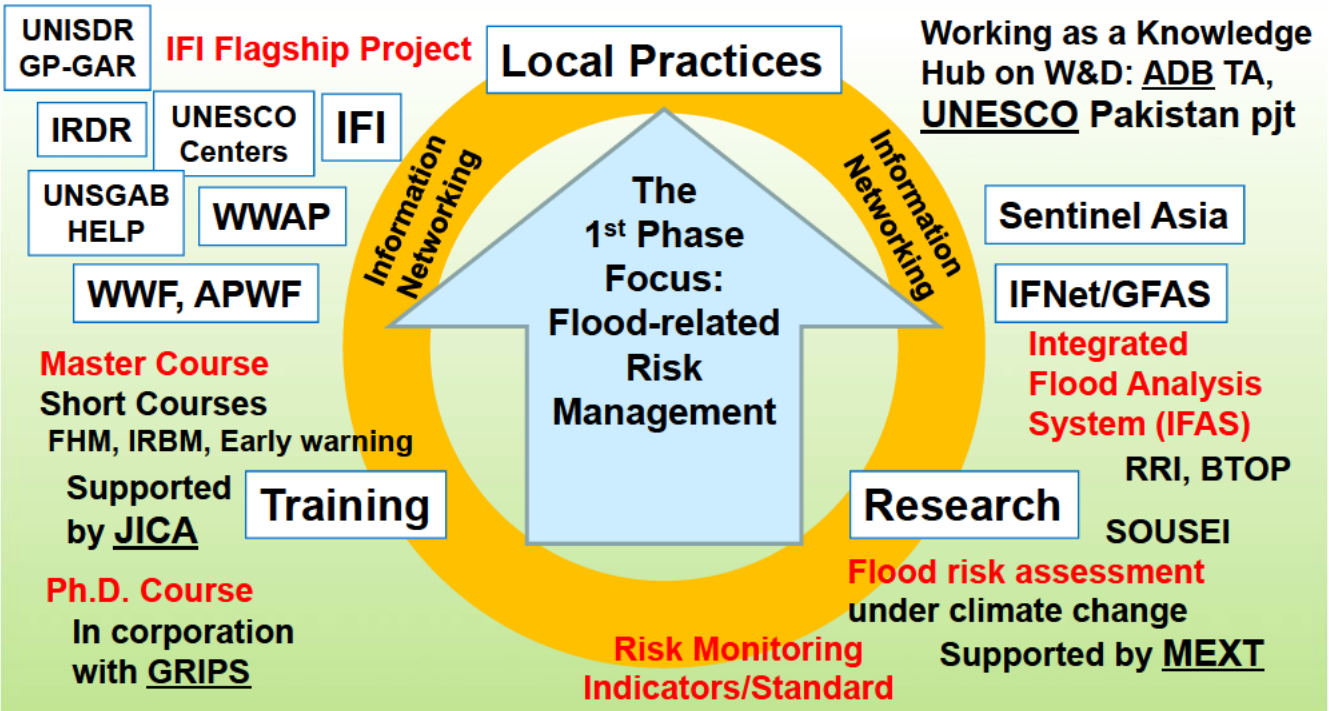
- **To be the global Center of Excellence to provide and assist implementation of the best practicable strategies to localities, nations, regions and the world to manage the risk of water related hazards including floods, droughts, land slides, debris flows and water contamination.**
  - **At the first stage, the priority is flood-related disasters.**

Three-pillars of Activities



ICHARM's Challenge: **Localism**

Delivering best available knowledge to local practices



ICHARM's Challenge: **Localism**

Delivering best available knowledge to local practices

- *Localism* is a principle that takes into account local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends.

TRAINING

Professional education

Capacity development of individuals & organizations

Technology transfer

Human resources networking

Capacity Development Programs

- **Short training courses**
  - Hazard maps, IFAS & local preparedness (2004-, JICA)
  - Tsunami (2008, ISDR), CC adaptation (2010, JICA)
  - Pakistan Flood WSs (2011-12, UNESCO) etc. etc.

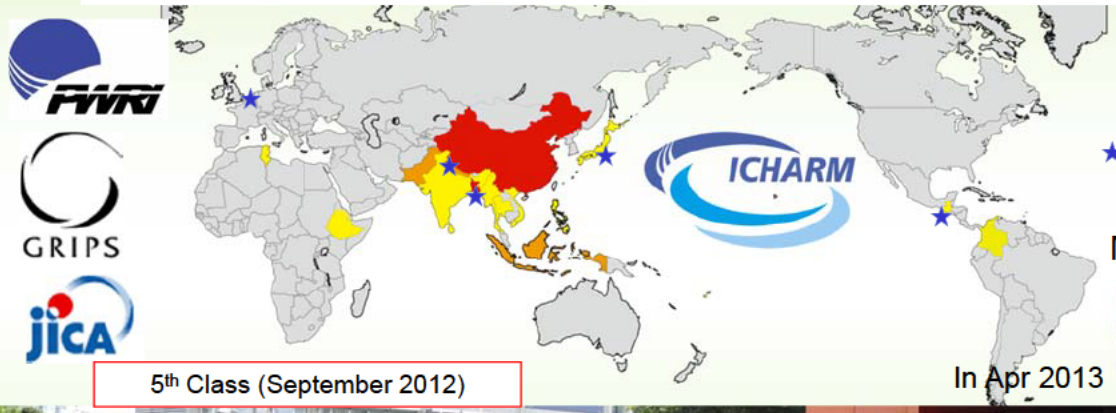
Targeted to organizational capacity development since 2009

- **Follow-up seminars** at trainees local nations (2006- JICA)
  - KL 2007, Guangzhou 2008, Manila 2009, Hanoi 2010, BKK 2012, Dhaka 2013, KL 2014
- **Master Course** **on Water-related Disaster Management** with GRIPS (National Graduate Institute for Policy Studies) supported by JICA
  - 10 ('08), 7 ('09), 12 ('10), 12 ('11), 19 ('12), 12 ('13), M1: 12
- **Ph.D. Course** **on Disaster Management** with GRIPS
  - 1 ('13), D3: 1, D2: 2, D1: 3

Nationalities of MC graduates and Ph.D. candidates

In Feb 2014

72 MS & 1 PhD graduated. 12 MS & 5 Ph.D. students studying.



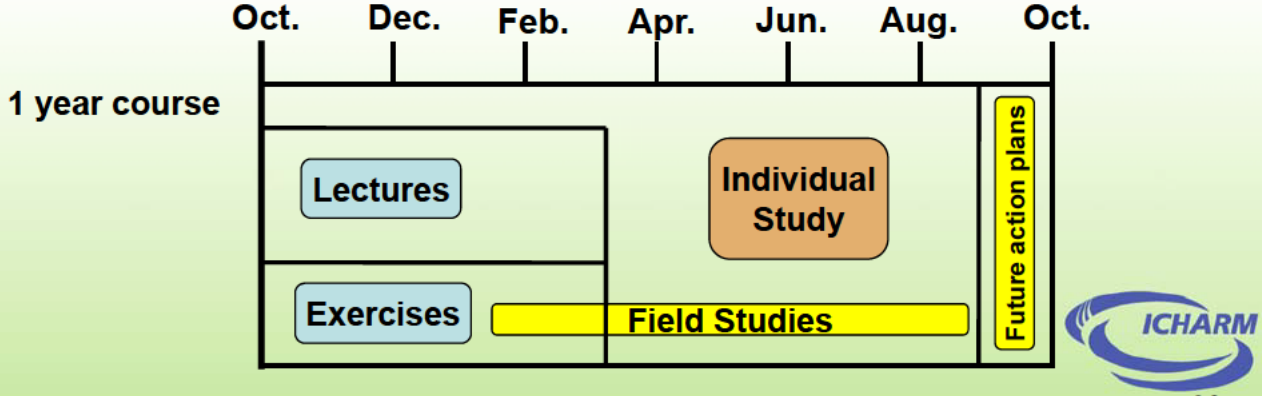
5th Class (September 2012)

First PhD (2013)

Master Course on Water-related Disaster Management

with National Graduate Institute for Policy Studies (GRIPS)
supported by JICA since October 2007

- To foster **solution oriented practitioners** with solid theoretical and engineering bases who can serve for planning and implementation of flood management practices within the framework of integrated water resources management at national to local levels.



Ph.D. course
with GRIPS since 2010

- Foster researchers who can guide and supervise researchers and research projects on water-related disaster risk management
- Half work and half study, 3 years course
- Publication of at least two papers in peer reviewed international journals from dissertation studies

Governance

- Flood management is largely an issue of governance, not necessarily of science and technology or economy.
  - WMO mission to Myanmar right after the Nargis in May 2008 issued a press release saying "Cyclone warnings were sufficient. Deaths inevitable". 138 000 died.
  - N Ambraseys and R Bilham "Corruption kills", *Nature*, 13 Jan 2011
- ICHARM Master Course offers a **Sontoku-award** since 2009: A student voted most by other students as one who served best for the benefit of the group rather than his/her own benefit.

Ninomiya Kinjiro Sontoku: Social reformer in agro-economy (1787-1856)

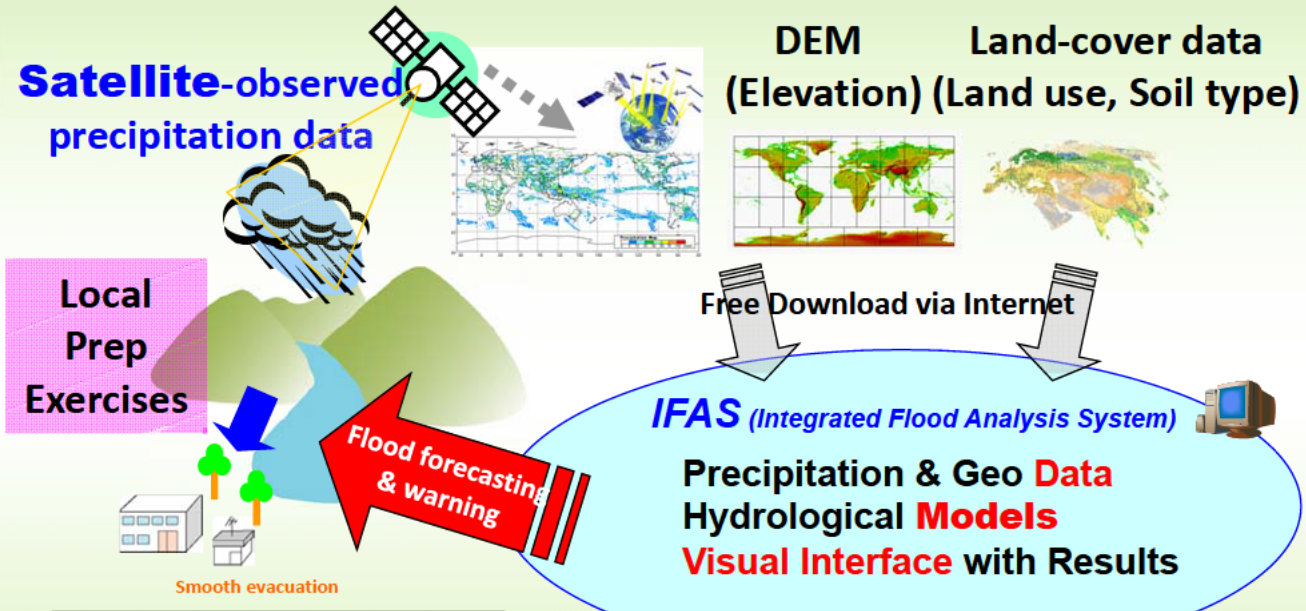
RESEARCH

Early warning

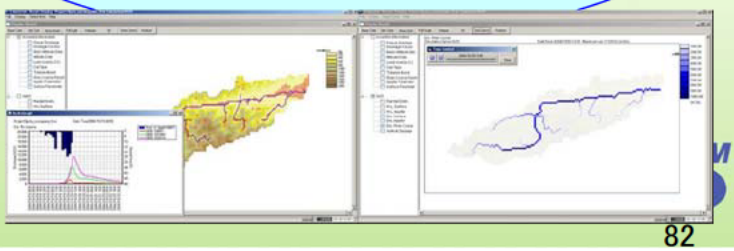
Risk assessment

Integrated with capacity development

IFAS (Integrated Flood Analysis System)

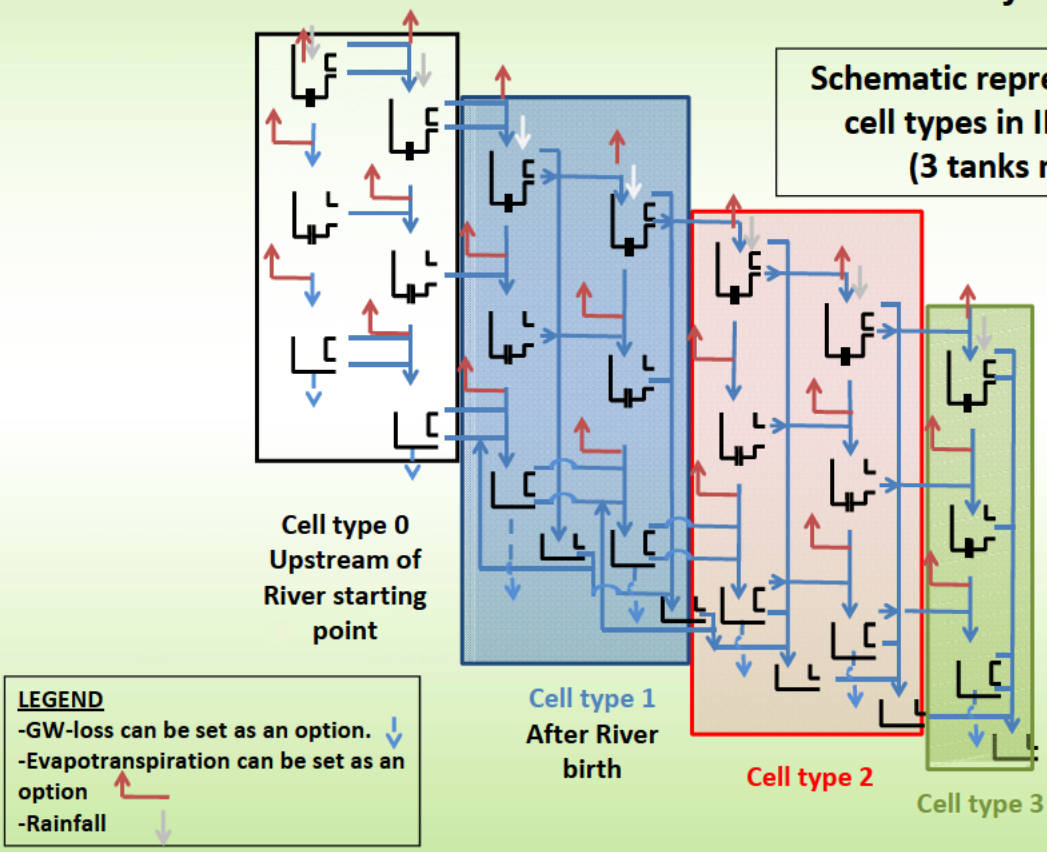


Ungaged or Poorly gaged basins



PWRI Distributed Hydrological Model

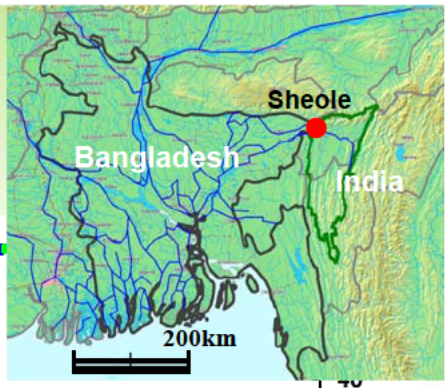
PDHM: Synonym to IFAS

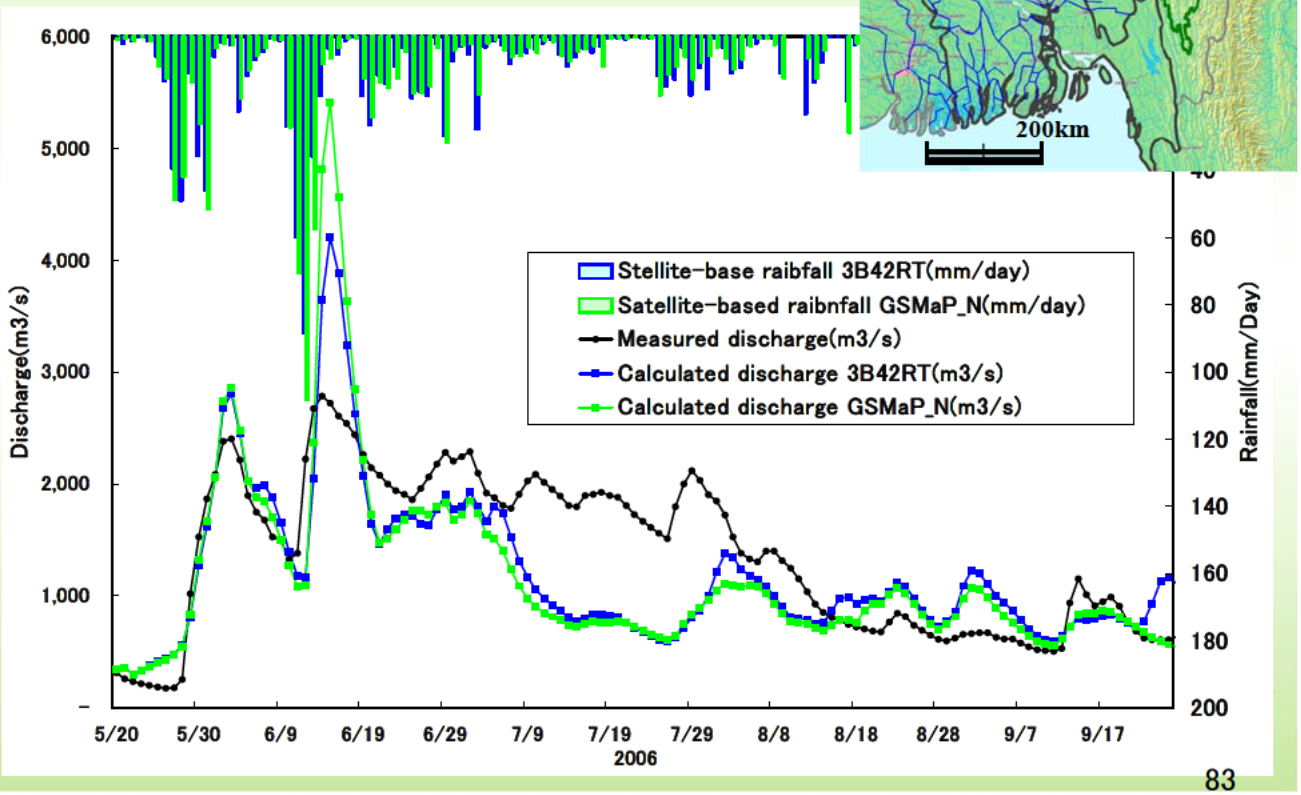


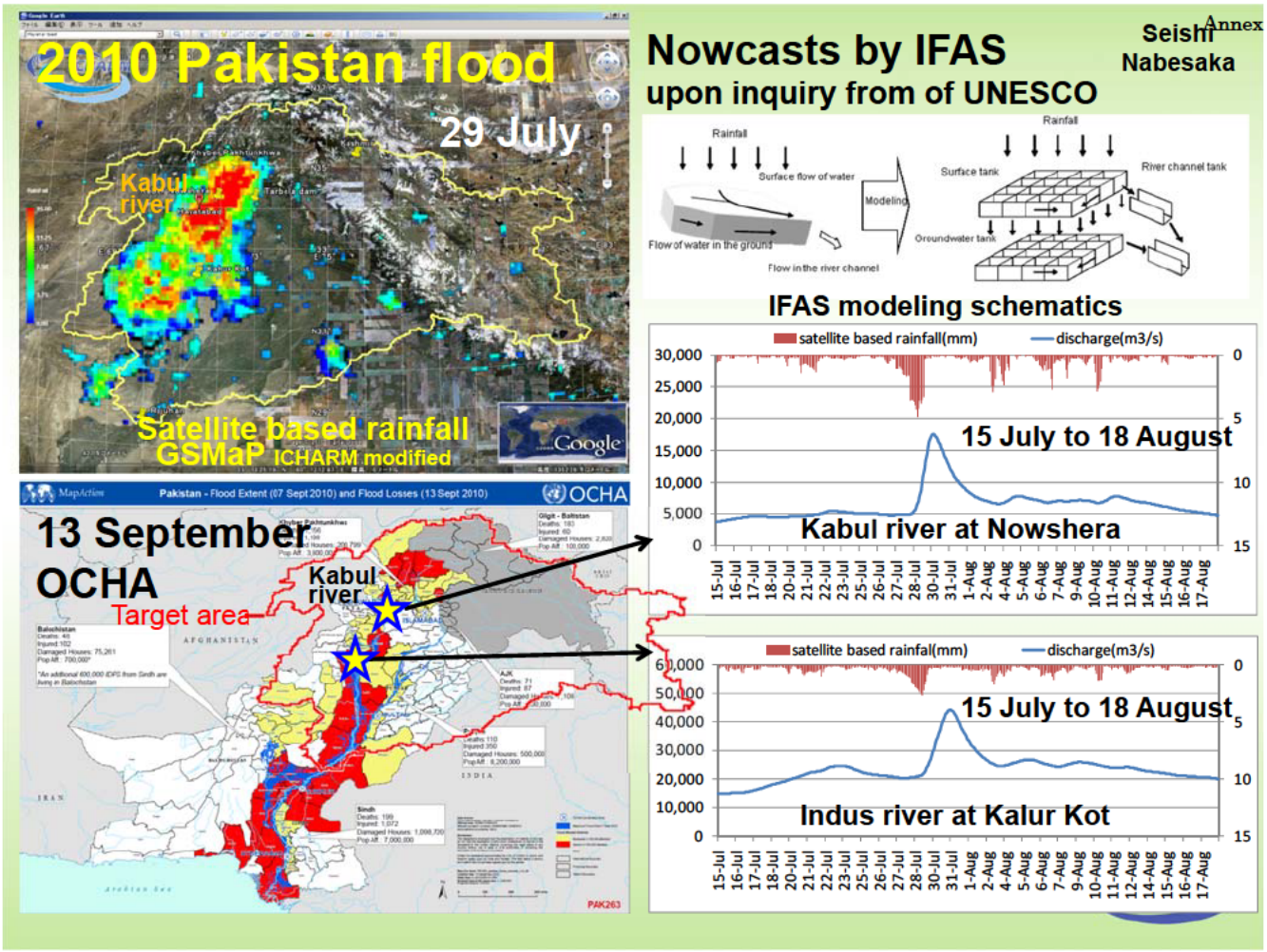
Bangladesh

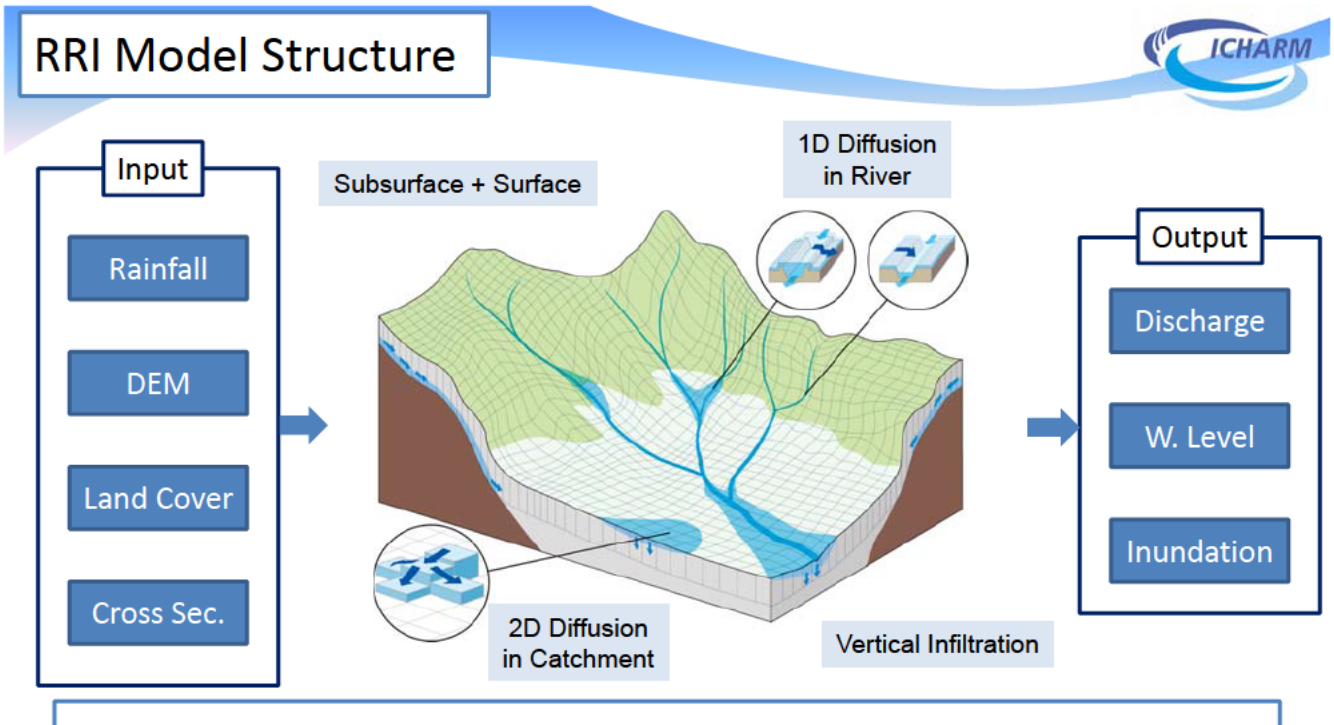
Barak Basin:31,026km^2

Site: Sheole





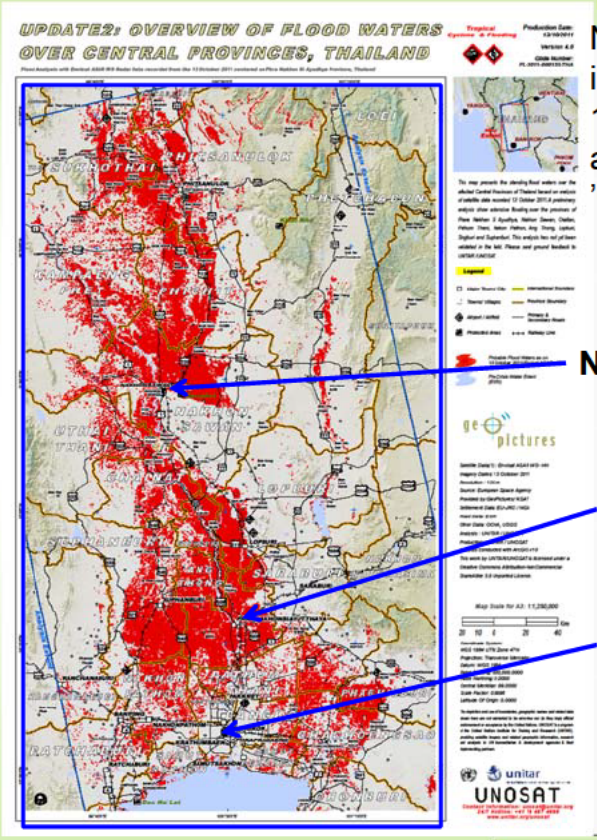




- Two-dimensional model capable of simulating rainfall-runoff and flood inundation simultaneously
- The model deals with slopes and river channels separately
- At a grid cell in which a river channel is located, the model assumes that both slope and river are positioned within the same grid cell

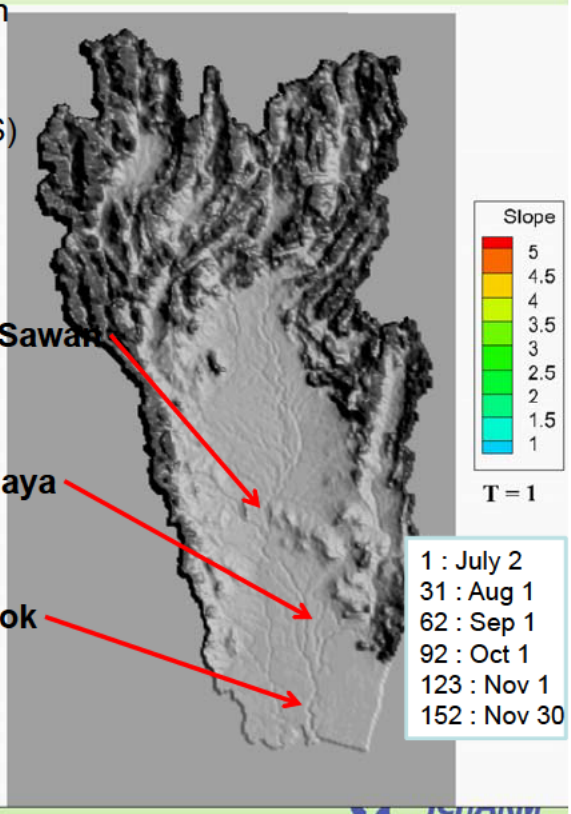
Sayama, T. et al.: Rainfall-Runoff-Inundation Analysis of Pakistan Flood 2010 at the Kabul River Basin, *Hydrological Sciences Journal*, 57(2), pp. 298-312, 2012.

13 Oct, 2011 by MODIS

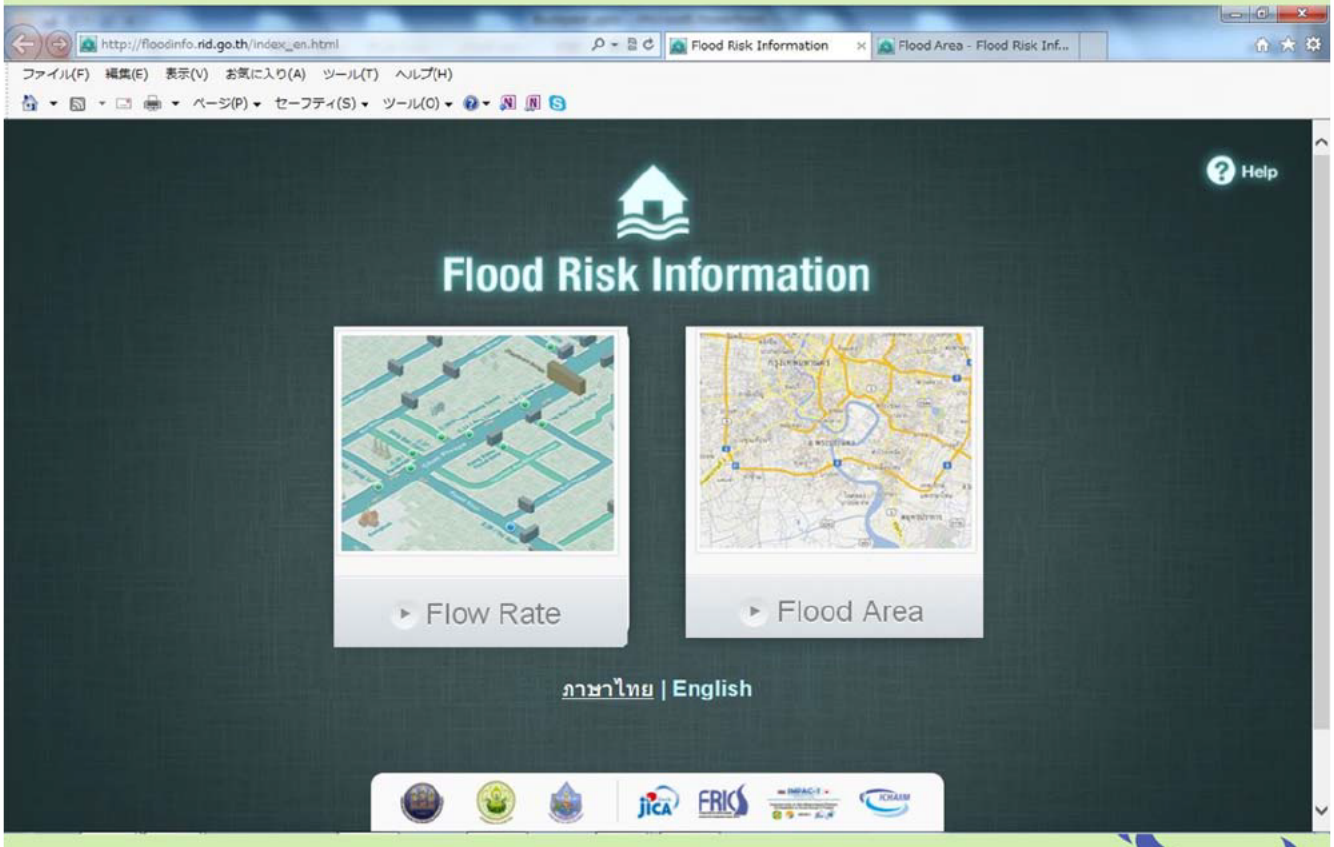


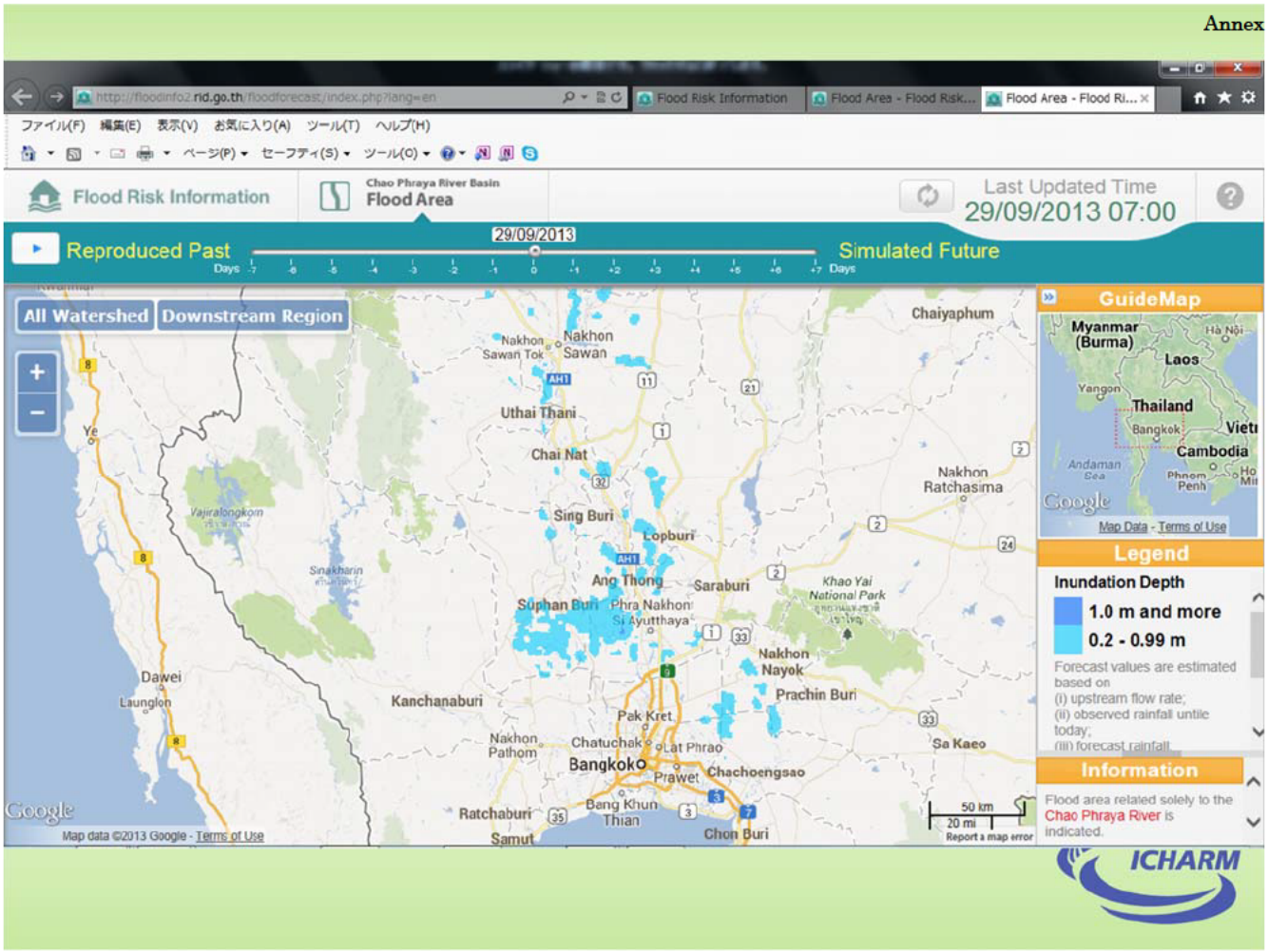
Tyhoon Nock-ten in July. 145% of av (J,A,S) '08-'10

Simulation on Oct 18, 2011 by ICHARM

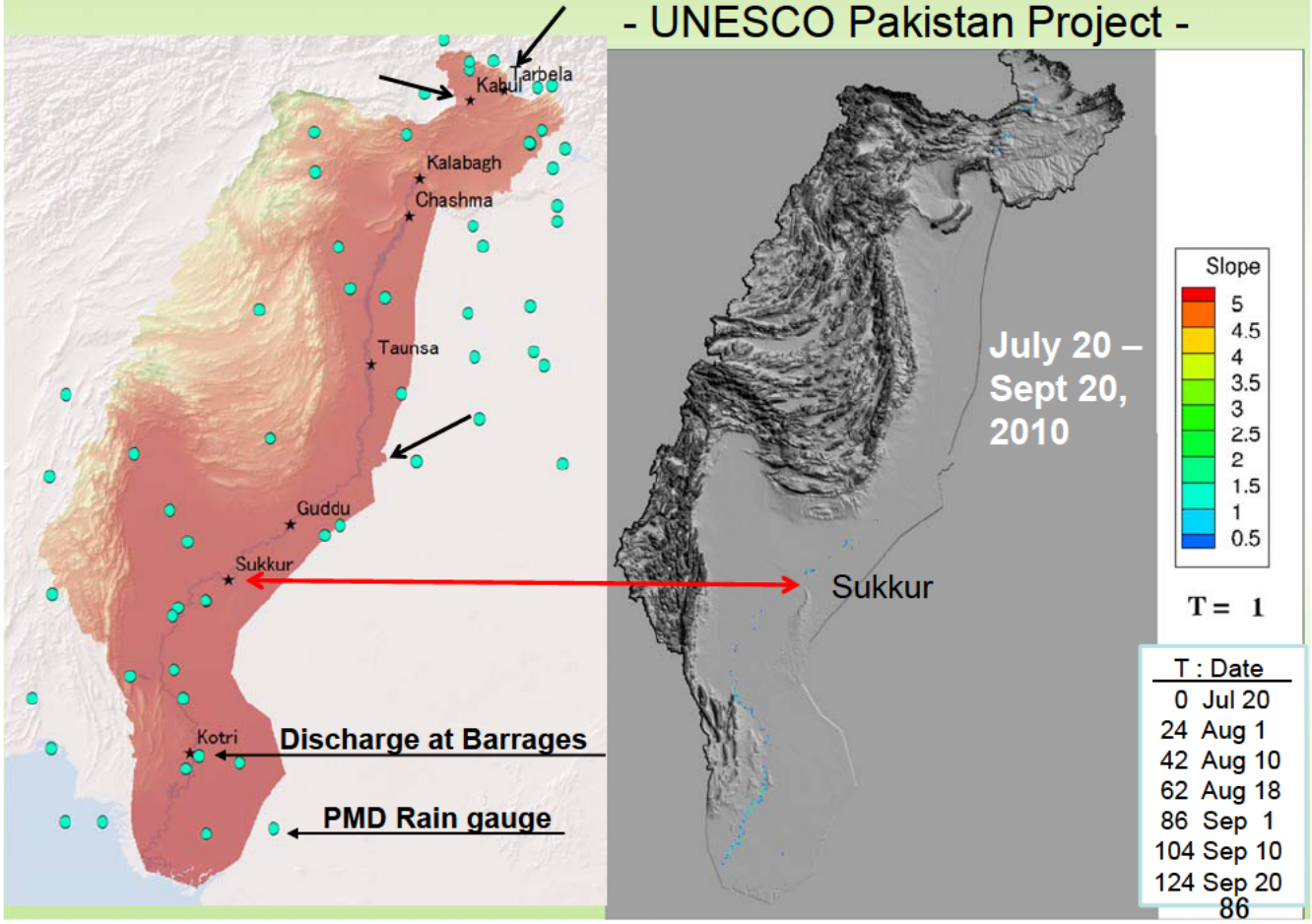


Sayama's RRI model by satellites & NWF





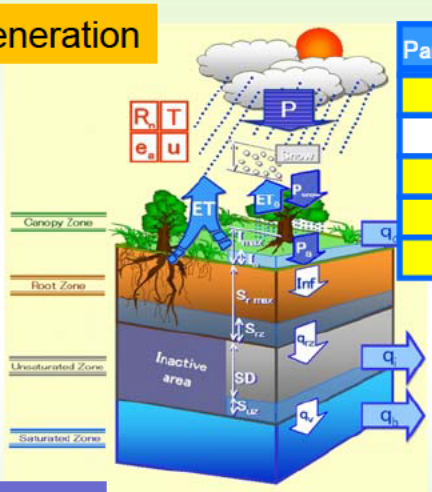
The RRI inundation simulation of the 2010 Indus Flood
- UNESCO Pakistan Project -



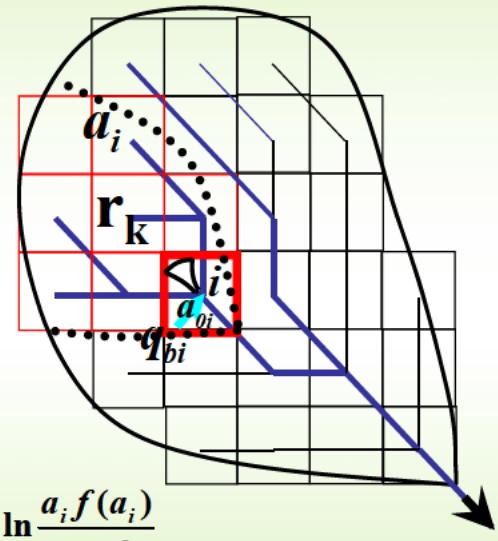
BTOPMC model

Block-wise TOPMODEL with Muskingum-Cunge method

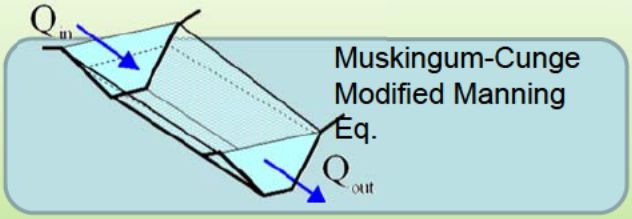
Runoff Generation



Parameters
D_i
m
α_{ET}
B
n_0



Flow Routing



Muskingum-Cunge Modified Manning Eq.

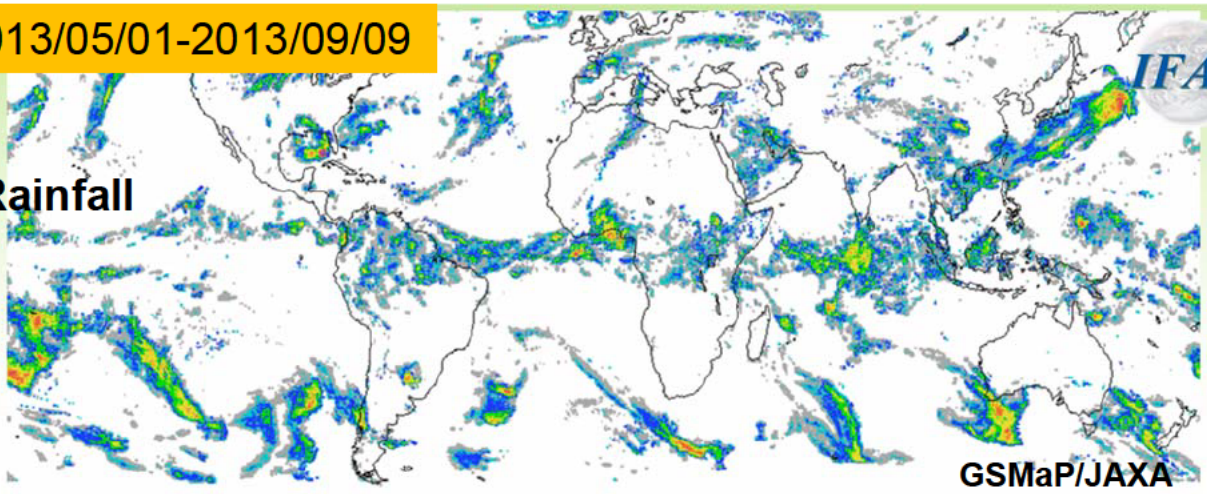
$$\gamma_i = \ln \frac{a_i f(a_i)}{\tan \beta_i}$$

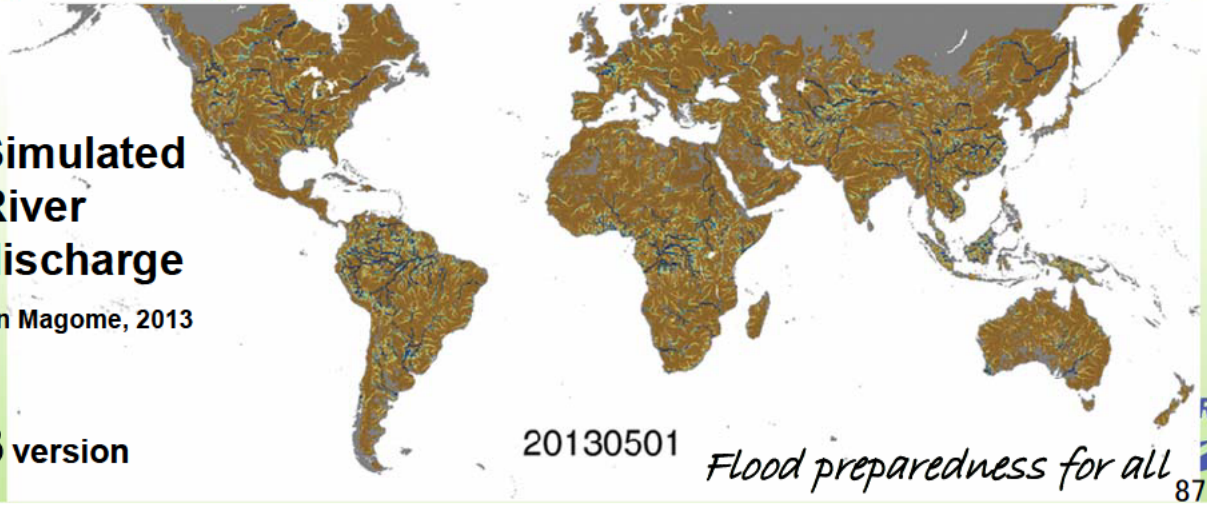
$$SD_i = \overline{SD} + m(\gamma - \gamma_i - \overline{\ln D} - \ln D_i)$$

$$q_{bi} = D_i \tan \beta_i \exp(-SD_i / m)$$

ICHARM

2013/05/01-2013/09/09



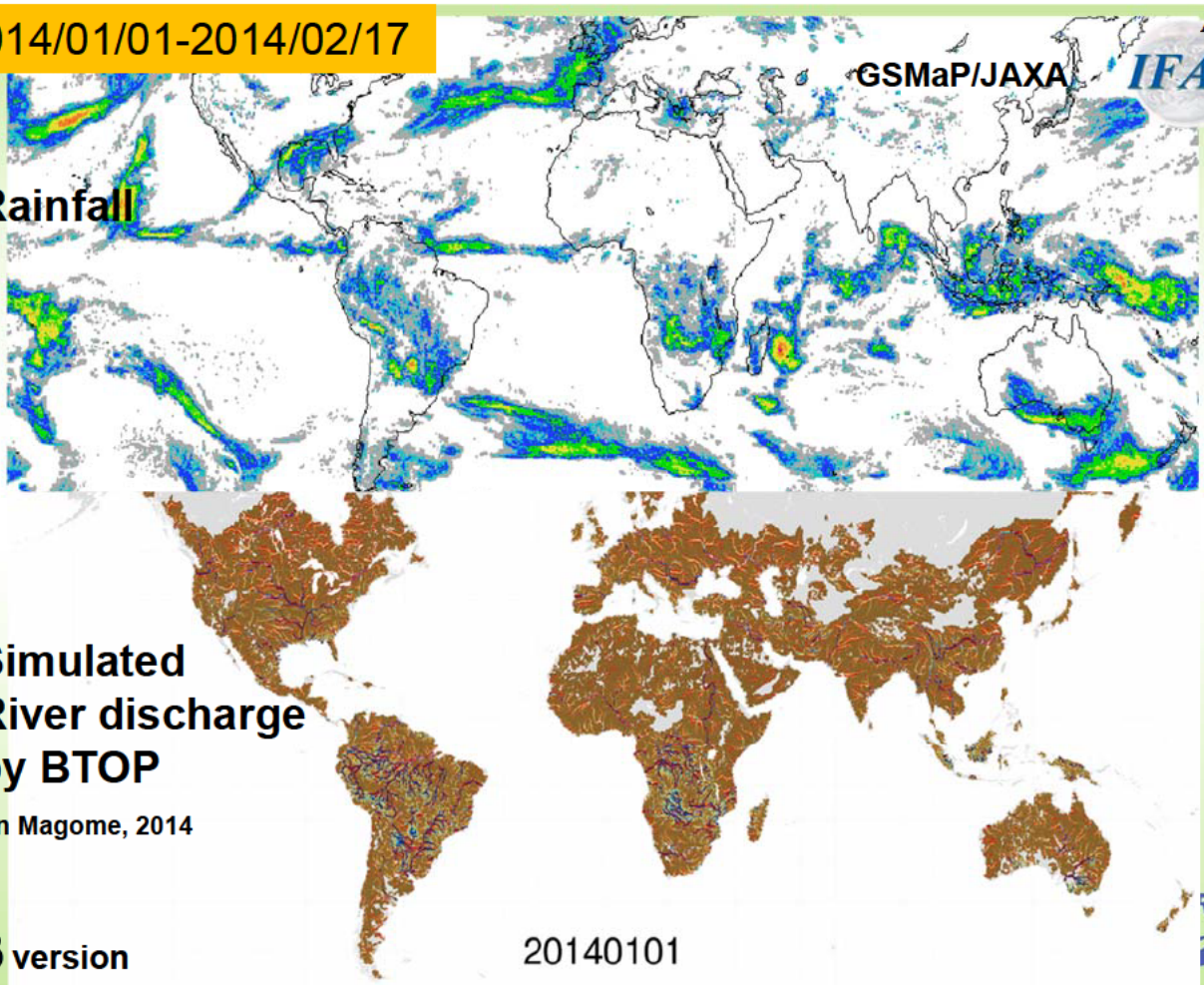


2014/01/01-2014/02/17

GSMaP/JAXA

IFAS

Rainfall



Simulated River discharge by BTOP

Jun Magome, 2014

β version

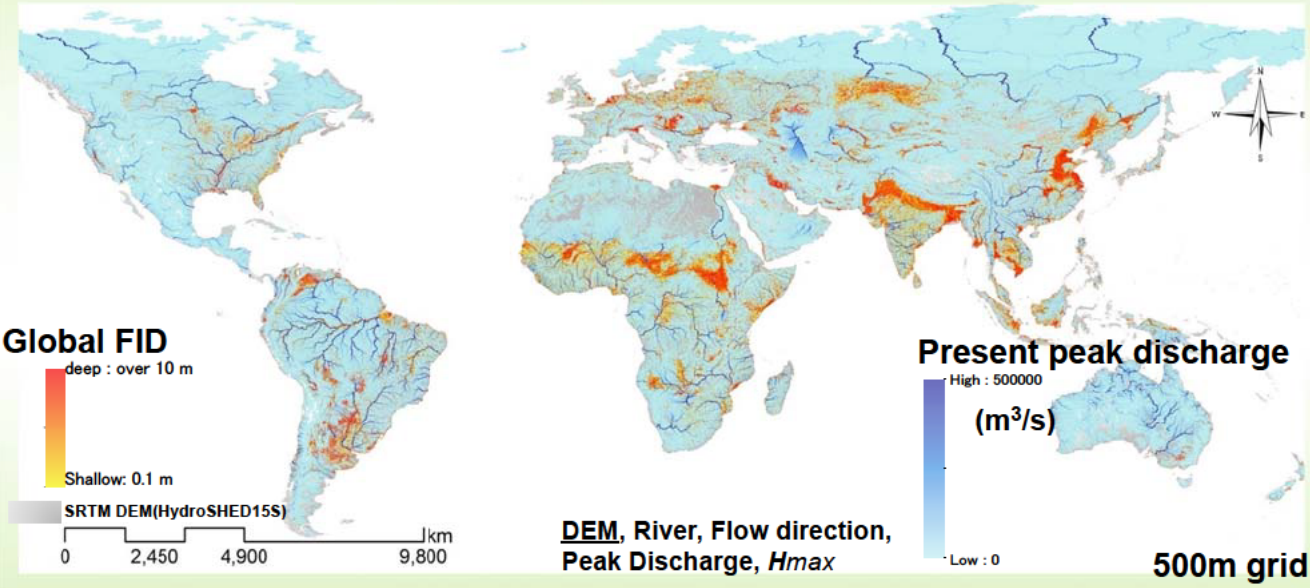
20140101

FLOOD REDUCTION ASSESSMENT SYSTEM

POTENTAIL GLOBAL FLOOD INUNDATION DEPTH

YJ KWAK

Flood Inundation Depth Map



MRI-GCM3.2S BC Present (1980-2004)

50-year return period based on the BTOP model during 25-year simulations

ICHARM

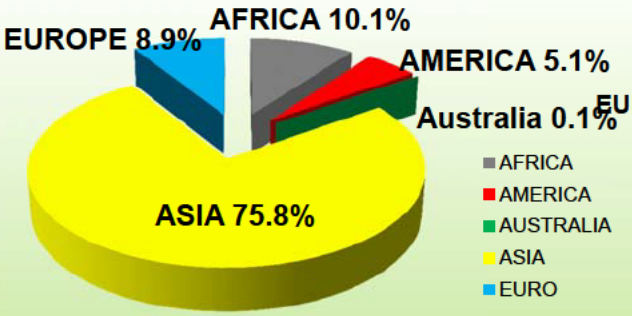
YJ KWAK

Global Flood Risk Assessment

MRI-GCM3.2S BC	AGCM period	Inundated Area (km2)	Area change (%)	Affected People	AP Change (%)
AFRICA	SFAC(2075-2099)	1,589,419	7.3	79,895,776	4.2
	SPAC(1980-2004)	1,480,849		76,679,204	
AMERICA	SFAC(2075-2099)	220,880	1.4	39,153,306	0.6
	SPAC(1980-2004)	217,727		38,901,851	
AUSTRALIA	SFAC(2075-2099)	18,468	1.9	363,953	0.1
	SPAC(1980-2004)	18,129		362,243	
ASIA	SFAC(2075-2099)	1,881,358	4.2	611,300,000	3.4
	SPAC(1980-2004)	1,805,456		576,200,000	
EURO	SFAC(2075-2099)	740,654	2.3	69,075,234	1.9
	SPAC(1980-2004)	723,960		67,775,212	

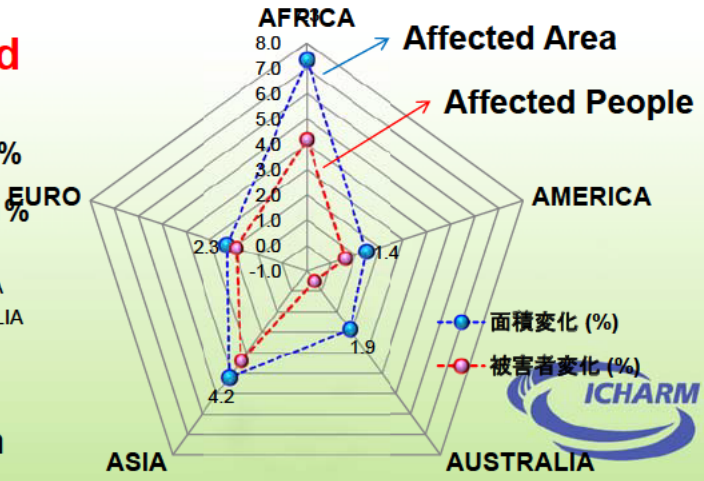
Continent-wise Potential Affected People

760 million People Affected



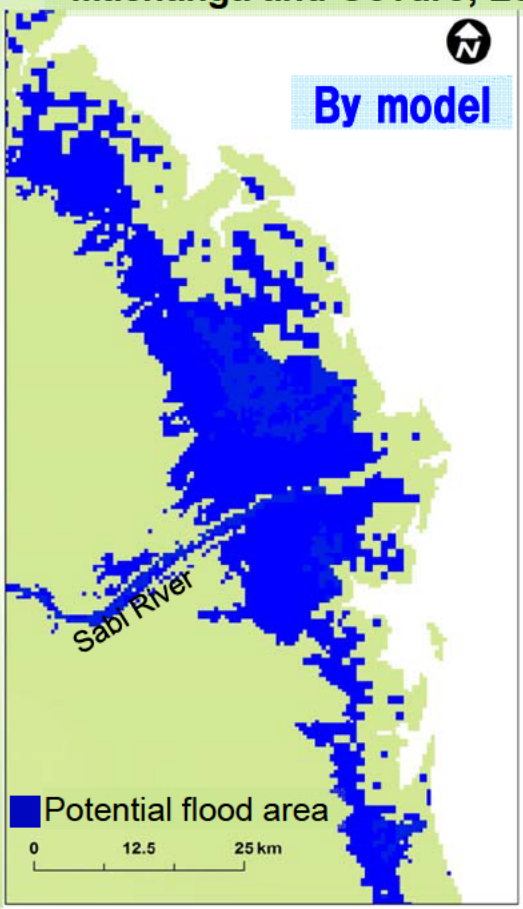
Present (1980-2004) 759.9 million

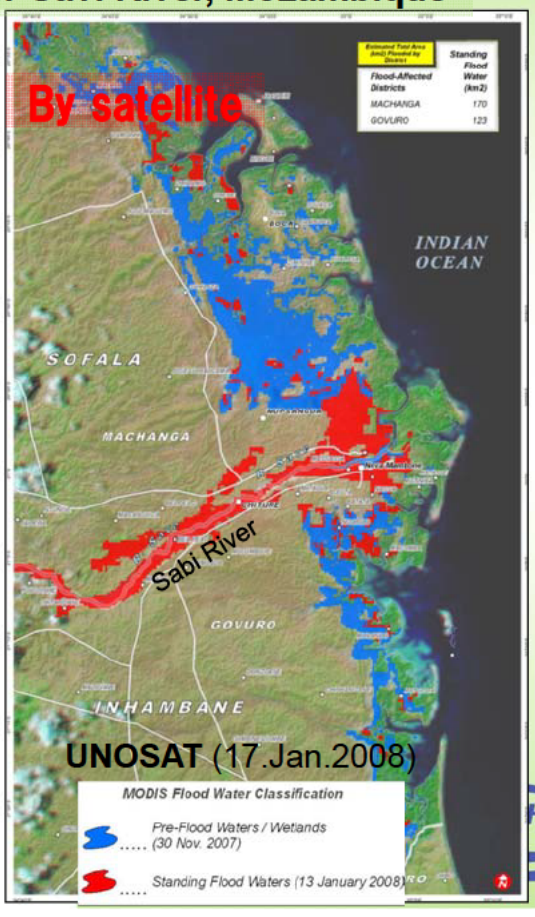
Estimated % increase in (2075-2099) without population change



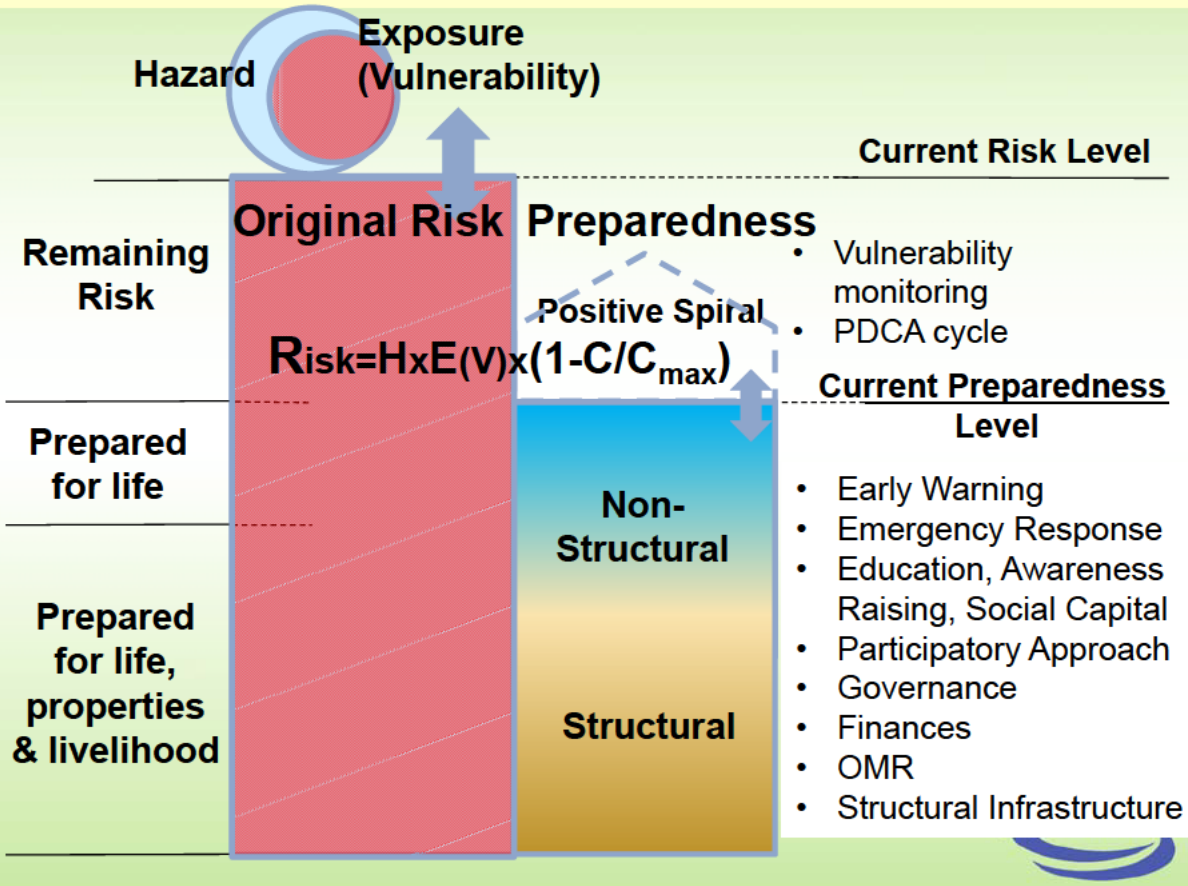
ICHARM

Map of Flood Waters over the Affected Districts of Machanga and Govuro, Lower Savi River, Mozambique

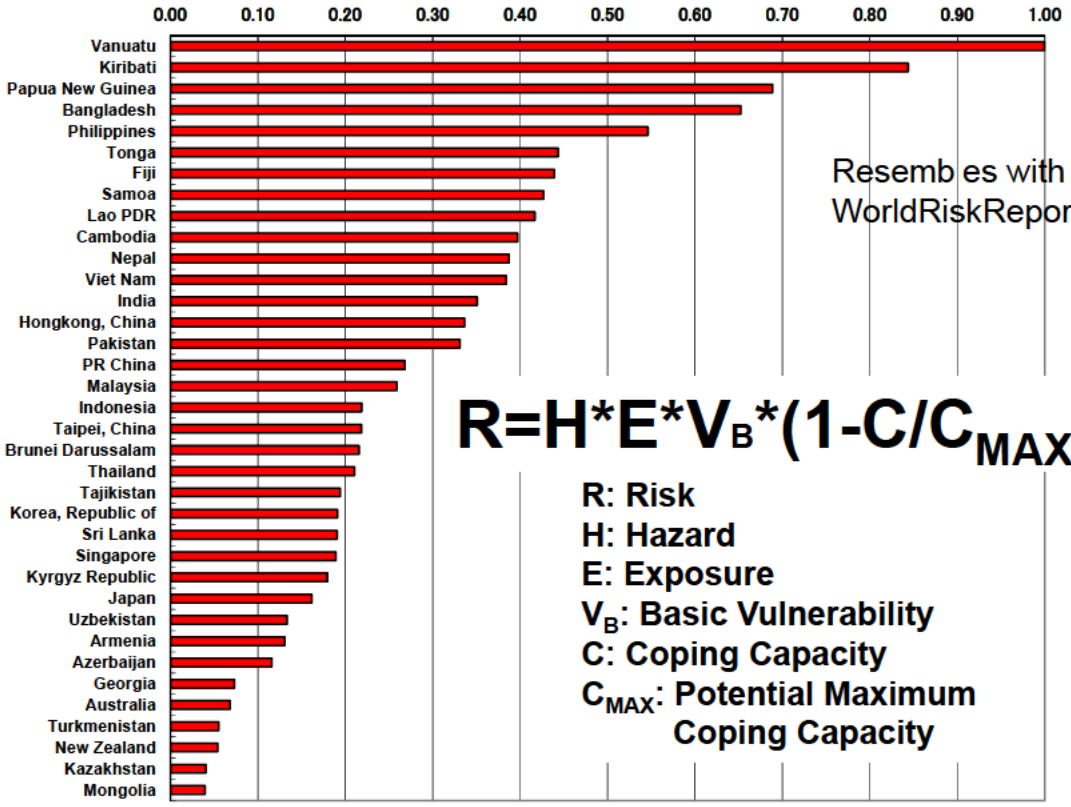




Monitor Disaster Risk & Preparedness



Flood/Wind Storm Disaster Risk Index of ADB member countries (draft for AWDO)

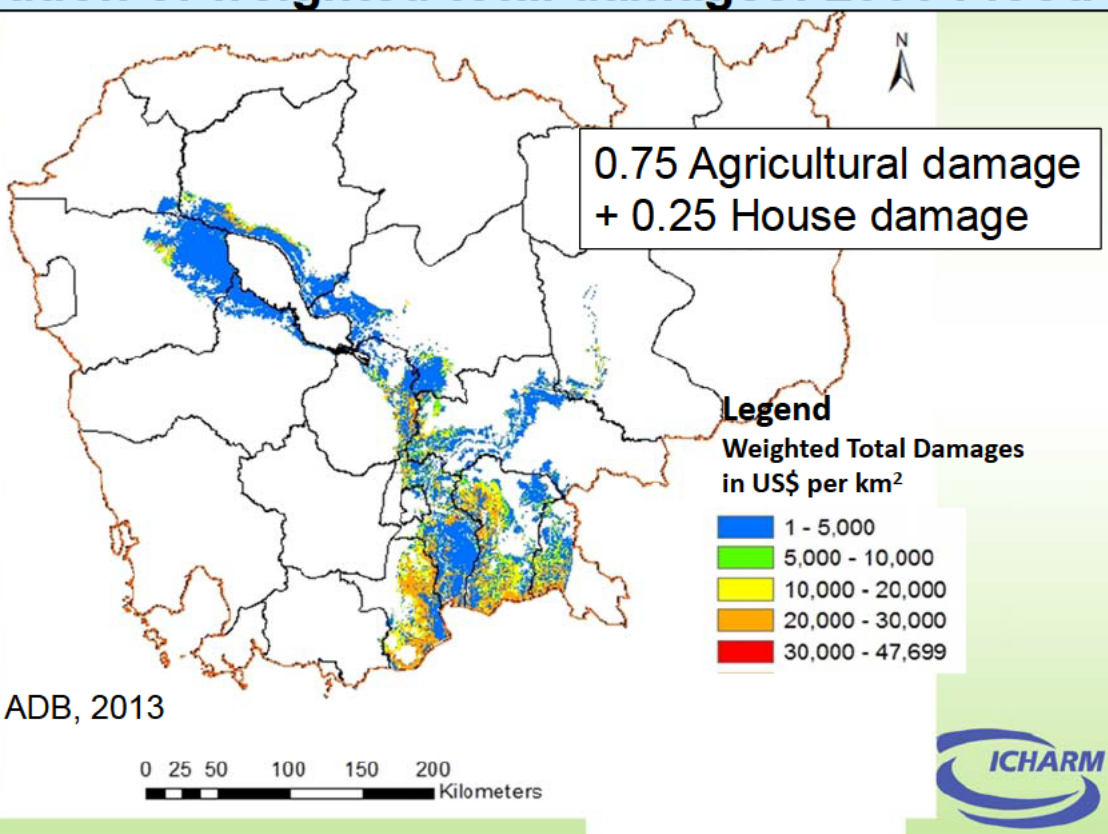


Resemb es with WorldRiskReport2011

$$R=H*E*V_B*(1-C/C_{MAX})$$

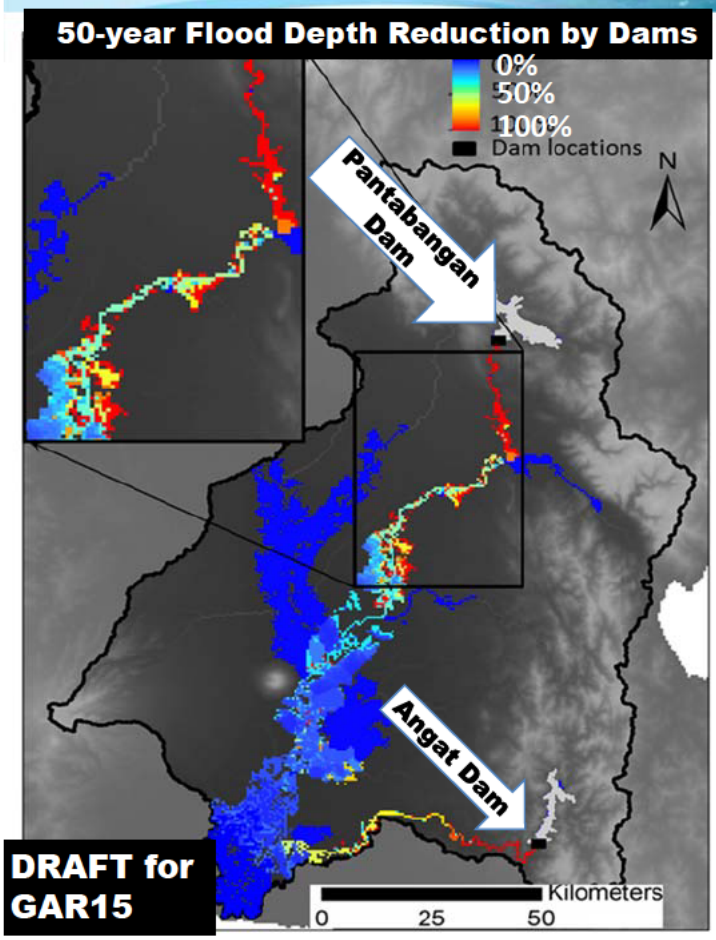
R: Risk
H: Hazard
E: Exposure
V_B: Basic Vulnerability
C: Coping Capacity
C_{MAX}: Potential Maximum Coping Capacity

Flood Vulnerability Measure
Distribution of weighted total damages: 2000 Flood



Reported to ADB, 2013

ICHARM



GWDRI

Global Water Disaster Risk Index

The Pampanga River Basin, the Philippines

Under 50 year Flood

<u>Supposing no dams,</u>

The inundated area: 1,362km²

The affected people: 993,000

<u>With existing two dams,</u>

The inundated area decreases by 3.2 %

The affected people by 6%.

ICHARM

LOCAL PRACTICES

Realization of localism
together with local people

Local Practices Program
with local partners

- Based on local realities and real problems
- Advanced technology with capacity development
- Jointly with local people
  - Nepal, Bangladesh, Indonesia, Cambodia, Philippines, Thailand, Pakistan


West Rapti, Banke, Nepal


Community Consultation, Banke Nepal

ADB-ICHARM TA7276-REG

2009.11-2013.3

Bangladesh: Whole Nation
- Review & recomm of Early Warning Systems
- Capacity building

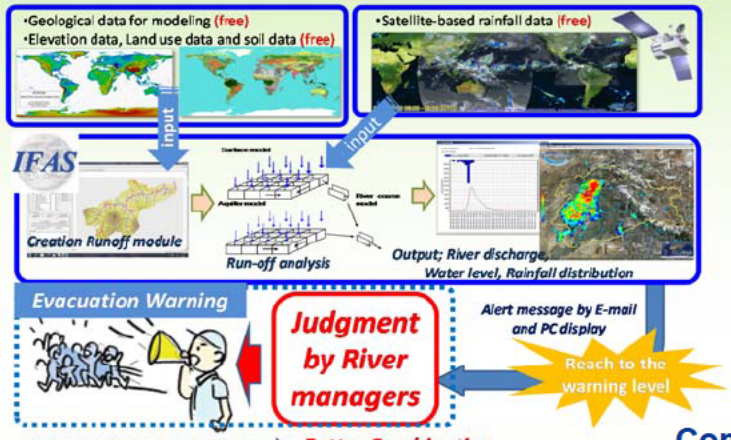
Philippines: Pampanga & Cagayan basins
- Application of IFAS
- Capacity devlpmnt & training

Cambodia: Lower Mekong Basin
- Development of flood vulnerability indices

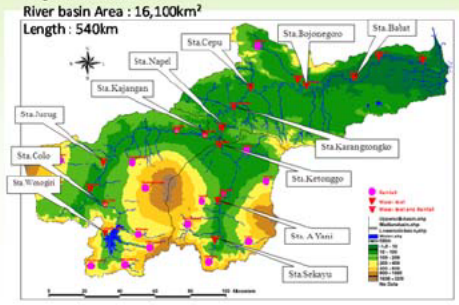
Indonesia: Solo basin
- Implementation of satellite-based flood forecasting system
- Community-managed flood risk management
- Capacity building

IFAS installation in Solo river basin in Indonesia

Integrated Flood Analysis System (IFAS)

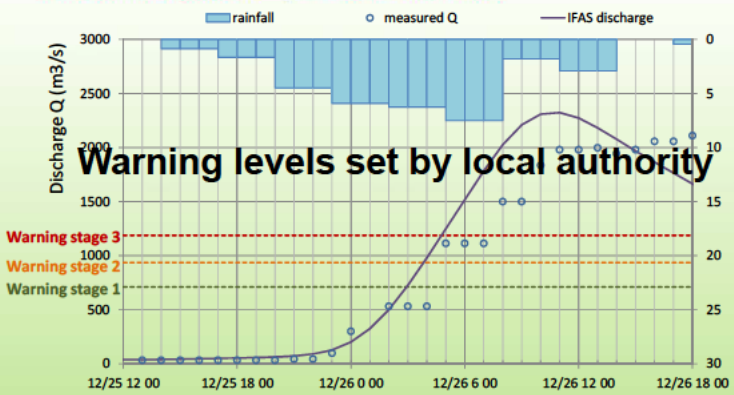


Solo River



Community based flood management

Demonstration activities:
(1) facilitation for community hazard and risk assessment and mapping,
(2) facilitation for preparing risk maps, FRM action plans and the manual for early warning system and evacuation plan
(3) support community in technical aspects for carrying out emergency drills and exercises

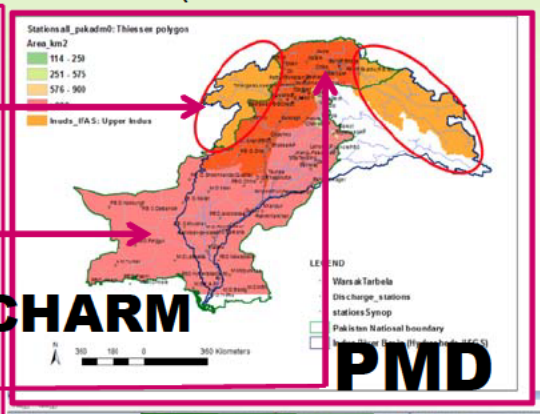


Warning levels set by local authority

Indus-IFAS: flood forecasting system based on IFAS/RRI (**UNESCO-Pakistan project** 2012-13)

INPUT DATA CHALLENGES:

- *Lack of transboundary data*
- *Null-Low raingauges network density*
- *Uncertainty on snowmelt*

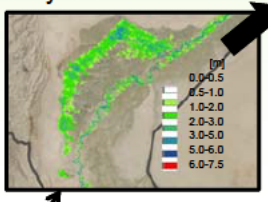


ICHARM

PMD

JAXA, SUPARCO

Inundation area by RRI

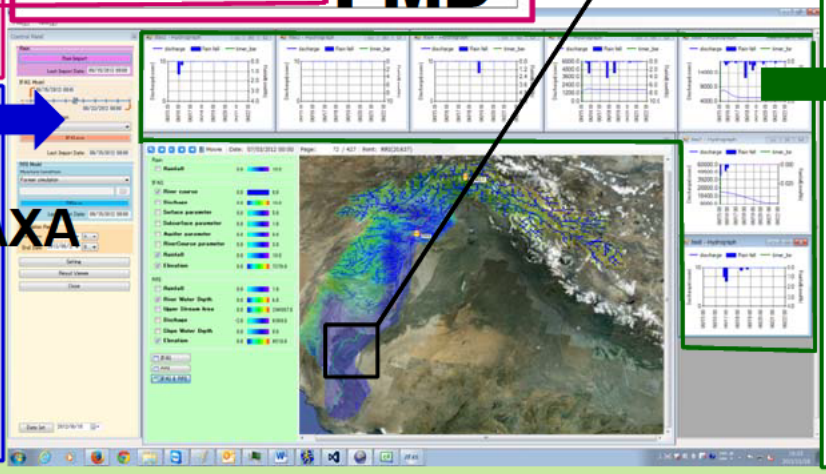


FLOOD HAZARD MAPPING

INPUT DATA :

- Rainfall data (ground-gauges, GSMaP, forecasted)
- **Real-time observed discharges**

JAXA



OUTPUT DATA:

- Rainfall distribution maps
- Hydrographs at specified locations
- Inundation extents in mid-low Indus

Capacity Building for Pakistan (2012-13)

6 Pakistani officers graduating from ICHARM/GRIPS MSc

Short- training in Japan of 11 Senior Managers from Pakistan

ICHARM participation to international Workshop and Training in Pakistan

Indus-IFAS training in Pakistan

INFORMATION NETWORKING

To support and collaborate for mainstreaming DRR based on scientific knowledge

ICHARM

Information Networking

Alliance with Univ., Prof. Ass., UNOs, IOs, Gov., GOs, NGOs etc.

INTERNATIONAL FLOOD INITIATIVE

MISSION STATEMENT:

The International Flood Initiative (IFI) promotes an integrated approach to flood management to take advantage of floods and use of flood plains while reducing the social, environmental and economic risks.

OVERALL OBJECTIVE:

To build the capacity necessary to understand and better respond to flood hazards, vulnerabilities and benefits.

IFI's GUIDING PRINCIPLES:

Living with Floods
Equity
Empowered participation
Inter-disciplinarily and trans-sectorality.
www.ifi-home.info

IFI Flagship Project:

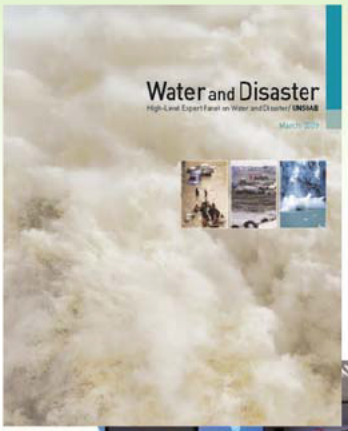
Project to support targeting, strategizing and benchmarking flood risk reduction at global, national and local levels

Launched at UNHQ, NY in March 2013

In Close Collaboration with:

UNESCO · International Hydrological Programme · World Meteorological Organization · UN · International Strategy for Disaster Reduction (ISDR) · UNU · United Nations University · ICHARM · IAHS AISH · IAHR AIRH

Activities as a member of High Level Expert Panel on Water and Disaster (HLEP/UNSGAB)



HLEP Report of action plans through meetings in Tokyo, Seoul, Marseilles, New Orleans, and Istanbul. 40 actions proposed and committed by members. IFI no.2 and 30 (Early warning & risk indices)

The Side Event of the Special Thematic Session on Water and Disasters (UN Headquarters, New York, March 5th 2013)

Special Thematic Session on Water (UN Headquarters, New York, March 6th 2013)

ICHARM

United Nations Special Thematic Session on Water & Disasters

on March 6, 2013, NY

- The first high-level UN thematic event discussing issues at the nexus of water and disasters.
- **His Imperial Highness the Crown Prince of Japan and His Royal Highness the Crown Prince of Orange of the Netherlands presented keynote addresses.**
- Assembled audience of 500 experts and officials from UN member states, international organizations, private sector, and civil society.

Side Event to the Session co-hosted by ICHARM

- Approximately 100 experts from 30 countries and organizations.
- Side Event participants recommended that the international community establish measurable targets for disaster risk reduction as part of **the post-MDG & HFA2 process**, and enhance international and regional cooperation to facilitate sharing of knowledge and experience in disaster management.

ICHARM

居安思危 Be aware of risk while we are safe

思則有備 Awareness leads us preparedness

有備無患 Preparedness leaves us no regret

「春秋」左氏伝
Source: Zuo Qiuming "Zuoshi Commentary" in Confucius ed. "Spring and Autumn", 480BC

ICHARM cares people's well-being and empowerment!

www.icharm.pwri.go.jp

ICHARM *preparedness for floods*

参考資料）

第 1 回 ICHARM 運営理事会　会議資料（日本語版）

目次

第 1 回 ICHARM 運営理事会

議事案

日時：平成 26 年（2014 年）2 月 25 日（火）

場所：経済産業省別館 3 階　310 会議室

議事案：

10:00-10:05
　開会　　土木研究所　理事長

10:05-10:15
　冒頭挨拶　　ユネスコ
　　国土交通省　技監

10:15-11:50
【審査事項】議長：魚本理事長
1) 運営理事会手続規則の審査・採決

2) ICHARM 活動レポートの審査

3) 長期及び中期プログラムの審査・採決

4) 事業計画の審査・採決

11:50-12:00
　閉会の挨拶

12:00-13:00
　写真撮影、意見交換会

第 1 回 ICHARM 運営理事会

出席者名簿

白石　隆 Takashi Shiraishi

政策研究大学院大学(GRIPS)、学長

ヨハネス・クルマン Johannes Cullmann

ユネスコ国際水文学計画（IHP）政府間会合、議長

マルガリータ・ワルストロム Margareta Wahlström

国連防災戦略(ISDR)、特別代表

不破　雅実 Masami Fuwa

国際協力機構(JICA)、地球環境部長（田中明彦理事長代理）

足立　敏之 Toshiyuki Adachi

国土交通省(MLIT)、技監

魚本　健人 Taketo Uomono (議長)

土木研究所(PWRI)、理事長

ブランカ・ヒメネス・シスネロス Blanca Jimenez-Cisneros

ユネスコ(UNESCO)、水科学部長（Irina Bokova 事務局長代理）

（敬称略）

(事務局)

藤澤　　寛 Hiroshi Fujisawa, 土木研究所理事
竹内　邦良 Kuniyoshi Takeuchi, ICHARM センター長
安田　成夫 Nario Yasuda, ICHARM グループ長
廣木　謙三 Kenzo Hiroki, ICHARM 国際水防災研究監
加本　　実 Minoru Kamoto, ICHARM 上席研究員
岡積　敏雄 Toshio Okazumi, ICHARM 上席研究員
岩見　洋一 Yoichi Iwami, ICHARM 上席研究員
村瀬　勝彦 Masahiko Murase, ICHARM 上席研究員

Rules of Procedure for ICHARM Governing Board
ICHARM 運営理事会　手続規則

As of 14 January 2014
平成 26 年 1 月 14 日現在

English	（日本語対訳）
Article 1　Intent These Rules of Procedure (hereinafter referred to as "the Rules") shall state the necessary matters which shall guide proceedings of the International Centre for Water Hazard and Risk Management (ICHARM) Governing Board (hereinafter referred to as "the Governing Board") meeting, subject to Article 6 of the agreement between the Government of Japan and the United Nations Educational, Scientific and Cultural Organization (UNESCO) regarding the International Centre for Water Hazard and Risk Management (category 2) under the auspices of UNESCO, signed on 23 July 2013 (hereinafter referred to as "the Agreement").	（趣　旨） 第１条　この規則は、2013 年 7 月 23 日に締結された国際連合教育科学文化機関の賛助する水災害の危険及び危機管理のための国際センター(第二区分)に関する日本国政府と国際連合教育科学文化機関との間の協定（以下「協定」という。）第６条に規定する ICHARM 運営理事会（以下「運営理事会」という。）の開催について必要な事項を定めるものである。
Article 2　Composition 1) The members of the Governing Board will be composed as provided for by Article 6 of the Agreement. The Chief Executive of the Incorporated Administrative Agency Public Works Research Institute, Japan will be designated as Chairperson of the Governing Board. 2) The members of the Governing Board shall be appointed by the Chairperson. 3) The term of office for each Governing Board member appointed by the Chairperson shall be two years. This term may be extended by re- appointment.	（構　成） 第２条 1) 運営理事会は、協定第６条に規定した構成員により構成する。日本国の独立行政法人土木研究所理事長を議長とする。 2) 構成員は議長が委嘱する。 3) 議長が任命する構成員の任期は 2 年とし、再任を妨げない。
Article 3　Board Meetings, Quorum, and Minutes 1) The functions of the Governing Board shall be prescribed as provided for by Article 6 of the Agreement. 2) The Chairperson shall convene the Governing Board meeting. Participation by a majority of Governing Board members shall be necessary to proceed with the Governing Board meeting. 3) The majority agreement of all attendees shall be necessary for the adoption. 4) The official language of the Governing Board meeting shall be English. 5) The secretariat of the Governing Board (referred to in Article 4) shall take minutes of the Governing Board meetings.	（議事等） 第３条 1) 運営理事会は、協定第６条に規定した事項を行う。 2) 運営理事会会合は、議長が議事進行を執り行う。運営理事会会合は、構成員の２分の１以上の出席をもって成立する。 3) 採択にあたっては出席者の２分の１以上の賛成を要するものとする。 4) 運営理事会会合の公式言語は英語とする。 5) 運営理事会の事務局（第４条に規定する委員会の事務局をいう。）は、運営理事会の議事に関する記録を作成するものとする。
Article 4　Secretariat ICHARM shall function as the secretariat of the Governing Board.	（事務局） 第４条　運営理事会の事務局は、ICHARM に置く。
Article 5　Amendment of the Rules The Rules may be amended during a Governing Board meeting by consent of the majority of attendees. The Chairperson can ask for electronic votes when urgent decision issues relevant to the Rules arise between meetings. The decisions in such cases shall be made by consent of the majority of the members who have voted by deadlines.	（要領の改正） 第５条　この規則は、運営理事会会合においては参加者の過半数の同意をもって改正できる。会合と会合の間において、この規則に関連して緊急に決定する必要が発生した場合、議長は電子投票を求めることができる。その場合、期限までに投票のあった構成員の過半数の同意をもって決定するものとする。
Article 6　Miscellaneous Provisions Miscellaneous provisions necessary for the management of the Governing Board but not included in the Rules shall be decided by the Chairperson in consultation with the Governing Board members.	（雑　則） 第６条　この規則に定めるもののほか、運営理事会に関して必要な事項は、議長が運営理事会に諮って定める。
Supplementary Provisions The Rules shall be enacted on 25 February 2014.	（附　則） この規則は、平成 26 年 2 月 25 日から施行する。

ICHARM Activity Report

[from October 2010 to March 2014]

（日本語版）

ICHARM Activity Report

[from October 2010 to March 2014]

目次

1. ICHARM の概要

1.1　歴史

UNESCO での署名式（2006 年 3 月 3 日）

2004 年 9 月、UNESCO の IHP（国際水文計画）政府間理事会において、土木研究所の 1 組織として ICHARM を設立する旨の日本政府からの提案を支援する決議が採択された。

2005 年 10 月には第 33 回 UNESCO 総会において提案を承認する決議が 191 の加盟国によってなされ、2006 年 3 月 3 日には日本政府と UNESCO、土木研究所と UNESCO 間のそれぞれの協定文書が締結された。3 日後の 3 月 6 日には、ICHARM は正式に設立された。

ICHARM 設立（2006 年 3 月 6 日）

設立後、ICHARM は様々な活動を積極的に実施し、2011 年 1 月には、ICHARM の活動に対する UNESCO からの評価が行われ、高い評価を受けた。それを受け、2013 年 7 月に日本政府と UNESCO との間で ICHARM 設立に関する協定が更新され、ICHARM はこれまでと同様に、UNESCO の後援を受けたカテゴリー2 センターとして活動を継続することとなった。なお、新協定では、旧協定下で設置されていた ICHARM Advisory Board（助言委員会）に代わって、ICHARM Governing Board（運営理事会）が設置され、ICHARM の長期・中期計画などについて審査・採択を頂くこととなった。

1.2　ICHARM の 3 本柱の活動

ICHARM は設立以来、ICHARM 助言委員会で意見を頂いた「ICHARM Action Plan」に沿って、図 1-1 のように「先端技術を活用した『研究』活動」、「主に途上国の行政官の能力開発を行う『研修』活動」、「ICHARM のプレゼンスを積極的に世界に向けて発信する『情報ネットワーク』活動」の 3 本柱を軸とし、活動を実施してきた。

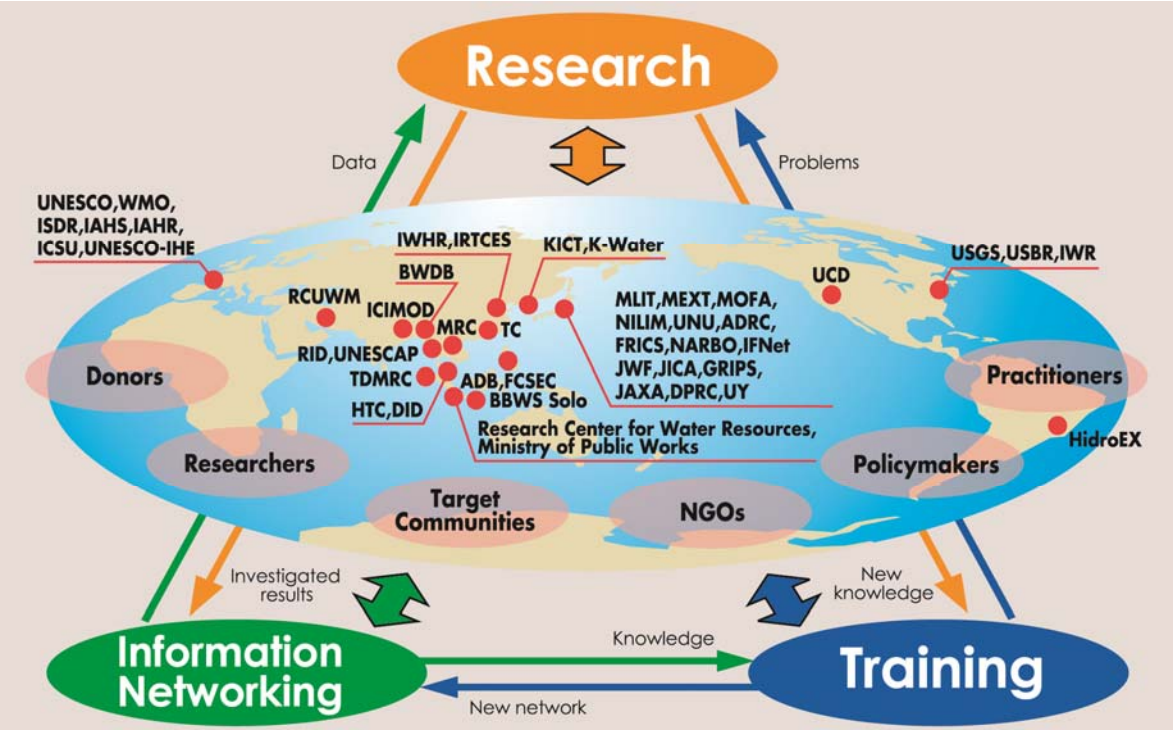
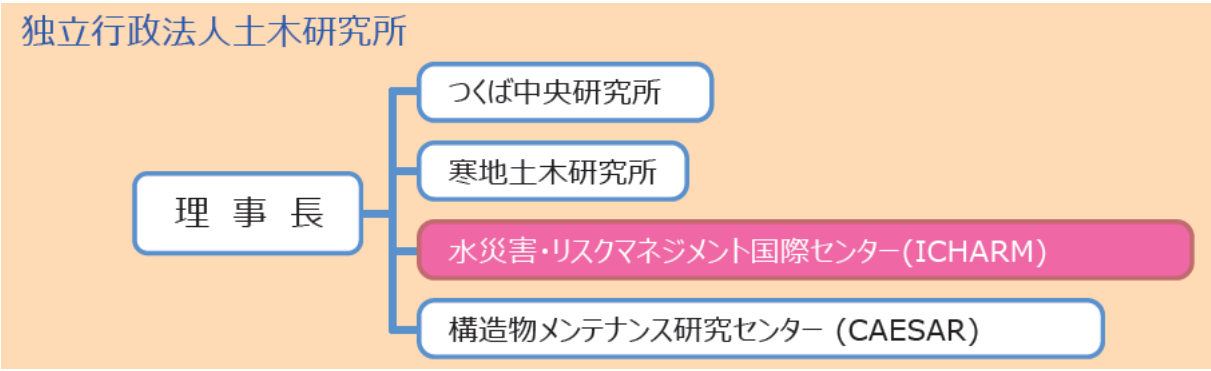


図 1-1　ICHARM の 3 本柱の活動

1.3　組織

ICHARMは設立以降、UNESCOカテゴリー2センターとして、UNESCOから後援を受けながらもUNESCOからは独立し、土木研究所の一組織として活動してきた。現在では、土木研究所の4つの主要な組織の一つとなっている。



ICHARM は、設立以降、活動の深度化に伴って職員数を増やしてきている。現在、設立当初と比較するとその数は約 3 倍となっており、これは土木研究所の他の研究グループと比較して最も職員数は多い。

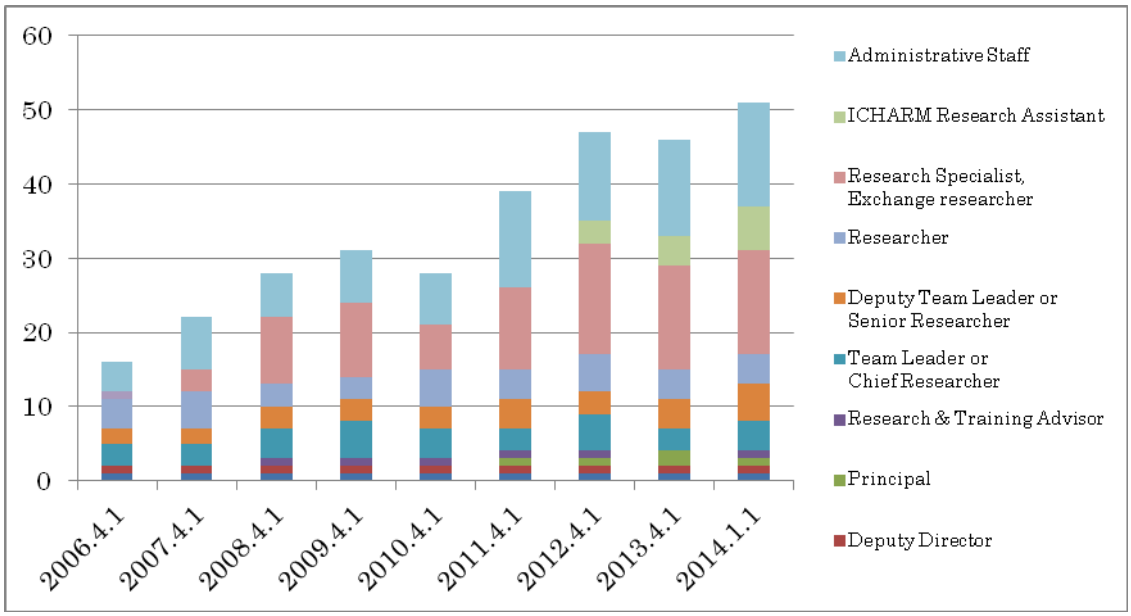


図 1-2　ICHARM 職員数の推移

1.4　予算

ICHARM の予算は、土木研究所からの予算とそれ以外の予算から成っており、それらの推移を図 1-3,4 に示す。土木研究所全体としての予算は、行財政改革に伴い減少傾向にある中で、ICHARM に関しては、2006 年 3 月の設立以降、土木研究所からの予算は増加傾向である（図 1-3）。これに伴い、土木研究所に占める ICHARM の予算割合は増加傾向にある（図 1-4）。

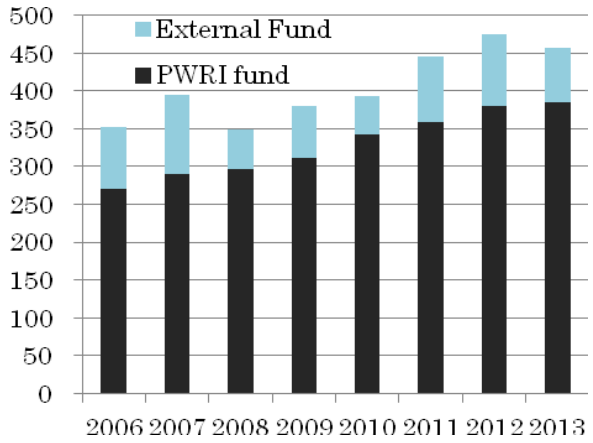


図 1-3　ICHARM 予算の推移

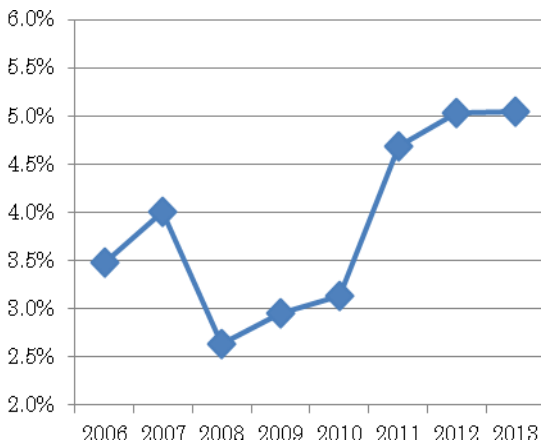


図 1-4　ICHARM/PWRI の予算比率の推移

1.5　ICHARM 助言委員会と ICHARM Action Plan の達成度

第 3 回 ICHARM 助言委員会（2010 年 9 月 29 日）

ICHARM 助言委員会は旧協定に基づき設置された。13 名の委員が選出され、ICHARM の過去の活動についてレビューがなされるとともに、ICHARM センター長が提出した「ICHARM Action Plan」に対して助言が与えられた。

現在の Action Plan は第 3 回の ICHARM 助言委員会で議論されたものであり、“consolidation（強化）”の言葉のもと、質の向上による能力向上のための戦略が提案された。この“強化“は、行動計画を「単なる例示」から「実質への適用」にシフトするために、行動内容の充実を強化することで達成される。

この“強化“のために、以下の 5 つの目標が設定された。

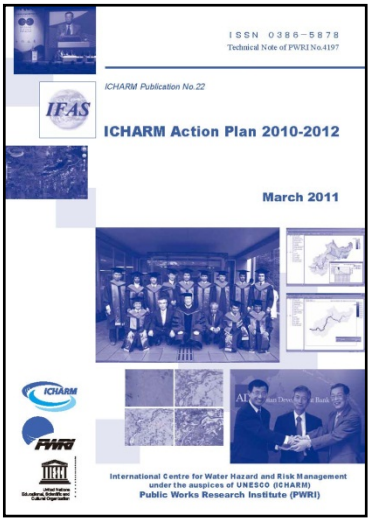


図 1-5　ICHARM Action Plan

前回 ICHARM Action Plan(2010-2012) における 5 つの目標

1. Improvement of education program on water-related disaster management.
2. System development to deliver flood forecasts based on globally available data for any basin, at any time, and anywhere in the world.
3. Local customization of advanced technology in partnership with local practitioners. Especially, establishment of partnership for local use of IFAS with local engineers by integrating satellite information with ground observations.
4. Support of local disaster risk assessment and preparedness. Especially for functioning as the Asia Pacific Knowledge Hub on Water and Disaster in collaboration with ADB, JICA and other funding agencies.
5. Other collaborative engagement on the activities of IFI, WWF, APWF, UNSGAB-HLEP, IRDR etc.

1.については、研修内容を研修生（途上国の行政実務者）のそれぞれの課題に即応するローカル・ニーズ及び現場実践を重視する等、毎年プログラムの改善を進めてきた。さらに現場実践主義を踏まえ、修士課程では対応できない高度な研究ニーズに対応するため、2010 年に博士課程を開講し、2013 年には第 1 期の修了者を輩出した。

2.については、ICHARM が開発を進めてきた統合洪水解析システム（IFAS）の更なる機能向上、RRI モデルの開発に力を注いだ。様々な特性を有する流域への適用については、今後さらにシステムの研究開発を進めていく必要がある。

3.については、機能向上を図った IFAS をもとにインドネシア・ソロ川における洪水予報への適用を行ったり、UNESCO からの支援を受けてパキスタン気象局などと連携して Indus-IFAS システムを現地に適用するなど、現地技術者による洪水管理を支援した。さらに、2011 年のタイ・チャオプラヤ川洪水後のマスタープラン作成の際にも、JICA の要請により RRI モデルを適用した技術支援を行い、実際の洪水現象の再現を行った。その他、アジア開発銀行からの支援を受けてバングラデシュの現地政府と協力して洪水予警報システム構築のための基本方針を作成した。

4.についても、特にAsia Pacific Knowledge Hubの一員として、アジア開発銀行からの支援により、途上国現地での災害リスクアセスメントとして、カンボジア・メコン川洪水平原での洪水脆弱性評価手法を開発・適用し、カンボジア政府に対してコミュニティに活用できる洪水管理の技術を支援した。また、コミュニティの防災力測定手法として、Flood Disaster Preparedness Indicesを開発し、台風委員会と協力して現地適用を行った。

5.については、2011 年に第 5 回洪水管理国際会議（ICFM5）を主催し、国際社会における「防災の主流化」への貢献を行うとともに、渇水や寒冷地での水問題も活動対象とするためにイランやロシアの関連機関と協定を結ぶなど、関係機関との協働の範囲を広げた。

以上の活動の結果、「国土交通省独立行政法人評価委員会」から、土木研究所における ICHARM を中心とする国際活動に対しては、（SS から C の 5 段階中）S 評価を受け、ICHARM の研究員に対して各種の賞が授与されている。

次章以降では、それぞれの 3 本柱の活動ごとに、2010 年 10 月から 2014 年 3 月までに行った活動について概説する。なお、本レポートには、レポートが公表される 2014 年 2 月から 2014 年 3 月に予定する活動を含むことを念のため申し添える。

2. 研究　－先端技術－

2.1 概説

ICHARM での研究活動の基本方針としては、世界における水災害被害軽減を目指すため、特に途上国での水災害リスクマネジメントを可能にするために必要となる研究を重点的に実施してきた。設立当初は、洪水によるリスクを把握する前段として、降雨や流出現象の解明に関する研究を重点的に実施していたが、近年は、洪水による被害リスクを評価するとともに適切な対応策の立案・実施などによるリスクマネジメントに資する研究にも範囲を拡大してきた。

以下では、ICHARM が実施してきた主な研究活動について述べる。

2.2 統合洪水解析システム（Integrated Flood Analysis System: IFAS)の開発・普及

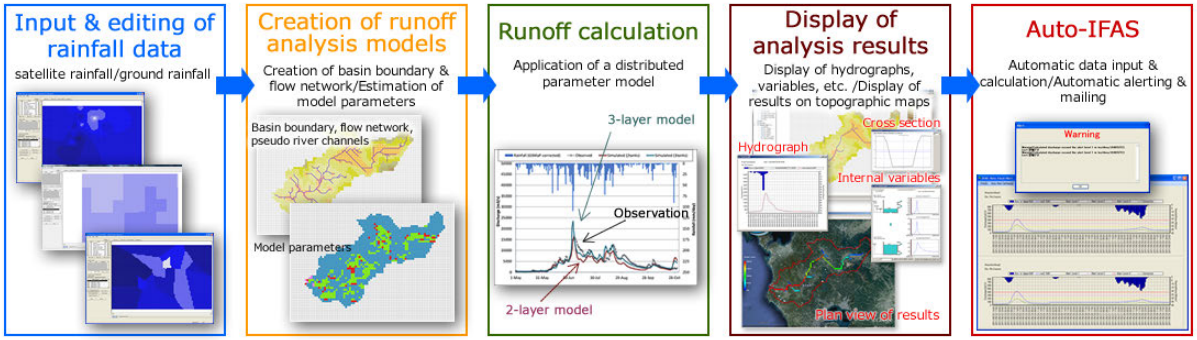


図 2-1 IFAS による計算の流れ

IFAS (Integrated Flood Analysis System) は、インターネットを通じ無償で入手可能で、ほぼ全世界をカバーしている地形や土地利用データを用いて、簡単に流出解析モデルが構築できるシステムである。

IFAS だけで、データの入手、モデルの構築、降雨流出解析、結果表示などの流出解析に必要な一連の作業を行うことが可能である。また、Auto-IFAS と呼ぶ追加モジュールを組み合わせることで、衛星雨量のダウンロードや地上雨量の読み込み、流出計算の実行、警報の発出などを自動的に行う機能を付加し、最小限の機能ながらもリアルタイムでの洪水予警報システムの構築を行うことも可能である。

このシステムでは、インターネットアクセスに制限がある地域でも、定期的に指定時刻のデータを収集しながら逐次計算を行うことによって、ネットワークとパソコンに大きな負荷をかけずに、迅速な流出計算と洪水予警報を可能とする工夫を行っている。

IFAS の実行形式ファイルは、以下の ICHARM サイトから無料で入手できる。

http://www.icharm.pwri.go.jp/research/ifas/

2008 年 12 月に IFAS サイトを開設以降、数回の IFAS のバージョンアップを経て、サイトへのアクセス数は図 2-2 に示すように、年を追うごとに増えてきている。

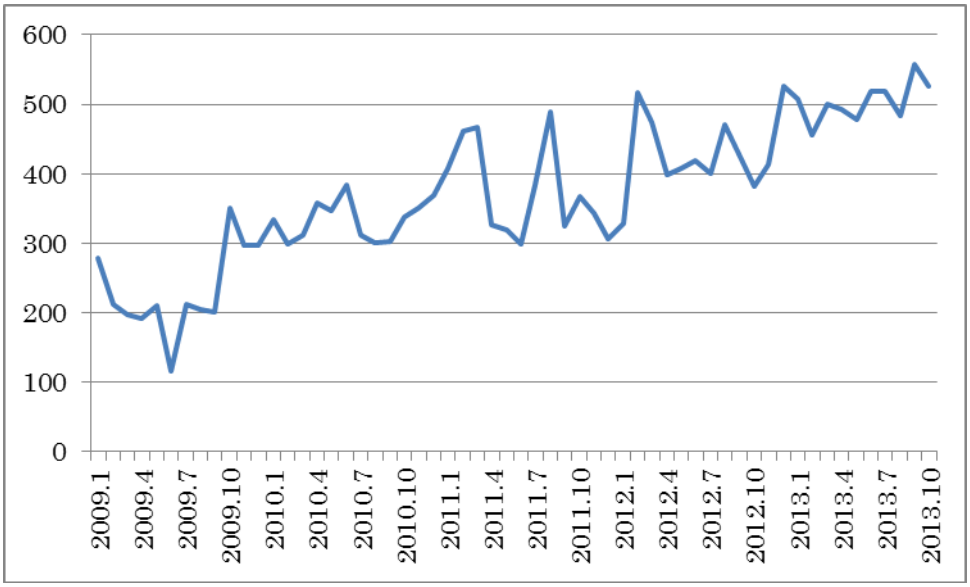


図2-2　IFASサイトへのアクセス数推移グラフ

2.3　降雨流出氾濫モデル(Rainfall-Runoff-Inundation: RRI Model) の開発

従来の洪水予測モデルは山地に降った雨が河川に集まる現象を解析することに主眼が置かれてきたため、例えば 2010 年パキスタン洪水や 2011 年タイ洪水のように、低平地で大規模な氾濫が発生するような洪水に対しては、その予測精度に問題があった。また、世界の洪水リスクを評価したり、大規模洪水を予測したりするためには、大規模な氾濫現象を迅速に推定することが大切であるが、従来の洪水予測モデルでは河川流量を予測することしかできず、降雨から河川流量と洪水氾濫を迅速に推定することは困難であった。

ICHARM ではその問題を解決する手法として降雨流出氾濫モデル(Rainfall-Runoff-Inundation: RRI Model) という新たな数値モデルの開発に取り組んできた。このモデルは、流域に降った雨が河川に集まる現象、洪水が河川を流下する現象、河川を流れる水が氾濫原に溢れる現象を流域一体で予測するモデルである)

このモデルを用いれば、例えば気候変動の予測情報をもとに、様々な地域・気候帯で、今後どのように洪水リスクが変化していくのかを予測することが可能になり、また IFAS と同様に、衛星による地形、土地利用、降水情報などを応用することにより、大まかにでも世界の大規模洪水を準リアルタイムで予測できるようになると思われる。

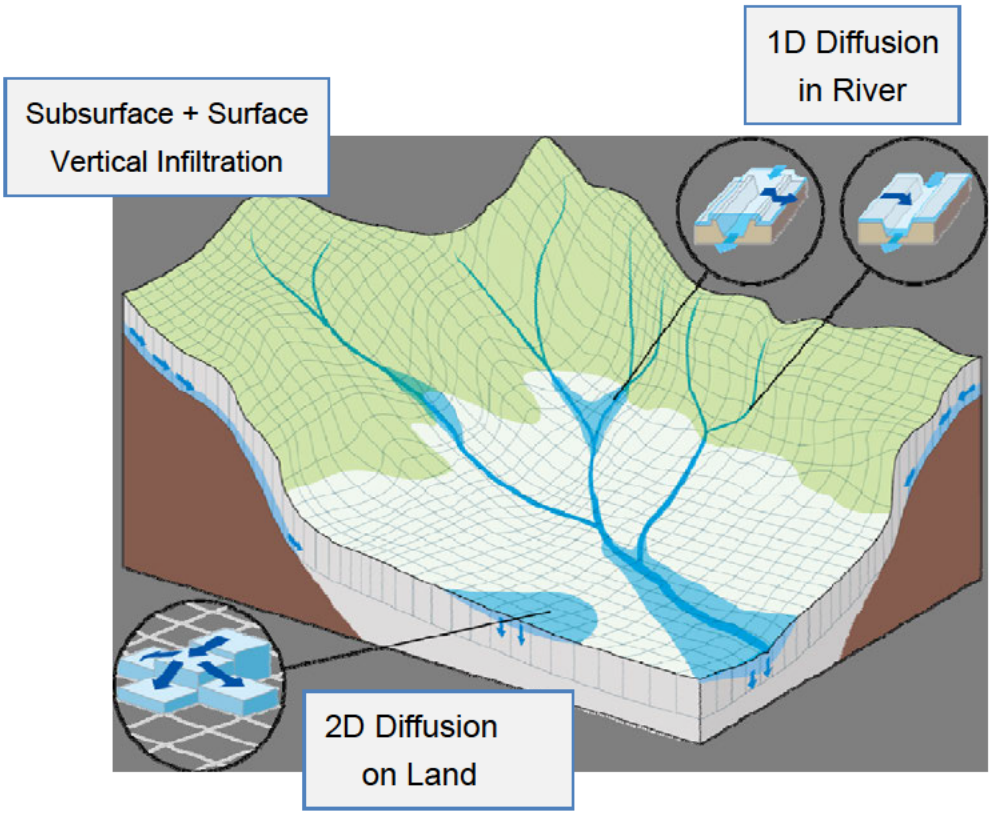


図 2-3　RRI モデルの構成図

2.4　文部科学省研究プログラム（革新プログラム・創生プログラム）への貢献

2.4.1　革新プログラム（2007 年度 - 2011 年度）

文部科学省は 2007 年に 5 か年の研究プログラムとして「21 世紀気候変動予測革新プログラム」を立ち上げた。このプログラムでは、地球シミュレーターを使用し、気候変動に関する政府間パネル（IPCC）の「第 5 期評価報告書（Assessment Report）」に貢献することが期待された。

ICHARM は気象研究所が実施した極端現象予測のプロジェクトのうち、「気候変動に伴う全球および特定脆弱地域への洪水リスク影響と軽減対策の評価」に参画し、以下の成果を得た。

1. MRI-AGCM（気象庁・気象研究所により開発された大気 GCM）などの気候モデルにおける日降水量を計算するための統計的バイアス補正方法
2. 将来的にはグリッドサイズによらない全球規模に適用可能な、水文シミュレーションのための規模によらない河川流域データセット
3. 規模によらない水文地形的な河川流域データセットを用いた、小規模から大規模の流域に適用可能な水文モデルとしての Block-wise TOPMODEL (BTOP)
4. MRI-AGCM を用いた現在・近未来・将来の気候シミュレーションに基づいて実施された BTOP のシミュレーションによる極端な河川流量地形的及び社会経済的なデータセットや知識を用いた新たな洪水リスク評価方法
5. 気候変動シナリオに基づく現状および将来の状況下での洪水による農業・家屋の被害評価

2.4.2　創生プログラム（2012 年度– 2016 年度）

革新プログラムに続く 5 か年の研究プログラムとして、文部科学省は 2012 年に「気候変動リスク情報創生プログラム」を立ち上げた。この目的は、極端な気候変化の発生確率とそれに伴う様々なシナリオ・災害・被害などによるリスクを評価するための情報を創出し、リスク管理分野における役割を果たすことにある。プロジェクトが対象とする特定分野は 5 つあり、ICHARM は領域テーマ D「課題対応型の精密な影響評価」の領域課題「自然災害に関する気候変動リスク情報の創出」のテーマ e「アジアにおける水災害リスク評価と適応策情報の創生」を担当している。

ICHARM は、不確実性の予測を考慮した地球温暖化の進行に伴う、特にアジアにおける、全球で洪水あるいは渇水のリスクの変化の定量予測を行っている。これは、最終的には社会経済的な影響評価のための方法の開発につながり、さらに全球あるいは流域規模での洪水あるいは渇水の評価や、これら災害に対する社会的脆弱性の評価方法を含むものとなる予定である。CMIP5 世代の多角的シナリオと GCM に基づいた気候予測を組み合わせながら、バイアス補正や全球流出解析や氾濫解析のために開発された技術を向上させながら、そのような評価を可能とする予定である。

2.5 洪水中の河川流量自動計測システム

ICHARM では、非接触型流速計（電波流速計）等の固定式流速計を用いた自動計測に、ADCP（超音波ドップラー流向流速計）による精度管理を組み合わせた、省人型・省コスト型でありながら高精度を確保できる次世代型の流量観測システムの開発と普及への取り組みを進めている。本技術は、わが国の急流河川に見られる厳しい河川流況でも有効であることが観測実験により実証されている。また、洪水中の河床変動についても自動計測を組み合わせて把握する手法の研究も行ってきた。

ADCP を用いた計測

2.6　WEP（Water and Energy Transfer モデルの開発

WEP（Water and Energy Transfer モデルは、元々は流域規模水循環モデルとして開発された。近年の閉鎖性流域での栄養塩負荷流出管理の必要性に鑑み、WEP モデルを窒素及びリンのシミュレーション機能（溶存態及び懸濁態）を付加することで、流域規模の水・物質循環モデルに拡張する研究を行ってきた。

2.7　洪水リスクアセスメントの研究

「リスクアセスメント」とは、ハザードの点検、脆弱性の分析そして対策の評価の一連の活動を指す。ICHARM では高度な水理水文モデル技術に併せ、ローカリズムの方針に基づいて各流域の物理的、社会的、経済的な特性を現地で徹底して調査した上で、その流域の特性に応じたリスクアセスメントを実施し、社会経済的な影響の把握とその対策の提案に取組んできた。さらに、これらの研究を発展させた、災害調査法の開発、水災害に関するリスク指標の開発、リスクマネジメント手法の標準化などにも取り組んできた。

2.8　ICHARM Research & Development (R&D) セミナー

ICHARM R&D セミナーは、ICHARM の活動を向上させ、研究スタッフに最新の知見を提供するために、不定期で開催されるセミナーである。2010 年 10 月から 2014 年 3 月にかけては、表 2-1 に示すように計 18 回 開催した。

表 2-1　ICHARM R&D セミナー　一覧表

No.	Date	Lecturer	Position	Lecture Title
30	12-Nov-10	Prof. Shoji Fukuoka	Professor, Chuo University	Adaptation of River technology for climate change
31	25-Nov-10	Asso. Prof. Hiroshi Takebayashi	Associate Professor, Disaster Prevention Research Institute, Kyoto University	Application of bed deformation analysis on natural rivers
32	7-Feb-11	Asso. Prof. Frank van der Meulen	Associate Professor, UNESCO-IHE	Climate change and adaptation in Europe
33	13-Apr-11	Prof. Toshio Koike	Professor, University of Tokyo	Integrated Earth Observations and Predictions toward Flood and Water Use under the Climate Change
34	21-Jun-11	Dr. Rabindra Osti	Senior Researcher, ICHARM	Special lecture for ICHARM BEST PAPER AWARD
35	21-Sep-11	Prof. Djoko Legono	Gajah Mada University , Yogyakarta, Indonesia	THE TRUE COLLABORATIVE-BASED LAHAR FLOW MONITORING SYSTEM IN A CHAOTIC CONDITION
36	17-Oct-11	Asso. Prof. Pat Yeh	Special-appointed Associate, Institute of Insustrial Science, The University of Tokyo	Estimation of Evaporation and Terrestrial Water Storage Change over Global Large River Basins
37	13-Dec-11	Prof. Toshio Koike	Professor, University of Tokyo	GEOSS Water Cycle Integrator An Innovative Tool Contributing to Integrated Human Security and Green Growth
38	13-Dec-11	Prof. Takashi Asaeda	Professor, Department of Environmental Science, Saitama University	Ecological knowledge for natural disasters
39	28-May-12	Mr.Kenzo Hiroki	Principal, ICHARM	Water, Disasters, and Green Economy
40	11-Jun-12	1. Mr. Eisa Bozorgzadeh 2. Dr. Saied Yousefi	1. Deputy of technical and research affairs, 2. Sr. Technical Expert, IWPCO	1.Analytical Study of Drought Management: Remarks and Points 2. Forensic Management of Water Resources for Generating Hydropower in IWPCO
41	11-Sep-12	Mr. Imbe Masahiro	Executive, Association for Rainwater Storage and Infiltration Technology	Implementation of Well-balanced Hydrological System for the Development along the Tsukuba Express Line
42	26-Feb-13	Prof.Andras Szollosi-Nagy	Rector, UNESCO-IHE	How should a (flood) early warning system be developed in data poor nations?
43	27-May-13	Dr.Takahiro Sayama	Researcher, ICHARM	Rainfall-Runoff-Inundation of Large Scale Flooding：From Prediction to Process Understanding
44	12-Jun-13	Mr. Takezumi Ban	President, Association for World Peace Japan	Earthquake Disaster and Poverty Prevention – Work of Toyohiko Kagawa
45	18-Oct-13	Mr. Wouter T. Lincklaen Arriens	Leadership Coach and Advisor, UNESCO-IHE	Expectation for Japan for improvement in the water security in Asia
46	13-Dec-13	Mr. Hayato Nakamura	Project Formulation Advisor (DRM), JICA Philippine Office	Typhoon Yolanda: Gap between Philippine DRRM and Mega Disaster
47	16-Jan-14	Dr. Anthony Kiem	Hydroclimatologist/Senior Lecturer, Faculty of Science and IT, University of Newcastle	Understanding and Adapting to Hydroclimatic Variability and Change in the Asia-Pacific Region

3. 研修 –能力開発-

3.1 概説

洪水のような大規模水関連災害に対応するためには、防災組織の職員個人の能力向上とともに組織全体としての対応能力向上を図ること（能力開発：Capacity Development）が必要不可欠である。

そのため、ICHARM では各種研修活動を通じて、個人の課題解決能力と防災組織としての災害対応能力向上に貢献してきた。またそれぞれの研修後には、帰国研修生のためにセミナーなどを開催してフォローアップを行い、彼らが帰国後に抱えている課題を把握し、新たな研修コースを設立してきた。これら多くの研修活動は、大学卒業後ある程度の現場経験を持つ、河川管理や水資源開発に関係する途上国の河川実務者に対して行われてきた。彼らは帰国後に研修の成果を本国に広めることを期待されている。

2010 年 10 月から 2014 年 3 月までに行われた ICHARM の研修活動は以下のとおりである。なお、各研修員数の詳細は資料 1 に示す。

表 3-1 研修プログラムリスト

分類	プログラムタイトル	期間	参加者数	連携先
博士課程 (3 か年)	防災学プログラム	2010.10-2013.9	1	GRIPS
		2011.10-2014.9	3 (中退：2)	
		2012.10-2015.9	2	
		2013.10-2016.9	3	
修士課程 (1 か年)	防災政策プログラム「水災害リスクマネジメントコース」	2010.10-2011.9	12	JICA, GRIPS
		2011.10-2012.9	19	
		2012.10-2013.9	12	
		2013.10-2014.9	12	
短期研修・ワークショップ (数週間程度)	パキスタンにおける総合洪水リスク管理のための能力開発	2012.5	6	UNESCO
		2013.5	5	
	IFAS を活用した洪水対応能力向上	2012.7-8,	13	JICA
		2012.12	7	
		2013.7-8	16	
	洪水ハザードマップを活用した地域防災計画	2011,1-2	12	JICA, ADB
		2011.7-8	11	
	アジア地域　気候変動への適応にかかる能力開発　－気候変動予測解析－	2011.2-3	7	JICA

3.2 博士課程「防災学プログラム」

2010年10月、ICHARMと政策研究大学院大学(GRIPS)は共同して博士課程「防災学プログラム」を立ち上げた。これは、土木研究所の設立以降、初めての挑戦的な試みであった。本プログラムの目的は、研究者を教育出来て、さらに水災害リスク管理分野で国内外問わず戦略や計画をリーダーシップをもって立案し実行できる人材を養成することである。本プログラムの入学者は1~3

名で、博士課程レベルの研究内容を遂行できる能力と意欲をもち、ICHARMで学んだ水災害リスク管理分野の知識を履行する意欲のある人材を求めている。現在までに1名の日本人学生が終了し、6名が就学中である。

また、土木研究所は、博士課程の学生を「ICHARM リサーチアシスタント」として雇用し、彼らがICHARMでの実務的な経験を学ぶための貴重な機会を提供している。

3.3 修士課程「防災政策プログラム　水災害リスクマネジメントコース」

2007 年、ICHARM は GRIPS と JICA と連携し、1 年間の修士課程「防災政策プログラム　水災害リスクマネジメントコース」を開設した。本プログラムは、途上国の行政官に対して、洪水関連災害に関する修士レベルの知識と技術を提供するものであり、終了後には「防災政策」の学位が与えられる。上半期のカリキュラムは主に講義と応用課題から成り、下半期は学生が関係する洪水軽減プロジェクトに関する修士論文の完成に充てられている。また、年間を通じて現地視察が行われる。

修了式（2013 年 9 月）

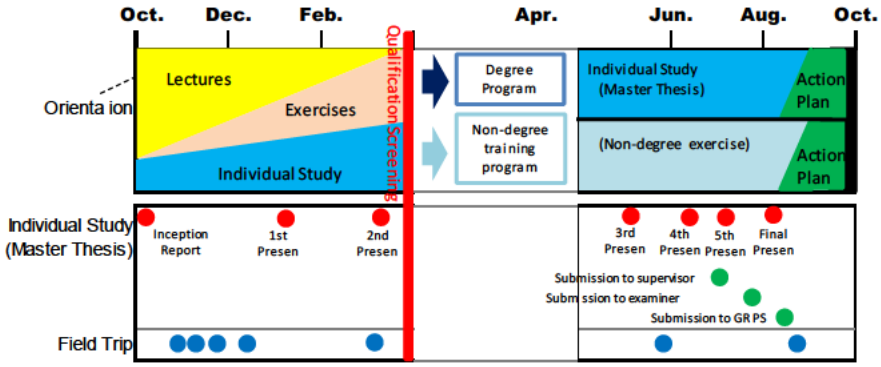
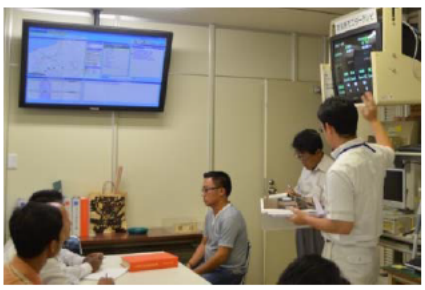


図 3-1 年間計画の概要

2010 年 10 月から 2014 年 3 月までで、ICHARM は計 4 期のコースを実施し、43 名が学位を取得した。研修の内容は毎年改善を重ねており、コース終了後の学生のアンケート結果から分析すると、昨年度は過去 5 年間でもっとも満足度が高かった。

3.4 短期研修・ワークショップ

短期研修やワークショップは、主に（独）国際協力機構(JICA)と連携し、数週間程度の短期間に、水関連災害リスクマネジメントに関する技術や知見の習得を目的として実施するものである。研修生のニーズに見あう研修とするために、ICHARM は途上国における水関連災害の最新の課題を把握して、コース内容や教育スタッフの改善を行うよう努めてきている 。



市町村への現地視察

3.4.1 JICA 研修「洪水ハザードマップを活用した地域防災計画」（2009 年度- 2011 年度）

この研修コースは、2004 年度から 2008 年度に開催した JICA 研修「洪水ハザードマップ作成」をより発展的な内容とし、洪水ハザードマップと洪水予警報システムを活用した地域防災計画の作成を通じて、地域における洪水に対する抵抗力を強化し、ひいては対象国の洪水被害を軽減させることを目標として実施したものである。

Town Watching 演習

目標の達成のために、本研修の内容は、災害時の住民避難について、避難が間に合う情報を出すために、自分の国には何が足りないか、それをどう今後整備していくのかを地域防災計画との関係で研修生に考えさせることを第一義に考え、講義や現地視察の内容もそれに沿うように工夫した。

3.4.2 JICA 研修「アジア地域　気候変動への適応にかかる能力開発」(2010 年度)

この研修コースは、途上国の行政官に対し、気候変動による河川への影響を評価できる能力、およびそれに対する適応策を立案できる能力を強化することを目標とし、計 7 名が参加した。

閉講式

研修後のアンケートからは、特に有益であったコンテンツとして、7 名中 5 名が IFAS 演習、PCM 演習および Trend Analysis 演習を挙げていた。これらの意見は、この研修以後実施された短期研修の内容にも活かされている。

3.4.3 JICA 研修「IFAS を活用した洪水対応能力向上（Capacity Development for Flood Risk Management with IFAS)」（2012 年度- 2014 年度)

この研修コースは、前年度までの JICA 研修「洪水ハザードマップを活用した地域防災計画」に代わるものであり、これまでの研修とは異なり、JICA が途上国で実施する現地プロジェクトとの相乗効果を出来るだけ図るために、以下の 2 点を考慮している。

Project Cycle Management

- 対象流域を、JICA プロジェクトが関連する流域に絞ったこと
- 研修生は、当該 JICA プロジェクトに関連する機関で、かつ、気象関係者・河川管理者・住民避難に責任を持つ者の 3 主体から参加させるようにしたこと

IFAS 演習

研修生のアンケートからは以下の内容が特に有用であったことが分かった。

- ◆ 日本における河川情報システムの講義
- ◆ Project Cycle Management (PCM)演習

- ◆ IFAS 演習
- ◆ Town Watching 演習
- ◆ 信濃川現地視察

研修生は、本研修で学んだ知識や経験を、帰国後に講義やワークショップを行うことにより所属組織に広めることが期待されている。

3.4.4 短期ワークショップ「パキスタンにおける総合洪水リスク管理のための能力開発」(2012 年度・2013 年度)

渡良瀬遊水地視察

このワークショップは、2010 年にパキスタンで起こった大水害を契機に、日本政府から UNESCO への資金拠出によって開始したプロジェクト「パキスタンにおける洪水予警報及び管理能力の戦略的強化（Strategic Strengthening of Flood Warning and Management Capacity of Pakistan)」の一環として実施した。2012 年と 2013 年に、パキスタンから合計 11 名の中級・高級行政官を招待した。

参加者の多くからは、このワークショップの内容は大変良く考えられており、素晴らしいものだったとの評価を頂き、特に、日本の河川管理とその着実な実施状況、渡良瀬遊水地のような遊水地はインダス川でも有効と思われるとのコメントがあった。

3.5 フォローアップ活動

Short course “Early warning system for flood disaster mitigation”

ICHARM によるフォローアップ活動は、帰国研修生が彼らのプロジェクトをより推進することを奨励するために実施しているものである。特に、フォローアップセミナーは帰国研修生に最新の知識や技術を提供するとともに、彼らが日常抱えている課題を明らかにして参加者間で議論を行うものである。

上記理由により、ICHARM は表 3-2 に挙げるフォローアップセミナーを開催した。

3.6 インターンシップ

Seminar on Sediment Hydraulics and River Management

ICHARM では、大学生のインターンシップや海外の研究機関の研究員を積極的に受入れ、本人が希望する分野を集中的に学ぶ機会を設けている。2010 年 10 月から 2014 年 3 月までで、計 14 名を受け入れた。

表 3-2　フォローアップ活動一覧表

開催日	フォローアップ活動	場所
2010 年 11 月 6-7 日	Short course “Early warning system for flood disaster mitigation”	Hanoi, Viet Nam
2012 年 2 月 20-23 日	Follow-up discussion (on the occasion of The Southeast Asia Flood Risk Reduction Forum)	Bangkok, Thailand
2013 年 2 月 13-14 日	Seminar on Sediment Hydraulics and River Management	Dhaka, Bangladesh

4. 情報ネットワーク

4.1 概説

ICHARM では、これまでに様々な種類の情報ネットワーク活動を行って、研究成果の普及及び関連機関との連携強化を図っている。以下に主な活動を述べる。

4.2 国際洪水イニシアチブ（International Flood Initiative: IFI）

国際洪水イニシアチブ（International Flood Initiative: IFI）は UNESCO、世界気象機関、国連大学、国連国際防災戦略などの国際機関が世界の洪水管理推進のために協力する枠組みである。IFI は、研究、情報ネットワーク、教育・研修、コミュニティの強化及び統合洪水管理などの技術支援を主要分野としており、ICHARM は、創設時から IFI の事務局を担当している。

4.3 第 5 回洪水管理国際会議（5th International Conference on Flood Management: ICFM5）

2011 年 9 月 27～29 日、東京において、「第 5 回洪水管理国際会議（ICFM5）」を開催し、世界 41 カ国から 450 名以上の参加を得た。メインテーマを「洪水：リスクから好機への転換」とし、洪水リスク管理など 5 分野で活発な議論が行われ、会議後には議論の結果を踏まえた ICFM5 宣言が出された。(http://www.ifi-home.info/icfm-icharm/icfm5.html)。また、選抜した論文は、IAHS の Red Book No.357 、Journal of Flood Risk Management Special issues (2012 年 12 月）ならびに Journal of Disaster Research 7(5)に掲載された。

全体セッション

特別セッション

4.4 アジア太平洋ナレッジハブへの関与

ICHARM は、2008 年 6 月、アジア太平洋水フォーラムの枠組みの下、アジア太平洋地域の水の安全を実現するために、付加価値の高いノウハウや研究成果の現地適用を行う「災害リスク軽減と洪水管理」のナレッジハブ（Knowledge Hub）に任命された。ナレッジハブの活動の一環として、ICHARM は 2009 年 11 月からアジア開発銀行の地域技術協力プロジェクトを開始した。（後述）

4.5　台風委員会への貢献

台風委員会は、アジア太平洋地域における台風の人的・物的被害を最小化するための計画と履行の方策を促進・調整するために、1968年に国連アジア太平洋経済社会委員会（ESCAP）と世界気象機関（WMO）のもとに組織されている政府間共同体である。

ICHARM からの貢献として、加本実上席研究員が水文部会の議長を務めるとともに、活動の一つとして、コミュニティの防災力を測定する指標である洪水災害準備指標（Flood Disaster Preparedness Indices: FDPI）のプロジェクトをけん引し、2012 年に完了してレポートをまとめた。

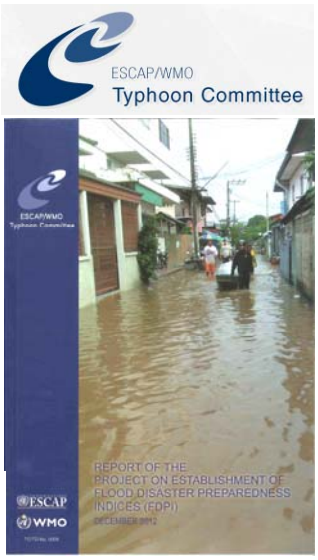


図 4-1 「Establishment of FDPI」
プロジェクトレポート（2012 年 12 月）

4.6　国連水と衛生に関する諮問委員会（UNSGAB）への貢献

国連水と衛生に関する諮問委員会(The United Nations Secretary General's Advisory Board on Water and Sanitation: UNSGAB)は、2004 年 3 月に当時の国連事務総長 Kofi Annan 氏により、水と衛生問題に関するアドバイスを受け、行動を推進するために設立された。

United Nations Secretary-Generals' Advisory Board on Water & Sanitation (UNSGAB)

ICHARM では、廣木謙三国際水防災研究監が UNSGAB の委員となり、国土交通省と連携しながらその活動に貢献した。2013 年 3 月には、国連事務総長が主催する『水と災害に関する特別ハイレベルセッション』を ICHARM として支援した。これは、国連が主催する災害に関する会議としては、初めて水と災害に関する諸問題を議論する場となった。

『水と災害に関する特別ハイレベルセッション』（2013 年 3 月）

4.7　他機関との協力協定

ICHARM は設立以降、表 4-1 に挙げるように、13 の関連機関と研究協定を結び、連携して活動を行っている。

とくに、洪水のみならず渇水や寒冷地での水問題も活動対象とするための足掛かりとして、2013 年にはイラン及びロシアの関連機関と新たに連携協定を締結するなど、積極的に展開を進めている。

表 4-1　協力協定リスト

1	Korea	Korea Disaster Prevention Association(KDPA)
2	U.S.A.	Bureau of Reclamation of the Department of the Interior of the United States of America
3	Netherlands	UNESCO-IHE Institute for Water Education(UNESCO-IHE)
4	Iran	Regional Centre on Urban Water Management(RCUWM-TEHRAN)
5	Philippines	Flood Control and Sabo Engineering Center (FCSEC)
6	Japan	Yamanashi University
7	CHINA	International Research and Training Center on Erosion and Sedimentation (IRTCES)
8	Brazil	HydroEx
9	Indonesia	Tsunami & Disaster Mitigation Research Center (TDMRC)
10	Japan	Kyoto University
11	Lao PDR	Mekong River Commission (MRC)
12	Iran	The Iran water and power resources development company(IWPC), Ministry of Energy, Tehran, I.R.IRAN
13	Russia	State Hydrological Institute (SHI)

4.8　海外出張

上記の様々な国際活動や後述の現地実践活動を推進するため、海外出張を精力的に実施しており、2010 年 10 月以降で合計延べ約 440 人に上る（図 4-2）。2011 年から UNESCO パキスタンプロジェクト（後述）を開始したため、2011 年と 2012 年の現地実践に関する出張が増加した。また、現地実践の深度化や国際的なプレゼンスが高まるのに伴い、現地視察や国際会議・委員会への参加回数は増加傾向である。

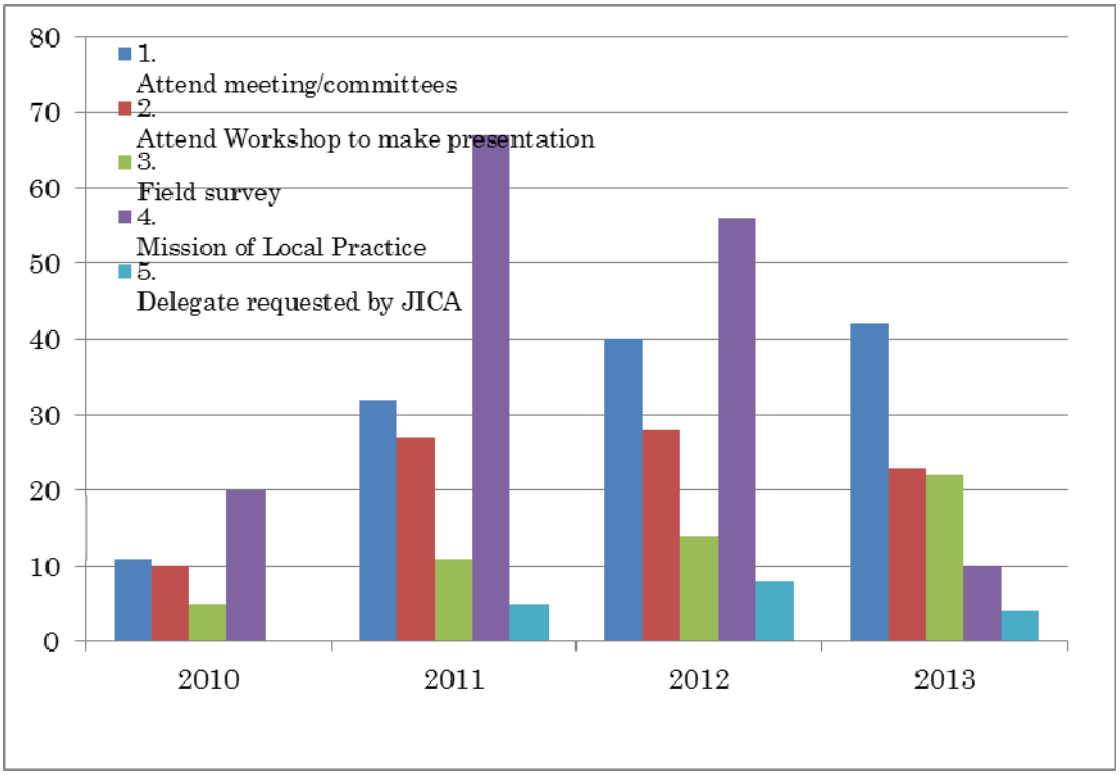


図 4-2　海外出張数の推移

5. 現地実践 -Localism-

5.1 概説

ICHARM で開発している各種モデルの現地適応性を検証するために、「Localism」の旗印のもと、アジア開発銀行や UNESCO が実施している現地実践プロジェクトに参画し、現地の行政機関や研究機関と共同して様々な活動を行ってきた。これらのプロジェクトは、各種機関との調整や実際の活動に困難さが伴うものであったが、どの活動も成功裏に終了することが出来たと考える。以下では、それぞれの概要について述べる。

5.2 ADB プロジェクト：水災害管理への投資の支援（TA7276）

2009 年 11 月にアジア開発銀行（ADB)との間で連携協定を結び、2013 年 3 月末まで水災害管理への投資の支援（TA7276）を遂行した。TA7276 は各国への防災管理への防災関連投資を今後積極的に行うための環境作りに資することを目標として実施してきた。なおこの活動は、2007 年の第 1 回アジア太平洋水フォーラムにおいて ICHARM が水災害に関するリード組織として活躍し、「災害リスク軽減と洪水管理」に関する知識ハブとしての任命を受け、この一環として行われた。土木研究所としても、連携協定によるプロジェクトを実施した初のケースで、国際機関としての ICHARM の新たな活動の幅を広げる大きな挑戦であった。

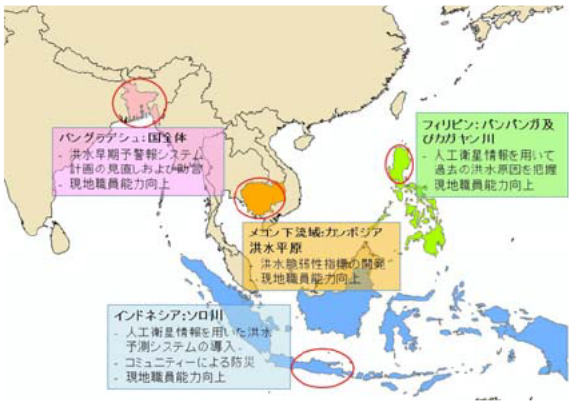


図 5-1 TA7276 実施対象国とその概要

ADB持続可能開発局長への最終報告
(2013.3.12)

TA7276 では、必ず現地調査を行い、洪水氾濫の状況、観測の状況、背後地の生活状況、流域の開発状況など現地から把握できる情報を最大限取り入れて、洪水予測、洪水リスク評価等を行った。対策としても問題点を把握しつつ、それぞれにあった解決手法を提案するという、いわゆる「ローカリズム」を取組み方針とした。

各国・地域での活動内容は以下のとおり 5 つであり、

① バングラディッシュ；洪水予警報システム構築のための基本方針作成
② インドネシア；ソロ川での人工衛星を活用した洪水予測システムの導入
③ カンボジア；メコン川洪水平原での洪水脆弱性評価手法
④ フィリピン；パンパンガ川、カガヤン川での衛星活用した流出モデルを使った洪水管理トレーニング

といった各国政府の技術向上の取り組みと、⑤今後のアジア洪水リスク評価の指標プロトタイプ開発に取組んできた。他の河川への適応についても、それぞれの河川の特徴を踏まえてカスタマイズすることで可能であり、このTA7276での成果は今後の発展性を広げる大きな成果であった。

2013 年 3 月に土木研究所魚本理事長及び竹内センター長が ADB のチャンダー地域持続可能開発局長を訪ねて、本プロジェクトの成果報告をした。その際、ICHARM の成果に対して感謝と高い評価の言葉を頂き、今後の支援も要請された。本活動を通じて築かれた各国カウンターパートとの良好な信頼関係こそが今後の ICHARM の強力な力となるものであり、土研 ICHARM の独自技術の有効性および「災害リスク軽減と洪水管理」に関する知識ハブとしての経験をもとに、今後もアジア太平洋地域の水関連災害の軽減に貢献に取組んでいく。

5.3 UNESCO パキスタンプロジェクト

2010 年7 月下旬、パキスタン国北部地方で記録的なモンスーンの豪雨により、過去80 年間で最悪の洪水が発生した。この洪水により、2025 万人が影響を受け、1985名が亡くなり、1,894 万戸の家屋が破壊されるか被害を受けるなど、多大な影響を受けた（National Disaster Management Authority, Pakistan 2010 Annual report）。

ICHARM 修士課程 3 名の卒業生とともに現地での Indus-IFAS 研修（2013 年 8 月）

この洪水災害からの復興の一環として、2011 年 7 月から UNESCO 運営による「パキスタンにおける洪水予警報および管理能力の戦略的強化」プロジェクトが開始された。これは、3 つのコンポーネントから構成される包括的なプロジェクトであり、ICHARM はそのうち 2 つ（技術協力と能力開発）を担当している。技術協力としては、ICHARM は、「Indus-IFAS」の開発と実行、そして洪水ハザードマップの作成においてパキスタン政府を支援している。「Indus-IFAS」は、IFAS モデルと RRI モデルを組み合わせることにより、特にインダス川の状況とニーズに適合するよう設計されている。能力開発としては、PMD（パキスタン気象部）と SUPARCO（パキスタン宇宙大気研究機関）をはじめとしたパキスタン政府関係者への ICHARM 修士課程および短期ワークショップの機会を提供してきた。

5.4 タイ洪水シミュレーション

2011 年 7 月から 11 月頃にかけて、タイ・チャオプラヤ川流域では大規模な洪水が発生し、人々の生活・経済活動・農業等に大きな被害をもたらした。ICHARM では 10 月中旬から、同流域の洪水状況を把握することを主たる目的として緊急対応の降雨流出氾濫シミュレーションを実施した。具体的には、チャオプラヤ川全流域を対象に、RRI モデルを用いて流量と洪水氾濫を一体的に予測することを試みた。緊急対応としてのシミュレーションでは、現地情報を入手することが難しいため衛星による地形情報や降雨推定量を活用することになる。さらに予測降雨量を同モデルに入力し、浸水域の広がり方や継続期間を推定した。シミュレーション結果の一部は国土交通省と共同で記者発表するとともに、政府・報道機関に対して情報提供を行った。その結果、多くのマスコミ関係から注目されることとなった。

また、この大洪水を受け、JICA は「チャオプラヤ川流域対策プロジェクト」を通じてタイ国政府を支援することを決め、ICHARM は同プロジェクトの国内検討委員という立場から技術的な支援を行った。

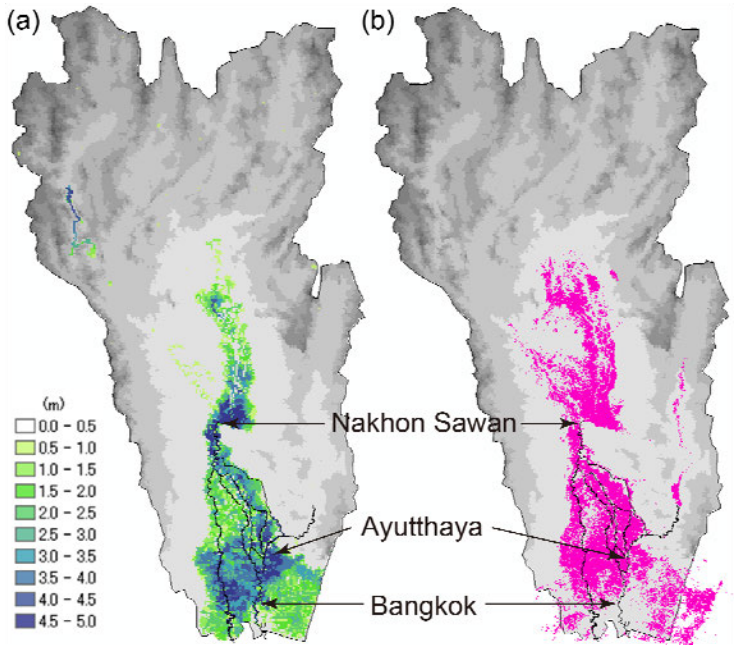


図 5-2　チャオプラヤ川流域全体を対象とした RRI モデルによる緊急対応シミュレーション結果(a)と衛星による同時期の浸水想定域(UNOSAT 公開)　（いずれも 10 月 13 日現在）

6. 広報

6.1 WEB サイト

広報活動の一環として、ICHARM は Web サイトを介して最新の情報発信を行っている。近年は毎月平均して 5000～6000 の訪問者を獲得している。アドレスは以下の通り。

http://www.icharm.pwri.go.jp/index.html

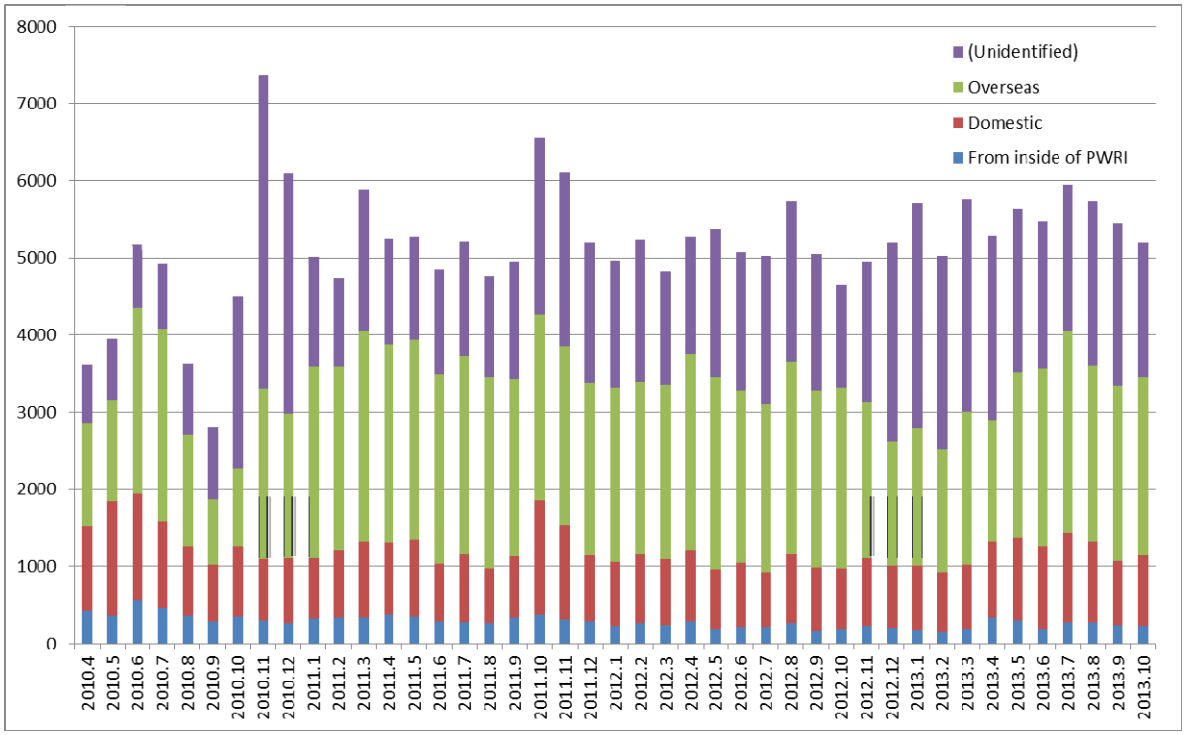


図 6-1　ICHARM web サイトへのアクセス数の推移

6.2 ICHARM ニュースレター

ICHARM は「ICHARM ニュースレター」を年 4 回定期的に発行している。ニュースレターには、センター長挨拶、特別トピック、国際会議報告、ICHARM 訪問者、進行中の研究や研修、プロジェクト紹介 など多様な内容が含まれている。ICHARM 設立以降では計 31 号発行され、本活動レポートの期間では、計 14 号が発刊されている。

ICHARM ニュースレターは以下のサイトから購読可能である。

http://www.icharm.pwri.go.jp/publication/index_j.html

Newsletter ICHARM

Volume 8 No. 4
Issue No. 31

January 2014

International Centre for Water Hazard and Risk Management
under the auspices of UNESCO

Contents

Message from Director

ICHARM has started the year 2014 with a refreshed enthusiasm under a renewed agreement between UNESCO and the government of Japan signed last July. The new agreement requires us to establish the Governing Board, which was the Advisory Board in the previous agreement. We expect that the Governing Board of top international executives will examine ICHARM's activity plan to ensure proactive implementation. We are making our best effort to prepare for the first board meeting, scheduled on February 25.

Near the turn of the year, we had another devastating disaster, when storm surges by Typhoon Haiyan (locally called Yolanda) hit Leyte Island of the Philippines on November 8. It was reportedly the strongest typhoon ever recorded among the landed. Many houses and towns were completely swept out, and more than 6,000 people were killed. It was only 7 years ago when Leyte experienced a giant landslide, which occurred after weeks of heavy rains and killed more than ten thousand people. Meanwhile, in Japan, people in Oshima Island were still at a loss after a deadly debris flow, unable to make any plans yet for recovery. Right after the turn of the year, we also saw many pictures of floods in Southwest England and Wales. Indeed, extreme hydro-met phenomena have been increasing.

Wallingford, England
photo by John Rodda 2014.1.11

Under such circumstances, the role of ICHARM is growing. One of the reasons is that it assumes the responsibility of the most critical part of disaster prevention; that is, as Chinese philosopher Sun Tzu says, "If you know the enemy and know yourself, you need no fear even against a hundred battles." In disaster prevention, to know the enemy is to know the characteristics of the hazards and their forecasts, and to know yourself is to assess exposure and vulnerability of human activities, coping capacities and institutional arrangements.

ICHARM, together with foreign students, is concentrating on acquisition and production of such knowledge on hazards and society in combination with capacity development programs, and apply the research results to local practices by helping practitioners of national and regional governments. Based on such substantive experiences, ICHARM also takes part in international efforts of policy and strategy making.

We hope ICHARM receives even further cooperation and support from the world to continue activities under the renewed agreement.

31 January 2014
Kuniyoshi Takeuchi
Director of ICHARM

East Samar, Leyte Island
photo by Mamoru Miyamoto 2013.12.13

ユネスコのカテゴリー2センターに関わるルールの見直しに伴い、昨年7月、ユネスコ・日本政府間の協定も改定されました。したがって2014年は、ICHARMにとって新協定下での新年になります。センター員一同、気持ちも新たに活動を開始しました。新協定では、従来の諮問委員会に代り、運営理事会にICHARMの運営を審査頂くことになります。理事会には内外関係機関のトップを迎え、大所高所からの審査とご指導を期待しています。第一回理事会は2月25日に開催の予定で、それに向けた準備を進めています。

昨年末には、また悲惨な災害が起きました。11月8日にレイテ島を中心に襲ったサイクロン・ハイヤン(台風30号)による高潮で、多くの町が壊滅し6000人以上の方々が亡くなりました。上陸した台風としては観測史上最大規模だったと報じられています。レイテ島ではわずか7年前、巨大地すべりで1000人以上の方が亡くなったところです。日本ではこれに先立つ台風26号で、大島の土石流災害により50人近くの方が亡くなり、避難された方々の帰還の計画も立たない時期でした。新年早々にはイギリスから、暮れからの雨で各地で洪水が発生したニュースが届けられています。気象の極端事象は進化の一途をたどっています。

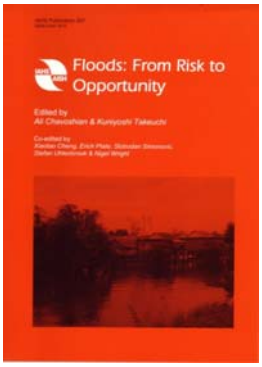
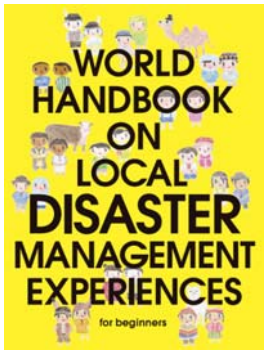
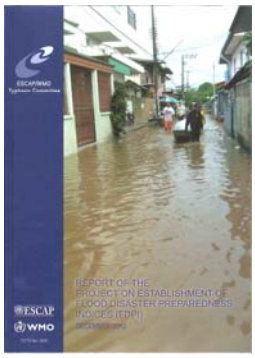
そんな中でICHARMへの期待はますます高まっています。水防災という戦いの中で最も重要な、「敵を知り己を知れば百戦危うからず」と言うところを分担しているからです。敵を知るのはハザードの特性研究、予報であり、己を知るのは人間活動の暴露と脆弱性の評価です。対策や社会の仕組みの評価も含まれます。これら敵と己を知る技術の研究を、能力開発プログラムを一体に、留学生と一緒に研究し、その成果を現地の実務者を通じて実践に移しています。その上で、リスク削減の国際政策や体制作りにも参加しています。

新しい協定の下でのICHARMの発展に、一層のご支援をお願いします。

6.3 出版物

ICHARM は、水関連災害に関する以下のような書籍類を出版してきた。

表 6-1　書籍リスト

IAHS Red Book "Floods: From Risk to Opportunity"	HANDBOOK on Local Disaster	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI)	Large-scale Floods Report
			
IAHS Publication No. 357 (2013), ISBN 978-1-907161-35-3, 480 pages	Leaflet, 2013, 38 Pages	Typhoon Committee, Leaflet, 2012 26 Pages	Book, 2011, 232 Pages
Ali Chavoshian, 竹内邦良, 加本実	杉本めぐみ	中須正, 岡積敏雄, 清水孝一	Ali Chavoshian, 竹内邦良

6.4 論文

ICHARM 研究者は、表 6-2 にように、国際論文ジャーナル誌や書籍の執筆、レポートの発刊など様々な媒体を通じて、研究成果や新たな発見を普及することに努めてきた。成果一覧を資料 2 に挙げる

表 6-2　論文一覧表

	2013	2012	2011	2010
書籍 Book	1	1	1	1
ジャーナル論文 Journal	12	4	8	4
一般論文 Paper	12	8	6	10
要旨　or　会議資料 Abstract or Conference	10	18	45	27
報文　or　その他 Articles or Others	4	7	14	9
土木研究所資料／土木研究所報 PWRI Technical Note/PWRI research report	2	4	2	3
合計　Total	**41**	**42**	**76**	**54**

7. 表彰

ICHARM 研究員の各種活動に対しては、2010 年以降下記のように多くの賞を受賞している。

受賞者	賞	（授賞理由）
上米良秀行 研究員	ベトナム天然資源環境大臣表彰 2013 年	ベトナム国の水文気象学の発展に対する貢献
佐山敬洋 研究員	第 15 回国土技術開発賞（ 優秀賞 ） 2013 年 7 月 5 日	降雨流出氾濫モデル（RRI モデル ）
・田中茂信 グループ長、 ・建部祐哉 交流研究員、 ・佐山敬洋 研究員	ベスト研究交流賞 （SAT テクノロジー・ショーケース） 2013 年 1 月 22 日	世界の大洪水を監視・予測する技術
佐山敬洋 研究員	平成 25 年度科学技術分野の文部科学大臣表彰（若手科学者賞）， 2013 年 4 月	世界の大洪水を対象にした降雨流出氾濫予測に関する研究
竹内邦良 センター長	「国際水文賞」（国際水文科学会（IAHS)）， 2012 年 10 月 23 日	国際水文分野における顕著な功績

8. 外部評価

ICHARM が外部機関から評価を受ける機会は、国内においては「土木研究所外部評価委員会」、「国土交通省独立行政法人評価委員会」があり、また、日本国政府と UNESCO の協定更新に先立って、UNESCO からも評価を受けている。それらの評価結果を表 8-1 に示す。

特に、「国土交通省独立行政法人評価委員会」においては、過去 3 か年の評価において、土木研究所全体の種々の活動に対して 3 つあるいは 5 つの「S 級（中期目標の達成に向けて優れた実施状況にあると認められる)」のうち、ICHARM の活動については全ての年度で「S 級」の評価を受けるなど、高い評価を受けた。

表 8-1　　外部評価一覧表

年月	評価者	評価結果
2013 年 8 月	2012 年度 国土交通省 独立行政法人評価委員会	土木研究所は **15 個の評価項目のうち「S」評価を 3 つの項目**に対して受け、ICHARM はそのうちの一つに貢献した（例：研修・教育プログラム、国際水文賞受賞　など）
2012 年 9 月	2011 年度 国土交通省 独立行政法人評価委員会	土木研究所は **15 個の評価項目のうち「S」評価を 3 つの項目**に対して受け、ICHARM はそのうちの一つに貢献した（例：研修・教育プログラム、タイ・チャオプラヤ川洪水対策への貢献　など）
2011 年 9 月	2010 年度 国土交通省 独立行政法人評価委員会	土木研究所は **23 個の評価項目のうち「S」評価を 5 つの項目**に対して受け、ICHARM はそのうちの一つに貢献した （例：研修・教育プログラム、博士課程の立ち上げ、ADB プロジェクトの履行　など）
2011 年 1 月	UNESCO 評価団	ICHARM は他の UNESCO 水センターと比較して**「極めて優れている」**と評価された
2010 年 8 月	UNESCO 外部監査報告 [185 EX/32 Part II – page 14]	“…水科学分野における一つの特徴は 13 のカテゴリー2 センターを有することである。そのうち、ICHARM は**「最も活動的」**であるセンターの一つである。IFI の事務局としても機能している。…” http://unesdoc.unesco.org/images/0018/001888/188888e.pdf

資料

Number of Alumni of ICHARM training program (as of February, 2014)

Ph.D. Program "Disaster Management"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
2010-												1																			1
2011-							1											1	1												3
2012-	1								1																						2
2013-	2								1																						3
Total	**3**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**

M.Sc. Program "Water-related Disaster Management Course of Disaster Management Policy Program"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total	(Number of students conferred Master's degree)
2007-2008	2			3						1		3						1													10	10
2008-2009	2			2			1				1							1									2				9	7
2009-2010	2			1			1				3	1					1					1			2		1				13	12
2010-2011	2			2	1				1		1						1	3			1										12	12
2011-2012	2			2				1			2							2			6	1			1			1		1	19	19
2012-2013	2				1										2		1	1		1			1	1	1				1		12	12
2013-2014	2			1		1							1				1				1	2			2				1		12	
Total	**14**	**0**	**0**	**11**	**2**	**1**	**2**	**1**	**1**	**1**	**7**	**4**	**1**	**0**	**2**	**0**	**4**	**8**	**0**	**1**	**8**	**4**	**1**	**1**	**6**	**0**	**3**	**1**	**2**	**1**	**87**	**72**

JICA training program "Flood Hazard Mapping"

2004			2	2							2			3	2							2					2			1	16
2005			2	2							2			2	2							3					1			2	16
2006			2	2							2			2	2							2					2			2	16
2007			2	2							3			2	3							2			1		3			2	20
2008			1	2							0			2	2							1					1			1	10
Total			**9**	**10**							**9**			**11**	**11**							**10**			**1**		**9**			**8**	**78**

JICA training program "Local Emergency Operation Plan with Flood Hazard Map"

2009	1	1								2			1			1				1				1	1	1				10
2010	1	2								2			1			1	1			1				1	1	1				12
2011	1	2								2			2			1				1				1	1					11
Total	**3**	**5**								**6**			**4**			**3**	**1**			**3**				**3**	**3**	**2**				**33**

JICA training program "Capacity Development for Flood Risk Management with IFAS"

2012	3												3							2		2					3				13
2013	3												3							2		3					2			3	16
Total	**6**												**6**							**4**		**5**					**5**			**3**	**29**

JICA training program "Capacity Development for Flood Risk Management with IFAS (B)"

2012																													**7**	**7**

JICA training program "Capacity Development for Adaptation to Climate Change"

2010	**1**										**3**										**1**					**1**			**1**	**7**

UN/ISDR Training course "Comprehensive Tsunami Disaster Prevention"

2008										**2**	**4**					**2**								**3**					**11**

UNESCO Pakistan Project workshop

2012																					6									6
2013																					5									5
Total																					**11**									**11**

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
Total	**27**	**5**	**9**	**21**	**2**	**1**	**3**	**1**	**3**	**3**	**29**	**5**	**7**	**15**	**13**	**2**	**7**	**10**	**1**	**5**	**22**	**20**	**1**	**1**	**13**	**3**	**20**	**1**	**2**	**20**	**272**

ICHARM Publication List FY2010

	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Forms of community participation in disaster risk management practices		Rabindra Osti	Katsuhito Miyake				Forms of community participation in disaster risk management practices	NOVA Science Publisher			
2	Journal	Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		Rabindra Osti	Tara Nidhi BHATTARAI	Katsuhito Miyake			Natural Hazards	Springer	Vol 58, Issue 3	1209	1223
3		Flood-Related Disaster Vulnerability: an impending crisis of megacities in Asia		Yoganath Adikari	Rabindra Osti	Tomoyuki Noro			Journal of Flood Risk Management	Wily Interscience	Vol.3, Issue 3	185	191
4		Field Assessment of Tam Pokhari Glacial Lake Outburst Flood in Khumbu Reguon, Nepal		Rabindra Osti	Shinji Egashira	Katsuhito Miyake	Tara Nidhi BHATTARAI		Journal of Disaster Research	Fuji Technology Press Ltd	Vol.5, No. 3	264	273
5		環境社会学における自然災害研究の視角ー開発・環境・災害の因果サイクルモデルの視点からー	A Research Perspective on Natural Disasters and Environmental Sociology: Viewpoints on the Cause and Effect Cycle Model of Development-Environment-Disaster	中須正 Tadashi Nakasu					環境社会学研究 Journal of Environmental Sociology	有斐閣 Yuhikaku Publishing Co., LTD.	16	65	78
6	Paper	Development of a statistical bias correction method for daily precipitation data of GCM20		Hironori Inomata	Kuniyoshi Takeuchi	Kazuhiko Fukami			土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	247	252
7		Applicability of GSMaP correction Method to Typohoon "Morakot" in Taiwan		小澤剛 Go Ozawa	猪股広典 Hironori Inomata	白石　良樹 Yoshiki Shiraishi	深見和彦 Kazuhiko Fukami		土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	445	450
8		降雨流出氾濫モデルによるサイクロンナルギス高潮氾濫シミュレーション Storm Surge Inundation Simulation of Cyclon Nargis with a Rainfall-Runoff-Inundation Mode		佐山敬洋 Takahiro Sayama	Nay Myo Lin	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka	竹内邦良 Kuniyoshi Takeushi	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	529	534
9		実河川における掃流砂量の計測手法に関するー提案 PROPOSAL OF BEDLOAD-DISCHARGE OBSERVATION IN ACTUAL RIVERS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1171	1176
10		河川モニタリング動画を用いた非接触型流量計測法の精度検証と準リアルタイム計測システムの構築 MEASUREMENT ACCURACY OF NON-CONTACT DISCHARGE MEASUREMENT METHOD USING RIVER MONITORING MOVIE AND DEVELOPMENT OF QUASI REAL TIME MEASUREMENT SYSTEM		藤田一郎 Ichiro Fujita	原浩気 Hiroki Hara	萬矢敦啓 Atsuiro Yorozuya			土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1177	1182
11		ADCPを用いた洪水流観測の計測精度評価に関する総合的検討 DISCUSSION OF ACCURACY EVALUATION METHODS OF TOWING FLOOD FLOW OBSERVATION DATA MEASURED BY ADCP		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1183	1188
12		非接触型電波式流速計を用いた洪水流量自動観測手法の一考察 A STUDY OF AN AUTOMATIC WATER DISCHARGE MEASUREMENT SYSTEM USING A NON-CONTACT CURRENT METER		萬矢敦啓 Atsuiro Yorozuya	大平一典 Kazunori Odaira	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	53	58
13		高速流におけるADCP観測のための橋上操作艇に関する提案 PROPOSAL OF TETHERED ADCP PLATFORM FOR HIGH-SPEED FLOW MEASUREMNTS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	59	64
14		A Global Outlook of Sediment-Related Disasters in the Context of Water-Related Disasters		Yoganath Adikari	Tomoyuki Noro				International Journal of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol3, No1	110	116
15		Development of automatic water discharge measurement system		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira		Environmental Hydraulics	Christodoulou & Stamou (eds) @ 2010 Taylor & Francis Group		839	844

16	Abstract	GSMaP補正手法の適用性に関する研究―マイクロ波放射計による観測頻度がGSMaP補正手法の精度に与える影響―	Applicability of a GSMaP correction method — Effect of frequency of microwave-radiometer observation on accuracy of a GSMaP correction method —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
17		流域貯水量の推定に基づく流域分類 Catchment classification based on storage estimations at the catchment scale		佐山敬洋 Takahiro Sayama	Jeff McDonnell				日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
18		衛星リモートセンシングによる土砂災害監視の可能性について Applicability for urgent monitoring of sediment-related disaster by the satellite remotesensing		清水孝一 Yoshikazu Shimizu	林真一郎 Shinichiro Hayashi	小山内信智 Nobutomo Osanai	西真佐人 Masato Nishi		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		36	37
19		多時期衛星画像解析及び数値計算による2004年スラウェシ島パワカラエン山で発生した巨大崩壊の土塊の侵食過程	Analysis of the erosion process of the soil mass from a 2004 large-scale landslide at Mt. Bawakaraeng in Sulawesi Island by using multi-temporal satellite images and numerical calculation	清水武志 Takeshi Shimizu	山越隆雄 Takao Yamakoshi	田村圭司 Keiji Tamura	清水孝一 Yoshikazu Shimizu		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		448	449
20		ALOS(だいち)による崩壊地の抽出手法について	Extraction of landslide areas by using ALOS	吉川和男 Kazuo Yoshikawa	小山内信智 Nobutomo Osanai	清水孝一 Yoshikazu Shimizu			平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		490	491
21		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering			
22		局地的豪雨早期予測・探知のための高速降雨予測モデルの検討	Development of a fast rainfall-prediction model for early forecasting and detection of localized downpour	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		569	570
23		GPS基盤整備の乏しい地域におけるADCP観測の一考察	Proposal of ADCP observation in areas lacking GPS infrastructure	菅野裕也 Yuya Kanno	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		41	42
24		死者ゼロに向けた「早期避難」についての一考察	Study on early evacuation for zero causalities	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		101	102
25		人工衛星観測雨量でみた2010年メコン川渇水の検討	Analysis of the 2010 Mekong drought based on satellite rainfall data	川上貴宏 Takahiro Kawakami	鍋坂誠志 Seishi Nabesaka	小澤剛 Go Ozawa	深見和彦 Kazuhiko Fukami	竹内邦良 Kuniyoshi Takeushi	第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		105	106
26		Application of Artificial Neural Networks and Wavelet Analysis in Prediction of Water Level in Nan River of Thailand		Somchit AMNATSAN	Daisuke Kuribayashi	A. W. JAYAWARDENA			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
27		マイクロ波放射計による観測頻度がGSMaP補正値の誤差に与える影響 ―国内河川流域での事例解析―	Effect of frequency of microwave-radiometer observation on errors of GSMaP corrected values — Case analysis of rivers in Japan —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		16	17
28		Flood Characteristics Analysis of Ganges-Brahmaputra-Meghna River system inside Bangladesh		Partha Pratim Saha	Shigenobu Tanaka	Mamoru Miyamoto			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		18	19
29		広域降雨流出浸水予測モデルの開発 Development of a Rainfall-Runoff-Inundation Model		佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami	田中茂信	竹内邦良 Kuniyoshi Takeushi		水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		20	21
30		GIS 及びALOS 衛星観測データによる氾濫域の流量算定 The estimation of overflow volume using GIS and ALOS Image Data: A Case study in Indus River Basin, Pakistan		郭 栄珠 Youngjoo Kwak	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			第49回(平成22年度秋季) 日本リモートセンシング学会 学術講演会 Presentation at the 49th conference of Remote Sensing Society of Japan	日本リモートセンシング学会 Remote Sensing Society of Japan		93	94
31		Bed-load discharge measurement by ADCP in actual rivers		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		River Flow 2010	Dittrich, Koll, Aberle & Geisenhainer (eds) – © 2010 Bundesanstalt für Wasserbau		1687	1692
32		Experimental application of flood forecasting system (IFAS) using satellite-based rainfall		Tomonobu Sugiura	Takahiro Kawakami	Go Ozawa	Jun Magome	Kazuhiko Fukami	9th International Conference on Hydroinformatics, Beijing, Chin				

33		Rainfall-Runoff-Inundation Analysis for Flood Risk Asessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi]		5th Conference of Asia Pacific Association of Hydrology and Water Resources (APHW)	APHW		568	576
34		Comparison of MRI-AGCM precipitation output with ground observation and propose of a simple statistical bias correction method		Hironori Inomata	Kuniyoshi Takeuchi]	Kazuhiko Fukami			3rd International Workshop on Global Change Projection: Modeling, Intercomparison, and Impact Assessment				
35		Bedload discharge measurement in developing counties		Atsuhiro Yorozuya	Shoji Okada	Yuya Kanno	Kazuhiko Fukami		4th International Perspective on Current & Future State of Water Resources & the Environment				
36		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	Proceedings of the Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering			
37		Rainfall-Runoff-Inundation Analysis for Flood Risk Assessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi		Proceedings of Symposium on Robust and Resilient Society against Natural Hazards & Environmental Disasters and the Third AUN/Seed-Net Regional Conference on Geo-Disaster Mitigation			24	26
38		Recent Flood Disasters in Asia: the case of Typhoon Ketsana		Yoganath Adikari	Yoshiyuki Imamura	Katsuhito Miyake			Proceedings of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
39		Coastal Vegetation Characteristics for Tsunami Disaster Mitigation at Southern Coast of Java Indonesia		Dinar Istiyanto	Shigenobu Tanaka	Daisuke Kuribayashi	Katsuhito Miyake		Proceeding of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
40		Storage excess: A new conceptual framework for subsurface water collection, storage and discharge at the watershed scale		Takahiro Sayama	Jeff McDonnell	Kate Sullivan			American Geophysical Union, Fall Meeting 2010	American Geophysical Union			
41		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Kwak Youngjoo	Hasegawa Akira	Inomata Hironori	Kazuhiko Fukami		Geophysical Research Absract	EGU			
42		Integrated Flood Analysis Sytem (IFAS) as an efficiency tool to implement floof forecasting/warning sytem		Kazuhiko Fukami	Tomonori SUGIURA	Go Ozawa	Takahiro KAWAKAMI		CGCM COE UNITEN-Technical Report	Universiti Tenaga Nasional (UNITEN), Malaysia	7		
43	Article. Others	2009 Typhoon Ondoy and Pepeng Disasters in the Philippines		Tadashi Nakasu	Teruko Sato	Takashi Inokuchi	Shinya Shimokawa	Akiko Watanabe	防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	9	16
44		Landslide Disaster around Baguio City caused by Typhoon Pepeng in 2009		Takashi INOKUCHI	Tadashi NAKASU	Teruko Sato			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	35	42
45		2009 Typhoon Ondoy Flood Disasters in Metro Manila		Teruko Sato	Tadashi NAKASU				防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	64	74
46		Representations over a Tropical Storm Disaster and the Restoration of Everyday Lives for Urban Poor Victims in the Philippines：The Case of Typhoon Ondoy		Akiko Watanabe	Tadashi NAKASU	Takaashi Inokuchi			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	81	86
47		The Exacerbation of Human Suffering and Disaster Response Caused by Tropical Storm Ondoy and Typhoon Pepeng Disasters: Cases of NCR and Baguio City		Tadashi Nakasu					防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	97	104
48		河川実務者の観点から見たADCPによる流量観測技術開発の論点 Key points for developing water discharge measurement techniques using ADCP from field engineers' perspective		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources		46	55
49		Study on applicability of ALOS data for flood inundation simulation		Kazuhiko Fukami	Shigenobu Tanaka	Inomata Hironori	Hideo YAMASHITA		ALOS PI Report	Japan Aerospace Exploration Agency (JAXA)	PI NO.397	1	9

50		ラグナ湖の洪水貯留量を利用した低落差発電 Laguna Lake Low-Head Power Generation by using Flood Discharge Detention Volume		加本実 Minoru Kamoto					都市計画 Urban planning	(公社)日本都市計画学会 City Planning Institute of Japan	Vol 59, No.6	53	56
51		衛星リモートセンシング技術の土砂災害への応用	Satellite remote sensing technologies applied to sediment disaster countermeasures	水野正樹 Masaki Mizuno	林真一郎 Shinichiro Hayashi	清水孝一 Yoshikazu Shimizu	小山内信智 Nobutomo Osanai		土木技術資料 Civil Engineering Journal	土木研究センター Public Works Research Center	Vol53, No1	20	23
52	PWRI Publication	Planning and Design of Tsunami-mitigative Coastal Vegetation Belts		Shigenobu Tanaka	Dinar Istiyanto	Daisuke Kuribayashi			PWRI Technical Note	Public Works Research Institute	4177		
53		2009-2010 修士課程「防災政策プログラム水災害リスクマネジメントコース」実施報告書	Project report on the 2009-2010 Water-related Disaster Management Course of Disaster Management Policy Program	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4182		
54		Report on 2009-2010 Master's Program, "Water-related Disaster Management Course of Disaster Management Policy Program		Daisuke Kuribayashi	Kei Kudo	Shigenobu Tanaka			PWRI Technical Note	Public Works Research Institute	4190		

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1	Book	Large-scale Flood Report		Ali Chavoshian					ICHARM Book Series	ICHARM		1	207
2	Journal	Lessons learned from statistical comparison of flood impact factors among southern and eastern Asian countries		R. Osti	S. Hishinuma	K. Miyake	H. Inomata		Journal of Flood Risk Management	WileyInterscience	Vol.4, Issue 3	203	215
3		Development of reservoir control optimization simulator by integrating a distributed-rainfall-runoff-model and dynamic programming		Takahiro Sayama	Yasuto Tachikawa	Hiroki Kanno	Kaoru Takara		Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol. 29	33	45
4		How much water can a watershed store?		Takahiro Sayama	Jeffrey J. McDonnell	Amod Dhakal	Kate Sulivan		Hydrological Processes	John Wiley & Sons, Ltd	Vol. 25, Issue 25	3899	3908
5		Prediction and assessment of multiple glacial lake outburst floods scenario in Pho Chu River Basin, Bhutan		R. Osti	Shinji Egashira	Adikari Yoganath			Hydrological Processes	John Wiley & Sons, Ltd	Vol. 27, Issue 2	262	274
6		Rainfall-runoff-inundation analysis of the 2010 Pakistan flood in the Kabul River Basin		Takahiro Sayama	Go Ozawa	Takahiro Kawakami	Seishi Nabesaka	Kazuhiko Fukami	Hydrological Science Journal	IAHS	Vol. 57, Issue 2	298	312
7		Driftwood deposition from debris flows at slit-check dams and fans		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Natural Hazards	Springer	Vol. 61, Issue 2	577	602
8		Assessment of flood hazard, vulnerability and risk of mid-eastern Dhaka using DEM and 1D hydrodynamic model		Muhammad Masood	Kuniyoshi Takeuchi				Natural Hazards	Springer	Vol. 61, Issue 2	757	770
9		Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		R. Osti	Tara Nidhi Bhattarai	Katsuhito Miyake			Natural Hazards	Springer	Vol. 58, Issue 3	1209	1223
10	Paper	X-band MPレーダーとC-bandレーダーを併用した 降雨推定手法の開発 QPE BY COMBINED USE OF X-BAND MP RADAR AND CONVENTIONAL C-BAND RADAR FOR SEAMLESS RAINFALL DISTRIBUTION		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vo. 68, No.4	349	354
11		インダス川全流域を対象とした2010年パキスタン洪水の降雨流出氾濫解析 RAINFALL-RUNOFF-INUNDATION ANALYSIS OF PAKISTAN FLOOD 2010 FOR THE ENTIRE INDUS RIVER BASIN		佐山敬洋 Takahiro Sayama	藤岡 奨 Susumu Fujioka	牛山朋來 Tomoki Ushiyama	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol.68, No.4,	493	498
12		X-band MPレーダー情報を用いたC-bandレーダー降水強度の改善手法の開発 A method to improve C-band radar rainfall by utilizing X-band MP radar information		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	Japan Society of Civil Engineering	17	11	16
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14		気候変動による世界の水需給変化と社会的影響予測 Predicted World Water Supply and Demand Changes and Social Effects Attributable to Climate Change		三石真也 Shinya Mitsuishi	唐澤仁士 Hitoshi Karasawa	新井勝明 Katsuaki Arai			水文・水資源学会誌 Journal of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources	VOL.25 NO.2	103	112
15		Analysis of Hydrodynamic Characteristics of Potential Outburst Floods from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		Nepal Engineers' Association Japan Center (NEA-JC) Newsletter	Nepal Engineers' Association Japan Center (NEA-JC)	Vol. 5, No. 1	10	14

16	Abstract	GCMの極端および月降水量の同時バイアス補正手法の全球陸域への適用 An application of a statistical bias correction to express both seasonal pattern and extremes to GCM precipitation on the land surface of the globe		長谷川聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	43	43
17		2010 年7 月5 日に発生した板橋豪雨の数値シミュレーション Numerical simulation of severe rainfall in Itabashi on 5 July 2010		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	67	67
18		MRI-AGCM3.1Sおよび3.2Sにおける気候変動に伴う日降水量の変化と統計的バイアス補正 Daily Precipitation change in MRI-AGCM simulations associated with climate change and a statistical bias correction aimed to reproduce both seasonal pattern and extreme values		長谷川　聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami		極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		8	8
19		全球における気候変動に伴う洪水リスクの影響評価 Global-scale Assessment of Flood Disaster Risk under Climate Change		郭栄珠 Youngjoo Kwak	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		27	27
20		特定脆弱地域における気候変化に伴う洪水変化の影響評価 Evaluation of the Impact caused by Flood Situation Change along with Climate Change in Specific Vulnerable Areas		竹内邦良 Kuniyoshi Takeuchi	三宅且仁 Katsuhito Miyake	中須正 Tadashi Nakasu			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		28	28
21		超高解像度大気モデルMRI-AGCM3.1SならびにCMIP3 AOGCMsによる渇水の将来変化予測 Future Global Drought Changes Projected by MRI-AGCM3.1S and CMIP3 AOGCMs		菱沼志朗 Shiro Hishinuma	竹内邦良 Kuniyoshi Takeuchi	佐山敬洋 Takahiro Sayama			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		29	29
22		山地流域における雨水貯留と流出機構に関する研究 Watershed storages and runoff processes in mountainous river basins		Takahiro Sayama	Jeffrey J. McDonnell				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
23		Global-scale Assessment of Flood Disaster Risk under Climate Change		Youngjoo KWAK	Fukami Kazuhiko	Kuniyoshi Takeuchi			水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		92	93
24		Global Drought Changes Projection by MRI-AGCM3.1S and Other AOGCMs		Shiro Hishinuma	Kuniyoshi Takeuchi				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		94	95
25		Identifying Physical Components to Compose Flood Vulnerability Index Considering Micro-Topographical Effect		Shigenobu Tanaka	Katsuhito Miyake	Youngjoo Kwak	Shigenobu Hibino		水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		168	169
26		Development of Early Warning System based on IFAS		Seishi NABESAKA	Takahiro KAWAKAMI	Mamoru MIYAMOTO	Kazuhiko FUKAMI	Katsuhito MIYAKE	水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		234	235
27		インダス川全流域を対象とした2次元降雨流出氾濫解析 Rainfall-Runoff-Inundation Analysis in the Indus River Basin		佐山敬洋 Takahiro Sayama	鍋坂誠志	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	171	171
28		WRF による再現雨量を用いたパキスタン・カブール川洪水シミュレーション Streamflow simulation for Kabul River basin flood, Pakistan, by using forecast rainfall by WRF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	179	179
29		津波災害からの復興過程と地域社会：三陸沿岸部の高地移転	Restoration from the tsunami disaster and local communities: Relocation to higher ground in Sanriku coastal areas	中須正 Tadashi Nakasu	田中茂信 Shigenobu Tanaka	三宅且仁 Katsuhito Miyake			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	IV	67	68
30		On Tsunami Elevation Variation in Narrow Bays During the East Japan Great Tsunami Disaster 3.11 Event		Dinar Istiyanto	Shigenobu Tanaka	Yoshikazu Shimizu	Katsuhito Miyake		JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		103	106
31		Assessment of Future Changes in Precipitation and Discharge in Motagua River Basin Using High Resolution Climate Model		Rodrigo Fernandez	Shigenobu Tanaka				JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		111	114
32		A Comparative Study on Disaster Recovery Process : Disaster Recovery Begins before the Disaster		Tadashi Nakasu	Kuniyoshi Takeuchi				5th International Conference on Flood Management (ICFM5)	ICFM5		23	23

33	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	5th International Conference on Flood Management (ICFM5)	ICFM5		117	117
34	Proposal of water discharge measureemnt with ADCP in mountainous area and accuracy evaluation methods		Shoji Okada	Atsuhiro Yorozuya	Takashi Kitsuda	Kazuhiko Fukami		5th International Conference on Flood Management (ICFM5)	ICFM5		147	147
35	FLOOD FORECASTING AND RIVER FLOW MODELING IN MOUNTAINOUS BASIN WITH SIGNIFICANT CONTRIBUTION OF SNOWMELT RUNOFF		Amin Nazari	Nasiri Saleh	Ali Chavoshian			5th International Conference on Flood Management (ICFM5)	ICFM5		151	151
36	NUMERICAL PREDICTION OF FLOOD RAINFALL IN PAKISTAN		Tomoki Ushiyama	Takahiro Sayama	Yuya Tatebe	Susumu Fujioka	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		155	155
37	Automatic water discharge measurement for mountainous areas		Atsuhiro Yorozuya	Kazuhiko Fukami	Kazunori Odaira			5th International Conference on Flood Management (ICFM5)	ICFM5		157	157
38	Large Scale Rainfall-Runoff-Inundation Analysis in the Indus River Basin		Takahiro Sayama	Susumu Fujioka	Tomoki Ushiyama	Yuya Tatebe	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		160	160
39	Nation-wide Flood Risk Assessment Using Inundation Level Model and MODIS Time-series Images		Youngjoo KWAK	Jonggeol Park	Fukami Kazuhiko			IEEE-IGARSS 2011	IEEE		4395	4398
40	A New Assessment Methodology for Flood Risk: A Case Study in the Indus River Basin Risk in Water Resources Management		Youngjoo KWAK	Hasegawa Akira	Inomata Hironori	Jun Magome	Fukami Kazuhiko	Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	55	60
41	Determination of Inundation Area Based on Flood Hazard for a Global Water Risk Assessment		Jonggeol Park	Kwak Youngjoo				Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	61	64
42	人工衛星情報の土砂災害への活用について Sediment-related Disaster through Satellite Observation		Yoshikazu SHIMIZU					GIS-Landslide Workshop 3	GIS-Landslid研究会		8	8
43	Assessment of Debris Flow and Flood Inundation Hazards from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	The IHP Symposium on Extreme Events "Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future"	Regional Steering Committee for Southeast Asia and the Pacific UNESCO IHP		1	12
44	Hydrodynamic Characteristics of Potential Outburst Flood from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	30th Annual Meeting of the Japan Society for Natural Disaster Science	Japan Society for Natural Disaster Science		89	90
45	Towards Better Mitigation of Tsunami Disaster in Indonesia		Dinar C. Istiyanto	Shigenobu Tanaka	Toshio OKAZUMI			International Symposium on Engineering Lessons Learned from the Giant Earthquake	JAEE		556	567
46	Meta and Longitudinal Analyses of High Death Rates of Some Particular Municipalities in GEJET		Tadashi NAKASU	Kuniyoshi Takeuchi	Shigenobu Tanaka	Ken Yoneyama	Naoki Fujiwara	Integrated Research on Disaster Risk (IRDR) Conference 2011	IRDR		15	15
47	Development of rainfall observation with C-band radar combining with X-band MP radar		Tomoki Ushiyama	Atsuhiro YOROZUYA	Yuya KANNO	Kazuhiko FUKAMI		International Symposium on Weather Radar and Hydrology (WRaH 2011)	Weather Radar and Hydrology (WRaH) Scientific Committee			
48	2010年7月5日に板橋区で発生した局地的豪雨の数値実験 Numerical simulation of severe rainfall in Itabashi on 5 July 2010		Tomoki Ushiyama					第13回非静力学モデルワークショップ The 13th nonhydrostatic model workshop	社団法人　日本気象学会 Meteorological Society of Japan			
49	QPE by combined use of X-band MP radar and conventional C-band radar for seamless rainfall distribution		Tomoki Ushiyama					X-band Weather Radar Workshop	Delft University of Technology			

50		Challenge for sustainable water management		A.W.Jayawardena					International Symposium on Advances in Civil and Environmental Engineering Practices for Sustainable Development (ACEPS-2012)	Faculty of Engineering, University of Ruhuna, Galle, Sri Lanka			
51		Development and Application of Flood Disaster Preparedness Indices		Tadashi NAKASU					Working Group of Hydrology of 44rd Annual Meeting of Typhoon Committee	44rd Annual Meeting of Typhoon Committee			
52		Identification of Tsunami Wave Energy Damping Process by Coastal Vegetation Belt at Laboratory Scale Model Experiment		Dinar C. ISTIYANTO	Karuniadi S. UTOMO	Shigenobu TANAKA	Katsuhito MIYAKE		International Sessions in Conference o n Coastal Engineering	Japan Society of Civil Engineering	Vol. 2		
53		Aftermath of the 3/11 tsunami in Tohoku Region of Japan		A.W.Jayawardena					6th International Conference on Asian and Pacific Coasts	University of Hong Kong			
54		Suggestion for an Advanced Early Warning System Based on Flood Forecasting in Bengawan Solo River Basin, Indonesia		Mamoru MIYAMOTO	Ai SUGIURA	Toshio OKAZUMI	Shigenobu TANAKA	Kazuhiko FUKAMI	10th International Conference on Hydroinformatics				
55		Pollution Loading Modeling of Nutrient Salts and Application to Small-scale Semi-urbanized Basin		Mamoru MIYAMOTO	Hemantha RAJAPAKSE	Kazuhiko FUKAMI			5th international perspective on water resource & the environment	ASCE	34		
56		Analysis of potential outburst flood from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa				7th NESAJ Knowledge Transfer Symposium	Nepalese Students' Association in Japan (NESAJ)			
57		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Youngjoo KWAK	Akira HASEGAWA	Hironori INOMATA	Kazuhiko FUKAM		European Geosciences Union General Assembly 2011 (EGU2011)	EGU	vol. 13		
58		A Critical Cause Analysis of Human Loss Exacerbation Caused by the 2011 GEJET Disaster – The Case of Rikuzentakata City in Iwate Prefecture		Tadashi NAKASU					2012 Advanced Institute on Forensic Investigations of Disasters				
59		Internationalization of SABO- Importance, Concept, Evolution and Internalization		Adikari Yoganath					International Sabo Forum 2011				
60		Flood Management: a lesson to be learned from Arakawa river, Japan		Narayan P. Gautam					Revo Science	Revo Science Media			
61	Article, others	伊勢湾台風災害と災害対策基本法の成立:その意味と教訓(Typhoon Isewan Disaster and Disaster Countermeasures Basic Act: Their Meaning and Lessons)		Tadashi NAKASU	三宅且仁 Katsuhito Miyake	清水孝一 Yoshikazu Shimizu			水利科学 (Water Science)	社団法人 日本治山治水協会 Japan Society of forest conservation and flood control	Vol. 55	100	119
62		降雨予測を活用したダム洪水調節におけるリスク管理に関する研究 Research on Risk Management of Dam Flood Control by Utilizing Rainfall Prediction		三石真也 Shinya Mitsuishi	角 哲也 Tetsuya Sumi	尾関敏久 Toshihisa Ozeki	矢神卓也 Takuya Yagami		ダム工学 Journal of Japan Society of Dam Engineers	ダム工学会 Japan Society of Dam Engineers	Vol.21 No.4	242	250
63		貯水池の連携運用等による効率的な発電の実施に向けて	Implementation of effective power generation through integrated reservoir operation	三石真也 Shinya Mitsuishi	豊田忠宏 Tadahiro Toyoda	猪股広典 Hironori Inomata			ダム技術 Engineering for Dams	ダム技術センター Japan Dam Engineering Cecter	No.301	34	42
64		Lower Mekong Basin -Existing environment and development needs-		加本実 Minoru Kamoto	M. Juntopas				Human and Natural Environment for the Mekong River	TERRAPUB, Tokyo		25	42
65		Dynamics of hydrometeorological and environmental hazards, Environmental Hazards		A. W. Jayawardena					The Fluid Dynamics and Geophysics of Extreme Events, Lecture notes series, Institute for Mathematical Sciences	National University of Singapore	Vol. 21	229	267
66		Dynamics of Hydro-Meteorological and Environmental Hazards		A. W. Jayawardena					Asia Pacific Mathematics Newsletter	World Scientific Publishing	Volume 1 No 4	32	36

67		Chapter 8: Adaptation Measures for Climate Change in Japan		Toshio OKAZUMI	Eiji Otsuki				Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		125	129
68		Chapter 13: Integrated Flood Analysys System: An Efficient Tool to Imolement Flood Forecasting and Warning Systems		Kazuhiko Fukami	Tomonobu Sugiura	Go Ozawa	Jun Magome	Takahiro Kawakami	Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		178	195
69		日本におけるADCPを用いた高水流量観測手法 Method of water discharge measurement during flood using Acoustic Doppler Current Profiler in Japan		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	深見和彦 Kazuhiko Fukami		河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	34	41
70		日本におけるADCPを用いた流量観測データの品質管理手法の考察 QUALITY-ASSURANCE PLAN FOR DISCHARGE MEASUREMENTS USING ADCP IN JAPANESE RIVERS		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	28	33
71		洪水時の流量観測手法における新しい動向	A new trend in discharge observation during flooding	深見和彦 Kazuhiko Fukami					地質と調査 Geology and Survey	(一社)全国地質調査業協会連合会 Japan Geotechnical Consultants Association	No.131	22	28
72		復興理論と東日本大震災	復興理論と東日本大震災	中須正 Tadashi Nakasu					雑誌河川 Monthly magazine "Rivers"	(公社)日本河川協会 Japan River Association	Vol. 68, No.1	94	99
73		大規模水災害の減災に向けて －低頻度大規模水災害への対応－	Countermeasures for infrequent large-scale flood	田中茂信 Shigenobu Tanaka					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		28	31
74		洪水流量観測手法における新しい潮流	A new trend for flood river flow discharge measurement techniques	深見和彦 Kazuhiko Fukami					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		14	17
75	PWRI Publication	Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		ICHARM					PWRI Technical Note	Public Works Research Institute	4215		
76		2010-2011 修士課程「防災政策プログラム水災害リスクマネジメントコース」実施報告書	Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"	ICHARM					土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4209		

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	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			ESCAP/WMO Typhoon Committee	ESCAP/WMO Typhoon Committee		1	26
2	Journal	Future Changes in Low Precipitation Patterns Projected by the Super-high-resolution MRIAGCM3.1S and CMIP3 AOGCMs		Shiro HISHINUMA	Kuniyoshi TAKEUCHI				Hydrological processes	Wiley	Vol. 27, Issue 23	3319	3331
3		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lake		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Volume 10, Issue 3	299	313
4		Glacila and sediment hazards in the Rolwaling valley, Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		International Journal of Erosion Control Engineering	Japan Society of Erosion Control Engineering	Vol.5, No.2	123	133
5		Changes in Flood Risk under Global Warming Estimated Using MIROC5 and the Discharge Probability Index		Atsushi Okazaki	Pat YEH	Kei Yoshimura	Masahiro Watanabe	Masahide Kimoto	Journal of the Meteorological Society of Japan	Meteorological Society of Japan	Vol. 90, No. 4	509	524
6	Paper	Effect of density of gauges on accuracy of merged GSMAP: case study of typhoon Morakot		Go OZAWA	Hironori INOMATA	Kazuhiko FUKAMI			IAHS Publication	International Association of Hydrological Sciences	357	350	356
7		A New Approach to Flood Risk Assessment in Asia-Pacific Region Based on MRI-AGCM Outputs		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Hydrological Research Letters	Japan Society of Hydrology and Water Resources	6	70	75
8		Climate change impact study on FLOOD Risk in lower West Rapti River basin using MRI-AGCM outputs		Edangodage Duminda Pradeep PERERA	Akiko HIROE	Kazuhiko FUKAMI	Toshiya UENOYAMA	Shigenobu TANAKA	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol. 69, No.4	451	456
9		Development of flood vulnerability indices for Lower Mekong Basin in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol.69, No.5	1	6
10		ALOS(だいち)合成開口レーダーを用いた崩壊地抽出手法と適用性 Applicability of methods for detecting landslides by using synthetic aperture radar of ALOS(Daichi)		林真一郎 Shin-ichiro Hayashi	水野正樹 Masaki Mizuno	小山内　信智 Nobutomo Osanai	西真佐人 Masato Nishi	清水孝一 Yoshikazu Shimizu	砂防学会誌 Journal of Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol. 65, No.4	3	14
11		タイにおける洪水災害に対する地域防災力評価指標の開発：ウボンラーチャタニー及びハートヤイの事例を中心に (Development of Flood Disaster Preparedness Indices (FDPI) in Thailand :Focus on the Cases of Ubon Rachathani and Hat Yai)		中須正 Tadashi Nakasu	岡積敏雄 Toshio Okazumi	清水孝一 Yoshikazu Shimizu			年報　タイ研究 The Journal of Thai Studies	日本タイ学会(The Japanese Society of Thai Studies)	12	65	81
12		記憶と解放、記憶と伝承ーインドネシア・アチェの津波経験を踏まえてー Memory and Release, Memory and Lore through tsunami disaster experience in Aceh, Indonesia		杉本めぐみ Megumi Sugimoto					情報知識学会誌 Journal of Japan Society of Information and Knowledge	情報知識学会 Japan Society of Information and Knowledge	Vol. 22, No.4	355	364
13		The Multiple Contributions of Dams and Reservoirs after the 2011 Great East Japan Earthquake		Toshio Okazumi	NAKANE, Tatsuto	KAMADAI, Takeshi	FUKUWATARI, Takashi		International Symposium on DAMS FOR A CHANGING WORLD	Organizing Committee, ICOLD 2012 Kyoto, JAPAN COMISSION ON LARGE DAMS		2-87	2-92

14	Abstract	LETKFを用いた2010年7月5日豪雨の再現実験 Forecast experiment of severe rainfall in 5 July 2010 by using LETKF		牛山朋來 Tomoki Ushiyama	深見和彦 Kazuhiko Fukami				日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	314	314
15		2010年パキスタン洪水をもたらした豪雨のダウンスケール再現実験 Forecasting experiment for severe rainfall causing Pakistan flood in 2010.		牛山朋來 Tomoki Ushiyama	Atif Rana Muhammad	佐山 敬洋 Takahiro Sayama	建部 祐哉 Yuya Tatebe	藤岡 奨 Susumu Fujioka	日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	379	379
16		OTT ParsivelとJoss-Waldvogelディスドロメータの雨滴粒径分布検証 Evaluation of raindrop size distribution observed by OTT Parsivel and Joss-Waldvogel disdrometer		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	450	450
17		統計的バイアス補正されたMRI-AGCM3.2Hの降水量の気候変化 A Statistical Bias-Corrected Precipitation Change of MRI-AGCM3.2H due to Climate Change		長谷川聡 Akira Hasegawa	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	548	548
18		Prediction of potential outburst floods from Tsho Rolpa Glacial Lake of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Toshio Okazumi	Kenji Kawaike	Yasuyuki Baba	第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-031	61	62
19		MODIS時系列データによる広域の洪水氾濫域抽出： タイ国チャオプラヤ川流域2011洪水の事例 Detection of large flood inundation area using MODIS time series: A Case study of 2011 flood in Chao Praya River basin		郭 栄珠 Youngjoo Kwak	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-049	97	98
20		東北地方太平洋沖地震津波による過去の津波記念碑の被害と災害教訓の伝承	Tsunami damage to monuments of past tsunamis during the 2011 off the Pacific coast of Tohoku earthquake and lessons from the disaster to learn and to pass on to future generations	杉本めぐみ Megumi Sugimoto	岡積敏雄 Toshio Okazumi				第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS10-019	37	38
21		ネパール西ラプティ川において気候変動が洪水流出量に与える影響の検討	Study on the effect of climate change on flood discharge of the West Rapti River in Nepal	廣江亜紀子 Akiko Hiroe	深見和彦 Kazuhiko Fukami	上野山智也 Toshiya Uenoyama	長谷川聡 Akira Hasegawa		第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		139	139
22		海外における広域土砂災害危険度推定の試み －衛星観測降雨情報を用いて－	Application of wide-area landslide prediction to overseas cases - Using satellite rainfall information -	清水孝一 Yoshikazu Shimizu	Badri Shrestha	岡積敏雄 Toshio Okazumi	小山内　信智 Nobutomo Osanai	石塚忠範 Tadanori Ishizuka	日本災害情報学会　第14回研究発表大会 The 14th meeting of Japan Society for Disaster Information Studies	日本災害情報学会 Japan Society for Disaster Information Studies	14	320	323
23		デジタル地形情報の洪水氾濫解析への利用～ICHARMにおける取り組み～	Applications of digital topographical information to flood and inundation analysis - researches at ICHARM -	深見和彦 Kazuhiko Fukami					平成24年度特別講演およびシンポジウム予稿集 Proceedings of the 2012 meeting of Japan Society of Engineering Geology	一般社団法人　日本応用地質学会 Japan Society of Engineering Geology		38	46
24		衛星観測雨量を用いた土砂災害の危険度推定に関する研究 Study on prediction of landslides through the satellite rainfall data		清水孝一 Yoshikazu Shimizu					第4 回GIS-Landslide and Natural Hazard 研究集会 The 4th meeting of the GIS-Landslide and Natural Hazard study group	GIS-Landslide 研究会 GIS-Landslide study group			
25		衛星観測雨量を用いた海外における土砂災害の危険度評価に関する可能性	Applicability of landslide prediction using satellite rainfall data to overseas cases	清水孝一 Yoshikazu Shimizu					2012東京大学空間情報科学研究センター全国共同利用研究発表会 The 2012 national meeting on joint usage and research	東京大学空間情報科学研究センター Center for Spatial Information Science, the University of Tokyo		8	8
26		Early warning and early evacuation from tsunamis, floods, volcano and other hazards		Megumi Sugimoto	Toshio Okazumi				American Geophysical Union 2012 Fall meeting	American Geophysical Union			
27		SUGGESTION FOR AN ADVANCED EARLY WARNING SYSTEM BASED ON FLOOD FORECASTING IN BENGAWAN SOLO RIVER BASIN, INDONESIA		Mamoru Miyamoto	Ai Sugiura	Toshio Okazumi	Shigenobu Tanaka	Seishi Nabesaka	Proceedings of 10th International Conference on Hydroinformatics	IWA IAHR	10	-	-
28		Estimation of flood volume in Chao Phraya river basin, Thailand from MODIS images coupled with flood Inundation level		Kwak Youngjoo	Jonggeol Park	Atsuhiro Yorozuya	K. Fukami		the 32nd annual IGARSS symposium 2012	IEEE Geoscience and Remote Sensing Society		887	890

29		Assessment of Flood Risk and Future Change due to Climate Change in Asia-Pacific Region Based on MRI-GCM Model		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Geophysical Research Absract	EGU General Assembly	14	-	-
30		Application of a Distributed Hydrological Model in the Karun River Basin, Iran		Shiro HISHINUMA					IAHS PUB symposium 2012	IAHS			
31		A study of ground-based, satellite-estimated and radar rainfall relationships at downstream of Shinano River, Japan		Narayan P. Gautam					4th TRMM and GPM International Science Conference	JAXA and NASA			
32	Article, others	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Floods: from Risk to Opportunity	IAHS Red book Series, IAHS	Vol.57	241	252
33		巨大津波後のアウターライズでの地震から露呈した津波防災の課題とまだ隠れている課題	Issues on tsunami disaster management exposed by outerrise earthquakes after the mega tsunamis and other hidden issues	杉本めぐみ Megumi Sugimoto					巨大津波災害に関する合同研究集会 Joint meeting on mega tsunami disasters				
34		生きる防災　アチェの誓い―津波被害のインドネシアで調査・教育に奔走―	Practical disaster management: Promise of Aceh – Strong commitment to research and education in tsunami-ridden Indonesia –	杉本めぐみ Megumi Sugimoto					日本経済新聞2012年12月25日 Nihon Keizai Shimbun (Dec. 25, 2012) *a Japanese newspaper	日本経済新聞 Nihon Keizai Shimbun Inc.		32	
35		水文・水理現象に関する調査 Investigation on Hydrology and Hydraulics		深見和彦 Kazuhiko Fukami	吉谷純一 Junichi Yoshitani				雑誌河川2012年9月号 Monthly magazine "Rivers" (Sep. 2012)	(公社)日本河川協会 Japan River Association	No.794	16	19
36		総合洪水解析システム(IFAS)による水文データ不足流域における洪水予測	Flood forecasting in poorly-gauged river basin using Integrated Flood Analysis System (IFAS)	深見和彦 Kazuhiko Fukami					2012年度(第48回)水工学に関する夏期研修会講義集 Proceedings of the 2012 summer meeting on hydraulic engineering	土木学会水工学委員会・海岸工学委員会 Coastal engineering committee of hydraulic committee, JSCE	48	A-2-1	A-2-19
37		災害調査と東日本大震災	Disaster Research and Great East Japan Earthquake and Tsunami Disaster	中須正 Tadashi Nakasu					社会と調査 Society and Survey	有斐閣 Yuhikaku Publishing Co., LTD.	12	64	69
38		工業団地の設立と新しいリスクマネジメント:2011年タイ、チャオプラヤ川洪水における連鎖的経済被害と地域社会	Development of industrial parks and new risk management: Chain reaction of economic damage during the 2011 Chao Phraya flood in Thailand and local communities	中須正 Tadashi Nakasu	Munetaka Kurahara				都市社会研究 Research on urban society	せたがや自治政策研究所 Setagaya center for policy studies	5	159	168
39	PWRI Publication	2011-2012修士課程「防災政策プログラム「水災害リスクマネジメントコース」実施報告書 Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		栗林大輔 Daisuke Kuribayashi					土木研究所資料第4245号 PWRI Technical Note No. 4245	土木研究所 Public Works Research Institute	4245		
40		洪水災害準備体制指標の開発 Development of Flood Disaster Preparedness Indices (FDPI)		中須正 Tadashi Nakasu	Toshio Okazumi	Yoshikazu Shimizu			土木研究所資料第4246号 PWRI Technical Note No. 4246	土木研究所 Public Works Research Institute	4246		
41		Development of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			Technical note of PWRI No.4247	Public Works Research Institute	4247		
42		Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi					Technical note of PWRI No.4251	Public Works Research Institute	4251		

ICHARM Publication List FY2013

	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	IAHS Red Book on "Floods: From Risk to Opportunity"		Ali Chavoshian	Kuniyoshi TAKEUCHI					IAHS	357		
2	Journal	Method for evaluating flood disaster reduction measures in alluvial plains		K. Taki	T. Matsuda	E. Ukai	T. Nishijima	S. Egashira	Journal of Flood Risk Management	Wiley	Vol.6	210	218
3		Reply to comment by Henriette I. Jager and Ryan McManamay on "Cumulative biophysical impact of small and large hydropower development in Nu River, China"		Kelly Kibler	Desiree Tullos				Water Resources Research	Wiley	49		
4		International comparison of measures taken for vulnerable people in disaster risk management laws		Karina Vink	Kuniyoshi TAKEUCHI				International Journal of Disaster Risk Reduction	Elsevier	4	63	70
5		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lak		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Vol.10	299	313
6		Approach to estimate the flood damage in Sukhothai Province using flood simulation		Anurak Sriariyawat	Kwanchai Pakoksung	Takahiro Sayama	Shigenobu Tanaka	Sucharit Koontanakulvong	Journal of Disaster Research	Fuji Technology Press	Vol. 8, No. 3	406	414
7		Numerical simulation of 2010 Pakistan flood in the Kabul River basin by using lagged ensemble rainfall forecasting		Tomoki Ushiyama	Takahiro Sayama	Susumu Fujioka	Yuya Tatebe	Kazuhiko Fukami	Journaof of Hydrometeorology	American Meteorological Society	15	193	211
8		Influence of Jamuna Bridge on River Morphology		Atsuhiro Yorozuya	Md.S. Islam	M. Kamoto	S. Egashira		Advances in River Sediment Research	Taylor & Francis Group		299	308
9		Influence of river bed evolution on inundation processes at Narayani River in Nepal		Atsuhiro Yorozuya	Krishna Prasad Rajbanshi	S. Egashira			Advances in River Sediment Research	Taylor & Francis Group		2043	2048
10		Effect of contemporary forest harvesting practices on headwater stream temperatures: Initial response of the Hinkle Creek catchment, Pacific Northwest, USA		Kelly Kibler	Arne Skaugset	Lisa Ganio	Manuela Huso		Journal of Forest Ecology and Management	Elsevier	310	680	691
11		Biophysical, Socioeconomic, and Geopolitical Vulnerabilities to Hydropower Development on the Nu River, China		Desiree Tullos	Eric Foster-Moore	Darrin Magee	Aaron Wolf	Kelly Kibler	Ecology and Society	Resilience Alliance	Vol. 18, No. 3	–	–
12		Flood vulnerability assessment in the light of rice cultivation characteristics in Mekong River flood plain in Cambodia		Toshio OKAZUMI	Shigenobu TANAKA	Youngjoo KWAK	Badri Bhakta SHRESTHA	Ai SUGIURA	Paddy and Water Environment	Springer	–	–	–
13		Investigating the impact of climate change on future runoff of river Satluj		Narayan P Gautam	Manohar Arora	N.K. Goel	A.R.S. Kumar		Journal of Hydrology and Meteorology	SOHAM-Nepal	Vol. 8	10	21
14	Paper	2011年タイ洪水を対象にした緊急対応の降雨流出氾濫予測 An Emergency Response-Type Rainfall-Runoff-Inundation Prediction for 2011 Thailand Flood		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	萬矢敦啓 Atsuhiro Yorozuya	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 1	14	29
15		レーダ雨量の不確実性を反映した降雨場の生成に関する研究	Stochastic rainfall field generation representing uncertainty in radar rainfall estimates	藤岡奨 Susumu Fujioka	佐山敬洋 Takahiro Sayama	三浦祐司 Yuji Miura	越田智喜 Tomoki Koshida	深見和彦 Kazuhiko Fukami	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_319	I_324

16		チャオプラヤ川流域における長期降雨流出氾濫解析	Long-term analysis of rainfall, runoff and inundation over the Chao Phraya River basin	建部祐哉 Yuya Tatebe	佐山敬洋 Takahiro Sayama	牛山朋來 Tomoki Ushiyama	藤岡奨 Susumu Fujioka	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_457	I_462
17		大規模洪水氾濫の時空間起源分析に関する研究 Analysis on Spatio-Temporal Sources of Large-scale Flooding		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	牛山朋來 Tomoki Ushiyama	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_463	I_481
18		河床変動及び強風を伴う河川表面流速の特性と風による影響の補正に関する検討 STUDY ON CHARACTERISTIC OF SURFACE VELOCITY IN RIVERS WITH RIVER BED CHANGE AND STRONG WIND AND REVISION OF WIND EFFECT		本永良樹 Yoshiki Motonaga					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_745	I_750
19		氾濫解析のためのPRISM DSMの活用とGPSを用いたその修正方法に関する研究 Study on PRISM DSM Application to inundation analysis and its modification method		萬矢敦啓 Atsuhiro Yorozuya					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_1549	I_1554
20		途上国へ適用可能な洪水リスク評価技術(総説) Applicable Methodologies for Flood Risk Assessment in the River Basin in Developing Countries		岡積敏雄 Toshio Okazumi	田中茂信 Shigenobu Tanaka				河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	17	20
21		メコン川下流域を対象にした家屋洪水被害推定手法の検証 Validation of a method for estimating flood damage to houses in the Lower Mekong Basin		上米良 秀行 Hideyuki Kamimera					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	51	56
22		異なる河床変動特性に応じた流速補正係数に関する考察 STUDY ABOUT VELOCITY INDEX ABOVE DIFFERENT RIVERBED CONDITION		本永良樹 Yoshiki Motonaga					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	195	198
23		アンサンブルカルマンフィルターを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using EnKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	319	324
24		人工衛星データを用いた洪水氾濫水位の算出手法の検討～メコン川下流域を例として～ Study about Estimation of Water Surface Elevation on Inundated Area Applying Satellite Based Information		萬矢敦啓 Atsuhiro Yorozuya					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	341	344
25		Monthly adjustment of Global Satellite Mapping of Precipitation (GSMaP) data over the VuGia-ThuBon River basin in central Vietnam using an artificial neural network		T. Ngo-Duc	J. Matsumoto	H. Kamimera			Hydrological Research Letters	Japan Society of Hydrology and Water Resources	7	85	90
26	Abstract	WRF-LETKFを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using WRF-LETKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	日本気象学会2013年度春季大会予稿集 Proceedings of the 2013 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	103	344	344
27		衛星雨量による土砂災害の危険度推定に関する事例研究 Feasibility study on prediction of sediment-related disaster risk by the satellite rainfall data		清水孝一 Yoshikazu Shimizu	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			第52回日本地すべり学会研究発表会講演集 Proceedings of the 52nd meeting of Japan Landslide Society	(公社) 日本地すべり学会 Japan Landslide Society		58	59
28		衛星観測降雨の土砂災害への適用に関する基礎的検討 Fondamental study on prediction of sediment-related disaster risk by the Satellite rainfall data		Yoshikazu SHIMIZU	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			平成25年度砂防学会研究発表会概要集B Proceedings of the 2013 meeting of Japan Society of Erosion Control Engineering	(公社) 砂防学会 Japan Society of Erosion Control Engineering		B210	B211
29		インドネシア国アンボン島の天然ダム決壊災害の減災はなぜ成功したか Good practice on evacuation from landslide dam break desaster on Ambon island, Indonesia		清水孝一 Yoshikazu Shimizu	森田耕司 Koji Morita	岡積敏雄 Toshio Okazumi			第5回GIS-Landslide研究集会 The 5th meeting of GIS-Landslide study group	GIS-Landslide研究集会 GIS-Landslide study group			
30		Importance of riverbed evolution in predicting inundation process		Shinji EGASHIRA	A. Yorozuya	E. K. P. Rajbanshi			Proc. HYDRO 2013 International	Indian Institute of Technology (IIT) Madras		646	654
31		Minimizing geopolitically ungauged catchment area of transboundary river basins to support disaster risk reduction		Kelly Kibler					7th Global FRIEND-Water Conference: Hydrology in a Changing World: Environmental and Human Dimensions	UNESCO-IHP, etc.	363		
32		Prediction on sediment related disaster through the satellite rainfall data		Yoshikazu SHIMIZU	Toshio OKAZUMI	Tadanori ISHIZUKA			USMCA 2013	USMCA2013			

33		Ensemble forecasts of rainfall and discharge in Japan for typhoon TALAS and ROKE in 2011 using EnKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	AOGS2013	AOGS			
34		Assessment of Flood Hazards and Vulnerability in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	6th International Conference on Water Resources and Environment Research	German research programme KLIWAS and the European sediment network SedNet			
35		Lessons Learnt From Two Unprecedented Disasters in 2011: Great East Japan Earthquake and Tsunami in Japan and Chao Phraya River flood in Thailand		Toshio OKAZUMI	Tadashi NAKASU	Megumi SUGIMOTO	Yoganath ADIKARI		Global Assessment Report on Disaster Risk Reduction 2013	UNISDR			
36	Article, others	Numerical Approach to Analyze Natural Dam Failure by Seepage Flow		Badri Bhakta Shrestha					NEA-JC Newsletter	Nepal Engineers' Association, Japan Center	Vol.6	13	18
37		世界の大規模洪水を監視・予測する先端技術 -2011年タイ洪水を事例に-	Advanced technology for monitoring and forecasting large-scale floods around the world - Application to the 2011 Thai flood -	佐山敬洋 Takahiro Sayama					河川文化 River culture	(公社)日本河川協会 Japan River Association	39	93	127
38		光学衛星画像による大規模崩壊の土砂移動状況の経年把握	The yearly monitoring of sediment movement by optical satellite images after a large-scale collapse	水野正樹 Masaki Mizuno	江川真史 Masafumi Ekawa	清水孝一 Yoshikazu Shimizu	筒井 健 Ken Tsutsui		土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-12	38	41
39		アジア開発銀行との連携協定による地域技術協力プロジェクト (ADB TA7276)最終報告	Final report on the ADB-ICHARM regional technical assistance project (ADB TA7276)	日比野繁信 Shigenobu Hibino	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha	鍋坂誠志 Seishi Nabesaka	宮本守 Mamoru Miyamoto	土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-6	38	43
40	PWRI publication	Report on 2012-2013 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi	Minoru Kamoto	Shun Kudo			PWRI Technical Note	Public Works Research Institute	4278		
41		2012-2013 修士課程「防災政策プログラム 水災害リスクマネジメントコース」実施報告書	Project report on the 2012-2013 Water-related Disaster Management Course of Disaster Management Policy Program	栗林 大輔, Daisuke Kuribayashi	加本実 Minoru Kamoto	工藤俊 Shun Kudo			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4271		

ICHARM プログラム

１．ICHARM の使命

ICHARM の使命は、国際から、国家、地域レベルで水関連災害・リスクマネジメントに携わる政府とあらゆる関係者を支援するために、自然・社会現象の観測・分析、手法・手段の開発、能力育成、知的ネットワーク、教訓・情報の発信等を通じて、水関連災害・リスクマネジメントにおける世界的な拠点としての役割を果たすことである。水関連災害として洪水災害、渇水災害、土砂災害、津波・高潮災害、水質汚濁、雪氷災害を指す。

ここでいう世界的な拠点とは、i) 革新的な研究、ii) 効果的な能力育成、iii) 効率的な情報ネットワークによって、世界をリードする人材、優れた施設、知的財産を擁する場を意味する。この 3 本柱によって、ICHARM は国家・地域における現場実践の知的拠点、及び実社会での政策立案における助言者としての役割を世界において果たす。

2. 長期プログラム（およそ 10 年）

ICHARM の使命を果たすため、世界及び地域の経験と傾向の中で地域のニーズ、重要課題、開発段階等を反映しつつ、自然、社会及び文化条件といった地域の多様性を考慮する原則、ローカリズムを念頭に、以下の活動を行う。

(i) 革新的な研究

水関連災害リスクマネジメントに関する質の高い研究成果と幅広い知識によって世界をリードし、水関連リスクマネジメントを世界スケールで進める有力なパートナーとなりうる ICHARM を作る。

(1) 水関連ハザードに係わる観測・予測・分析を行うための手法を開発し、水関連災害リスクを評価に資する。
(2) 特定流域および全球レベルでの水関連災害に対するエクスポージャーと脆弱性を評価、分析、モニタリングする手法を、リスクマネジメントの観点から開発する。
(3) 災害への備え、早期警報、ハード・ソフト対策の組み合わせ等、統合的かつ総合的な水及びリスク管理によって人類及び環境のレジリエンスを向上させる実務的な政策メニューを提言する。

(ii) 効果的な能力育成

現場対応能力が水関連災害に対する確固たるマネジメントには不可欠であり、発展と先進的な知識の応用を重視した最新の研修を通じて、ICHARM は質の高いブランドとなる水関連災害・リスクマネジメントの模範的な実務者の世界的ネットワークを支援する。

(4) 国家から地域に至る、あらゆるレベルで災害・リスクマネジメントの計画・実践に実質的に従事し、確固たる理論的・工学的見地で課題解決能力を有する実務者育成を支援する。
(5) 研究成果及び現地実践の両面で蓄積し、研修活動を通じて提供するノウハウによって水関連災害に対応し、問題解決に取り組む現地専門家・機関のネットワークを構築する。

(iii) 効率的な情報ネットワーク

ICHARM が有する広範な知的基盤と研究成果によって、世界レベルから地域レベルに至る水関連災害・リスクマネジメントを導く強力で総合的なオピニオンを支えていく。

(6) 実務者のための「災害情報の総合ナレッジセンター」として、世界の大規模水災害に関する情報・経験を収集・解析・提供する。
(7) 水関連災害リスクマネジメントに関する技術の発信と影響力のある国際的ネットワークを構築・維持することを通じて防災主流化に取り組む。

3. 中期プログラム（およそ 5 年）

上記の使命を達成するため、今後 5 年間において ICHARM は以下の活動を行う。

(i) 革新的な研究

(1) 水関連ハザードに係わる観測・予測・分析を行うための手法を開発し、水関連災害リスクの評価に資する。

〇洪水観測技術：従来、十分把握できていなかった洪水時の河床変動及び河川水流量を精度良く測定し、より合理的で流域単位の洪水管理を行うために、河床変動・河床粗度係数のモニタリング及び検証を行う。そのため、水深−流速の自動モニタリングによる流量観測技術を開発する。また、地上観測が困難な地域を対象に、洪水による浸水想定域及び被害家屋を把握する人工衛星画像解析の開発・検証を行う。

〇洪水予測と分析：総合洪水解析システム（IFAS）を改良し、蒸発散や複合ダム操作、融雪出水なども考慮できる機能を装備し、CommonMP への適用も含めて、その汎用性を向上させるとともに、日本国内・海外流域への適用・普及を進める。また、降雨流出・氾濫の各現象を流域一体で予測する降雨流出氾濫（RRI）モデルは地下水解析の部分を改良し、長期計算の精度を向上し、国内中小河川流域に適用して精度検証を進める。さらに、地形データを考慮した BTOP モデルで出力された流量を洪水浸水深（FID）モデルと連携させてアジア域を中心に全球洪水ハザードの予測とエクスポージャーを評価できる手法を開発する。数時間先から数日先までの洪水をもたらす降水を予測するため、気象モデルを用いたメソスケールのアンサンブル予

測のための新技術を開発し、その降水データを水文流出モデルに導入する。また、全球及びアジアの特定流域の気候変動による洪水外力への影響を分析するため、CMIP5 世代の気候予測データの統計的または物理的ダウンスケーリングを行い、バイアス補正を行う手法を開発する。

○渇水： BTOP モデルを改善し、精度向上に加えて、特定流域のダム操作、取水が考慮できる高精度モデルの開発・検証を行う。あわせて社会経済状況を踏まえた需要モデルの構築を完了し、社会経済渇水モデルの全球評価と流域単位の詳細評価を可能にする。

○土砂災害：我が国の技術をベースに途上国でも適用可能な衛星情報を活用した土砂災害予測モデルについて、衛星情報を活用した危険地域の特定技術、危険度判定技術に関する研究を進め、予測モデルの普及を図る。

○津波・高潮災害：途上国における津波・高潮災害への現地調査や ADB ミャンマープロジェクトで海岸部の高潮リスク評価のためモデルによる高潮予測を行う。

○水質汚濁：従来十分予測できなかった降雨時の水質負荷源と拡散輸送に影響するダイナミックな流出機構を再現するため、WEP(Water and Energy Transfer Processes)モデルにおける降雨時の SS、N、P の流出負荷の再現精度を向上させ、都市・森林・農地等の流域対策の課題と効果を解明する。

(2) 特定流域および全球レベルでの水関連災害に対するエクスポージャーと脆弱性を評価、分析、モニタリングする手法を、リスクマネジメントの観点から開発する。

日本を含むアジア各国での水災害に脆弱な流域を対象として、水災害リスクを表現する Global Risk Indices を開発して展開・普及させる。また、流域やコミュニティレベルでのリスク評価モデルの開発・精度向上やリスク軽減対策の効果の表現方法の改良を行う。

(3) 災害への備え、早期警報、ハード・ソフト対策の組み合わせ等、統合的かつ総合的な水及びリスク管理によって人類及び環境のレジリエンスを向上させる実務的な政策メニューを提言する。

災害事前復興対策、防災情報・避難対策等のリスク軽減策の効果分析、洪水準備体制指標など、総合的なリスク管理のための政策手段を、第 1 ステップとしてアジア地域を対象に評価・適用する。

(ii) 効果的な能力育成

(4) 国家から地域に至る、あらゆるレベルで災害・リスクマネジメントの計画・実践に実質的に従事し、確固たる理論的・工学的見地で課題解決能力を有する実務者育成を支援する。

より強力な GRIPS 及び JICA との協調の下、博士コース・修士コース・短期研修コースなどの、それぞれのコースの研修を継続し、特に博士課程を中心に ICHARM の研究活動と有機的に結びつけ、より幅広い知識を提供し、研究活動に資するよう研修スケジュール及び研修プログラムに改良する。さらに、研修プログラムのモジュール化・パッケージ化、e-learning による活性化・省力化及び遠隔研修に着手する。

(5) 研究成果及び現地実践の両面で蓄積し、研修活動を通じて提供するノウハウによって水関連災害に対応し、問題解決に取り組む現地専門家・機関のネットワークを構築する。

研修成果を各現地において実践し、次世代にわたってノウハウを提供するため、研修生と出身機関の双方に焦点を当てた場を提供しつつ、拡充に努める。海外における専門家および関連機関とのネットワークを構築するため、少なくとも年 1 回は現地国において帰国研修生のフォローアップ活動を実施し、帰国研修生の能力強化及び適切な助言、所属機関の災害対応能力向上を通じた現場実践活動を継続して行う。

(iii) 効率的な情報ネットワーク

(6) 実務者のための「災害情報の総合ナレッジセンター」として、世界の大規模水災害に関する情報・経験を収集・解析・提供する。

水災害情報やデータベースを収集・整備している機関との連携を図り、精度の高い情報を入手できる体制を構築する。また、ICHARM の研修・研究において各国から収集したデータをメタデータとして整理して蓄積するとともに、（了解が得られた）災害研究のレポートのリスト（ポータルサイト）を対外的に整備する。さらに、世界の最新の水関連災害の情報を収集・提供するために定期的にワークショップを開催し、その内容をレポートとして出版する。

(7) 水関連災害リスクマネジメントに関する技術の発信と影響力のある国際的ネットワークを構築・維持することを通じて防災主流化に取り組む。

2015 年 3 月に開催が予定される第 3 回国連防災世界会議を当面の目標として、防災主流化に関するポストミレニアム開発目標（MDGs）、持続可能な開発目標（SDGs）及びポスト兵庫行動枠組みへの取組みに対しての貢献を継続する。さらに、2015 年 4 月に開催が予定されている第 7 回世界水フォーラムや今後のアジア太平洋水フォーラムなどでのリーダーシップを通じて、これまでの各関係機関との連携を強化しつつ、研究及び研修活動との有機的な連携により、国際機関から国、地方政府、地域社会など幅広い階層にわたる広範なネットワーク構築に努める。研究や情報ネットワークは水災害・リスクマネジメントの政策提言に資することを目指す。

ICHARM 活動計画　（2014 年度(2014.4-2015.3)~ 2015 年度(2015.4-2016.3)）

業務区分	内容	2014 年度 活動と想定される成果	2015 度 活動と想定される成果
(1) 水関連ハザードに係わる観測・予測・分析を行うための手法を開発し、水関連災害リスクを評価に資する。			
1.1 洪水観測：従来、十分把握できていなかった洪水時の河床変動及び河川水流量を精度良く把握し、より合理的な洪水管理を行うために、河床変動・河床粗度係数のモニタリング及び検証を行う。そのため、水深-流速の自動モニタリングによる流量観測技術を開発する。また、地上観測が困難な地域を対象に、洪水による浸水想定域及び被害家屋を把握する人工衛星画像解析の開発・検証を行う。			
水文観測予測技術の開発	低コスト・低労力の新世代流量観測システムの開発	● ADCP および動画による観測データの分析・集積 ● 国内での技術普及 ● 新技術を利用した流量観測用マニュアルの公開	● マニュアルの再発行 ● 国内での技術普及 ● 流量観測を利用しない H-Q 関係に関する研究
1.2 洪水予測および解析：総合洪水解析システム（IFAS）を改良し、蒸発散や複合ダム操作、融雪出水なども考慮できる機能を装備し、CommonMP への適用も含めて、その汎用性を向上させるとともに、日本国内・海外流域への適用・普及を進める。また、降雨流出・氾濫の各現象を流域一体で予測する降雨流出氾濫（RRI）モデルは地下水解析の部分を改良し、長期計算の精度を向上し、国内中小河川流域に適用して精度検証を進める。さらに、地形データを考慮した BTOP モデルで出力された流量を洪水浸水深（FID）モデルと連携させてアジア域を中心に全球洪水ハザードの予測とエクスポージャーを評価できる手法を開発する。			
洪水分析および水資源管理のためのモデルやシステムの開発	衛星データをもとに流出解析モデルを簡便に作成できることを目的とした IFAS の開発	● 主要な気候区分･土地条件に適応した水文過程のモデルパラメータ設定手法の標準化 ● 低水解析､長期流出計算モジュールの開発	● 高度な治水・利水の施設等の運用操作を反映するモジュールの開発 ● はん濫や潮位の影響を考慮した低平地流出解析モジュールの開発 ● CommonMP 上への IFAS 連携機能の展開
	降雨・流出・氾濫（RRI）モデルの開発	水文過程の表現向上を目的とした地中流モジュールの改良	定量化した不確実性に関する情報を利用したアンサンブル洪水予測に向けた、アンサンブル WRF 予測と RRI シミュレーションの統

			合．動作性能については、アジア諸国のデータが乏しい地域で評価.
	遠隔測定を使った大規模な洪水域、洪水量、洪水被害の予測手法の開発	高解像度 SAR と光画像を組み合わせて、複数時間データの画像を統合し、氾濫域内の建物被害および位置を予測するアルゴリズムの開発	● 洪水量予測手法の開発 ● 災害復旧活動支援を目的とした実践的に適用可能なシステムの再考
	突発的洪水に適用できる洪水予測に関する研究 －定量的降雨予測－	アンサンブル Kalman フィルター（EnKF）を気象予報モデル（WRF モデル）に適用し、国内河川流域を含めた多様な条件下で、暴風雨関連事象を対象に動作性能を検証	WRF モデルを組み合わせた EnKF の適用と検証．特に、データの乏しい熱帯湿潤地域で動作性能を検証.
1.3 数時間先から数日先までの洪水をもたらす降水を予測するため、気象モデルを用いたメソスケールのアンサンブル予測のための新技術を開発し、その降水データを水文流出モデルに導入する。また、全球及びアジアの特定流域の気候変動による洪水外力への影響を分析するため、CMIP5 世代の気候予測データの統計的または物理的ダウンスケーリングを行い、バイアス補正を行う手法を開発する。			
地球温暖化による流量の変化の予測	不確実性を考慮した地球温暖化が洪水・渇水流出特性に与える影響に関する研究	● 特定領域を対象とした不確実性を考慮した降雨極値の変化予測手法の開発 ● 全球主要河川流域を対象とした不確実性評価を含めた洪水･渇水流出特性の変化予測	特定河川を対象とした不確実性を含めた洪水・渇水流出特性変化の予測
1.4 渇水：BTOP モデルを改善し、精度向上に加えて、特定流域のダム操作、取水が考慮できる高精度モデルの開発・検証を行う。あわせて社会経済状況を踏まえた需要モデルの構築を完了し、社会経済渇水モデルの全球評価と流域単位の詳細評価を可能にする。			
渇水	BTOP モデルを開発、渇水リスクを評価	全球 BTOP モデルについては引き続きキャリブレーションを進める。 特定脆弱流域の先行流域では 0.5km メッシュでダム操作のシミュレーションも可能とするモデルの構築を完了させ渇水リスクの検討に活用する。	全球 BTOP モデルは引き続きキャリブレーションを進める。 他の特定脆弱流域では 0.5km メッシュのダム操作も可能とする BTOP モデルの構築を完了させ、渇水リスク評価モデルの検討に活用する。
1.5 土砂災害：我が国の技術をベースに途上国でも適用可能な衛星情報を活用した土砂災害予測モデルについて、衛星情報を活用した危険地域の特定技術、危険度判定技術に関する研究を進め、予測モデルの普及を図る。			
土砂災害	危険可能性地区抽出手法、土砂	衛星情報を活用して途上国でも可能な技術と	左記手法をフィリピンのパンパンガ川流域で

	害危険度判定モデルの開発	しての土砂害危険可能性地区の抽出手法の検討を行う。また、衛星雨量を活用した長期雨量指標からの土砂災害危険度判定モデルの検討もあわせて行う。	試行を行う。危険度判定モデルは現地での観測データを用いながら引き続き検討を行う。
1.6 途上国における津波･高潮災害への現地調査や ADB ミャンマープロジェクトで海岸部の高潮リスク評価のためモデルによる高潮予測を行う。			
津波・高潮災害	高潮モデルの開発	高潮モデルを試行し、キャリブレーションと伴に今後のリスク評価モデル検討に向けての検討方針を策定する。	左記高潮モデルを活用したリスク評価モデル構築に取組む。
	PEARL プロジェクトへの貢献	UNESCO-IHE がリードする Preparing for Extreme And Rare events in costaL regions (PEARL) Project に参加し、東日本大震災への我が国の対応などをケーススタディとしてインプットするとともに、関係研究機関との連携を図る。	
1.7 従来十分予測できなかった降雨時の水質負荷源と拡散輸送に影響するダイナミックな流出機構を動態的に再現するため、WEP(Water and Energy Transfer Processes)モデルにおける降雨時の SS、N、P の流出負荷の再現精度を向上させ、都市・森林・農地等の流域対策の課題と効果を解明する。			
水質汚濁	閉鎖性水域の栄養物負荷および流出に関する管理状況の把握	WEP（水・エネルギー輸送プロセス）モデルの改良を行う	都市・森林などの流域の土地利用における汚濁負荷流出について、WEP モデルの検証を行う
(2) 特定流域および全球レベルでの水関連災害に対するエクスポージャーと脆弱性を評価、分析、モニタリングする手法を、リスクマネジメントの観点から開発する。			
日本を含むアジア各国での水災害に脆弱な流域を対象として、水災害リスクを表現する Global Risk Indices を開発して展開・普及させる。また、流域やコミュニティレベルでのリスク評価モデルの開発・精度向上やリスク軽減対策の効果の表現方法の改良を行う。			
2.1 流域間でのリスク比較を可能とする全球リスク指標の開発	洪水リスク評価手法の開発	現在までの研究成果を用いて洪水による直接被害との関連性をつける分析を進め、プロトタイプを構築する。全球リスク指標の開発を進めて、防災主流化など国際貢献に取組む。	さらなる充実と伴に引き続き精度向上、見直しに取り組む。モニタリングが可能となるよう組織の見直しを検討する。
	渇水リスク評価手法の開発	渇水についてはモデルの精査と伴に需要量の予測モデルを構築して、被害との関連性をつける分析を進め、プロトタイプを構築する。全球リスク指標の開発を進める。	引き続きリスクモデル開発に取り組む。

	2.2 特定流域リスク指標の開発	洪水リスク評価手法の開発	洪水ハザードの再現計算をもとに直接被害との関連性をつける分析を進め、プロトタイプを構築する。	他の特定脆弱流域への展開を図る。また既存の検討はリスク評価モデルの一般化および不確実性の評価までの向上を行う。
		渇水リスク評価手法の開発	高精度 BTOP の計算結果を検討する。需要側としては農業用水のモデルプロトタイプをもとに、さらに生活用水、工業用水の需要モデルの検討に展開する。	高精度 BTOP について他流域でも開発を進める。農業用水、生活用水、工業用水の需要予測について検討を進め、特定脆弱流域での水ストレスの評価モデルを構築する。さらにそれによる社会影響モデル検討にも着手する。
		流域リスク指標手法の開発	洪水及び渇水リスクの評価モデルに基づき、社会影響を評価して最終的に流域単位でのリスク指標を検討するにあたっての基本的設計を進める。	洪水・渇水のリスク評価モデルを活用して流域リスク指標への本格検討に着手する。
	2.3 他研究プログラムとの連携	文部科学省気候変動リスク情報創生プログラム（平成 24 年度ー）	CMIP5 世代の気候予測データを活用しながら、その不確実性を含めて全球規模およびアジアの５河川流域で定量的に予測するための手法の開発を行う。	（同左）
(3) 災害への備え、早期警報、ハード・ソフト対策の組み合わせ等、統合的かつ総合的な水及びリスク管理によって人類及び環境のレジリエンスを向上させる実務的な政策メニューを提言する。				
	災害事前復興対策、防災情報・避難対策によるリスク軽減策の分析、洪水準備体制指標など、総合的なリスク管理のための政策手段を、第 1 ステップとしてアジア地域を対象に評価・適用する。			
	3.1 総合的なリスク軽減策の検討	事前復興・緊急復旧対策に関する研究	新規にモデル流域での緊急復旧計画策定にむけ、現地の組織との共同研究体制づくり、基本モデルによるシミュレーションについての検討を行う。	緊急復旧計画のたたき台を検討した上で現地との協議を始める。他への活用の視点から素案をまとめる。
		防災情報・避難対策に関する研究	新規に防災情報・避難について、過去の被災自治体に対するヒアリングおよび分析を行い、災害時における適時適切な情報について再度整理する。	ソフト対策としての、防災情報のあり方について整理をして、今後の指標化、数値化等の議論に対しても貢献できるようまとめる。
		防災準備体制指標に関する研究	現在までの洪水準備体制指標（FDPI）研究を他の研究でも活用できる形式として、再整理す	ソフト対策の指標化、数値化等の成果に活用できるような取りまとめになるよう整理を進

		る。	める。
3.2 研究成果を活かした現地実践	ADB ミャンマープロジェクト ーミャンマーの都市管理に係るリスク評価ー （ヤンゴン、マンダレー、モーラミャイン）	水文、気象、被害、社会情報のデータ・情報収集	追加収集
		洪水モデル（RRI モデル）、高潮モデルの現地への適用	シミュレーション実施、リスクモデル構築への活用
		リスク評価モデルに関する基礎情報の収集、分析	リスク評価モデル構築
		能力開発トレーニングの企画・計画・調整、準備	トレーニング実施、トレーニング運営指導
	UNESCO パキスタンプロジェクト　第 2 フェーズ	（UNESCO と調整中）	（UNESCO と調整中）
	JST-JICA マレーシアプロジェクト	マレーシア国におけるIFASの導入プロジェクトの継続	
(4) 国家から地域に至る、あらゆるレベルで災害・リスクマネジメントの計画・実践に実質的に従事し、確固たる理論的・工学的見地で課題解決能力を有する実務者育成を支援する。			
より強力な GRIPS 及び JICA との協調の下、博士コース・修士コース・短期研修コースなどの、それぞれのコースの研修を継続し、特に博士課程を中心に ICHARM の研究活動と有機的に結びつけ、より幅広い知識を提供し、研究活動に資するよう研修スケジュール及び研修プログラムに改良する。さらに、研修プログラムのモジュール化・パッケージ化、e-learning による活性化・省力化及び遠隔研修に着手する。			
4.1 研究者を育成、指導できる専門家の育成	博士課程 「防災学プログラム」	2～3 名（2014～2017）	2～3 名（2015～2018）
4.2 地域レベルの水関連災害に係る問題に現実的に対処できる能力を備えた人材の育成	修士課程 「防災政策プログラム 水災害リスクマネジメントコース」	対象国から 10～15 名 対象国：タイ、ブラジル、パキスタン、フィリピン、インド、マレーシア、バングラデシュ、エチオピア、スリランカ、ミャンマー、ケニア、ジャマイカ、ナイジェリア、ニカラグア、スーダン、コロンビア、東チモール、フィジー、ギアナ	10～15 名 対象国は JICA と協議の上決定

4.3 水関連災害リスク管理に関する知識と技術の習得を目的とした、数日から数週間の研修	JICA 研修「IFAS を活用した洪水対応能力向上」	対象国から 14～21 名 ナイジェリア、タイ、バングラデシュ、フィリピン、ベトナム、ケニア、ブータン	
	JICA 研修「IFAS を活用した洪水対応能力向上」 第 2 フェーズ		対象国は JICA と協議の上決定
	上級職員を対象としたワークショップ	パキスタン（5～6 名）とアフガニスタンから	
	実務レベルの職員を対象とした技術研修		パキスタンから（5 名　未定）
(5) 研究成果及び現地実践の両面で蓄積し、研修活動を通じて提供するノウハウによって水関連災害に対応し、問題解決に取り組む現地専門家・機関のネットワークを構築する。			
研修成果を各現地において実践し、次世代にわたってノウハウを提供するため、研修生と出身機関の双方に焦点を当てた場を提供しつつ、拡充に努める。海外における専門家および関連機関とのネットワークを構築するため、少なくとも年 1 回は現地国において帰国研修生のフォローアップ活動を実施し、帰国研修生の能力強化及び適切な助言、所属機関の災害対応能力向上を通じた現場実践活動を継続して行う。			
5.1 研修修了生に対する支援	研修生出身国でのセミナー開催	● 修了生名簿の作成・維持 ● インターネットを利用した修了生のネットワーク構築 ● フォローアップ・ミーティングの開催	（継続）
(6) 実務者のための「災害情報の総合ナレッジセンター」として、世界の大規模水災害に関する情報・経験を収集・解析・提供する。			
水災害情報やデータベースを収集・整備している機関との連携を図り、精度の高い情報を入手できる体制を構築する。また、ICHARM の研修・研究において各国から収集したデータをメタデータとして整理して蓄積するとともに、（了解が得られた）災害研究のレポートのリスト（ポータルサイト）を対外的に整備する。さらに、世界の最新の水関連災害の情報を収集・提供するために定期的にワークショップを開催し、その内容をレポートとして出版する。			
6.1 災害関資料の収集	● 大規模洪水に関するワークショップ ● 4～5 名の専門家を招聘 大規模洪水に関する報告書	ワークショップの開催	大規模洪水に関する報告書の公表

	の公表		
	災害情報収集、収集した情報のメタデータを作成	枠組みを構築、予備的な情報収集	情報収集
6.2 各機関との連携	水災害情報関連の機関との連携	精度の高い災害情報入手を目的とした、UNESCO センターや国際機関（UNISDR、赤十字など）との連携	継続

(7) 水関連災害リスクマネジメントに関する技術の発信と影響力のある国際的ネットワークを構築・維持することを通じて防災主流化に取り組む。

2015 年 3 月に開催が予定される第３回国連防災世界会議を当面の目標として、防災主流化に関するポストミレニアム開発目標（MDGs）、持続可能な開発目標（SDGs）及びポスト兵庫行動枠組みへの取組みに対しての貢献を継続する。さらに、2015 年 4 月に開催が予定されている第 7 回世界水フォーラムや今後のアジア太平洋水フォーラムなどでのリーダーシップを通じて、これまでの各関係機関との連携を強化しつつ、研究及び研修活動との有機的な連携により、国際機関から国、地方政府、地域社会など幅広い階層にわたる広範なネットワーク構築に努める。研究や情報ネットワークは水災害・リスクマネジメントの政策提言に資することを目指す。

7.1 関係諸機関との連携	国際洪水イニシアチブ（IFI）事務局	IFI に参加する関係機関との調整を図りつつ、事務局としての機能を果たす。	
	国際的な枠組み（台風委員会、国際洪水ネットワーク（IF-Net）、日本水フォーラム（JWF）、アジア河川流域機関ネットワーク（NARBO）など）との連携強化	＜台風委員会への貢献＞ ● 台風委員会・水文作業部会議長 ● 衛星雨量データを用いた土砂災害危険度評価手法に関する研究の推進	
7.2 災害管理の主流化	国連事務総長諮問委員会（UNSGAB）	Special advisor としての参画、国際会議での発言を通じ防災主流化への貢献。	
	UNISDR アジア支部との協議	UNISDR Asia への貢献として 2013 年 12 月に報告した全球リスク指標の技術について引き続き精査を行う。	引き続き行われるコンサルテーションについて ICHARM が活躍できるようネットワークを維持するとともに技術的な精査を行う。
	第 6 回災害リスク軽減に関するアジア閣僚級会合（AMCDRR）	2013 年 12 月に報告したリスク指標についての成果を報告する場を設けて技術的な裏付けのある信頼性の高さをアピールする。	同上

	第 3 回　国連世界防災会議	2015 年 3 月 14-18 日に開催される左記会議に向けて、上記の活動および GAR15 ペーパーを引き継ぐ形で ICHARM の技術的高さを主張して、有効な技術であることをアピールする。また、最終的な取りまとめである HFA2 などへの貢献を確実にするべく準備を進める。
	第 7 回　世界水フォーラム	2015 年 4 月 12-17 日に開催される左記会議に向けて、準備段階から中心的立場になれるような働きかけを行う。
	アジア太平洋水フォーラム	Governing Council が 年 2 回開催される機を捉えて、ICHARM の活動を積極的にアピールする。
7.3 卒業生ネットワークによる相乗効果		● ICHARM で作成する卒業生名簿を更新し続ける。 ● ICHARM Newsletter の送付など卒業生との積極的なかかわりを継続する。
7.4 広報活動	ICHARM ホームページ	随時最新情報のアップデートを行う。
	ICHARM ニュースレター	年 4 回（4,7,10,1 月）の発行を行うとともに、購読者により強く訴えかける内容にするよう検討を行う。

国際連合教育科学文化機関の賛助する水災害の危険及び危機管理のための国際センター（第二区分）に関する日本国政府と国際連合教育科学文化機関との間の協定

日本国政府（以下「政府」という。）及び国際連合教育科学文化機関（以下「ユネスコ」という。）は、

二千六年三月三日にパリで、「国際連合教育科学文化機関の賛助する水災害の危険及び危機管理のための国際センターの設立に関する日本国政府と国際連合教育科学文化機関との間の協定」（以下「二千六年協定」という。）が署名されたことを想起し、

二千六年協定が、署名された日の翌年から起算して五年目の年の末日に効力を失ったことを考慮し、

新たな協定を締結することを希望して、次のとおり協定した。

Article 1
定義

この協定において、
１．「両当事者」とは、政府及びユネスコをいう。
２．「ＩＨＰ」とは、ユネスコの国際水文学計画をいう。

Article 2
設立

政府は、日本国の法令の範囲内で、この協定の定めるところにより、ユネスコの賛助する水災害の危険及び危機管理のための国際センター（以下「センター」という。）を日本国の独立行政法人土木研究所（以下「土木研究所」という。）の内部に設立するために必要な措置をとることに同意する。

Article 3
協定の目的

この協定は、センターに係る両当事者間の協力に関する条件並びに関連する権利及び義務を定めることを目的とする。

Article 4
法的地位

１．センターは、ユネスコから独立したものとする。
２．センターは、土木研究所の不可分の一部を成す。土木研究所は、日本国の法令に従い、その任務の遂行に必要な法人格及び法律上の能力（センターの活動に関連して、契約を締結し、動産及び不動産を取得し、及び処分し、並びに訴えを提起する能力を含む。）を有する。

Article 5
目的及び任務

１．センターは、持続可能かつ統合的な河川流域の管理の目的で水に関連する災害の危険の影響を防止し、又は軽減するため、地方、国、地域及び地球的規模の段階において、そのような危険及びその危機管理の分野における研究、能力の開発及び情報交換の活動を行うことを目的とする。

２．センターの任務は、１に規定する目的を達成するため、次のとおりとする。
(a) 組織的に、かつ、専門家により、科学的研究を促進し、及び効果的な能力の開発の活動を行うこと。
(b) 組織及び個人の間で、科学的、技術的及び政策的な情報を交換するためのネットワークを構築し、及び強化すること。
(c) 特に、関連するＩＨＰのネットワーク、世界水アセスメント計画、国際洪水計画（国際洪水イニシアチブ）並びに非政府機関並びに関係する国際的な組織及びネットワークの賛助する関連の事業計画に盛り込まれた科学的及び専門的な能力を利用して、協力的な研究活動を発展させ、及び調整すること。
(d) 特に世界の実務者及び研究者のために、国際的な研修を実施すること。
(e) 知識及び情報の移転活動（国際的なシンポジウム又はワークショップを含む。）を組織し、並びに一般公衆を含む様々な聴衆を対象とする適当な啓発活動に従事すること。
(f) 情報通信技術の強力な事業計画を作成すること。
(g) 技術的なコンサルティング業務を提供すること。
(h) センターの活動に関する技術的な出版物その他の記録媒体を利用した製品を作成すること。
３．センターは、ＩＨＰと緊密に調整して、１に規定する目的及び２に規定する任務を遂行する。

Article 6
運営理事会

１．センターの運営理事会を設置する。
２．運営理事会は、定期的に更新されるものとし、次の者により構成する。
(a) 土木研究所の理事長（議長とする。）
(b) 政府の代表者又は当該代表者が任命する代理
(c) センターの活動に関連する組織又は機関の代表者であって議長が任命するもの。ただし、五人を限度とする。
(d) ユネスコ事務局長の代理
(e) 希望する場合には、ＩＨＰの政府間理事会の代表者
３．運営理事会は、次のことを行う。
(a) ４の規定に従うことを条件として、センターの所長が提出するセンターの長期及び中期の計画を審査し、及び採択すること。
(b) ４の規定に従うことを条件として、センターの所長が提出するセンターの事業計画を審査し、及び採択すること。
(c) センターの所長が提出するセンターの活動に関する報告書を審査すること。
(d) ４の規定に従うことを条件として、センターの所長が提出するセンターの必要な内部規則を審査し、及び採択すること。
４．センターの長期及び中期の計画、事業計画並びに必要な内部規則は、土木研究所に関連する法令上の要件を満たすものとする。
５．運営理事会は、定期的に、かつ、少なくとも日本国の二会計年度に一回、通常会期として会合する。同理事会は、同理事会の議長の発意により又はユネスコ事務局長の要請若しくは同理事会の構成員の過半数の要請により同理事会の議長が招集する場合には、臨時会期として会合する。
６．運営理事会は、その手続規則を採択する。同理事会の第一回会合のための手続は、土木研究所の理事長が両当事者と協議の上定める。

Article 7
職員

１．センターは、所長及びセンターの活動に必要な職員で構成する。

２．所長は、土木研究所の理事長が任命するものとし、また、センターの活動を指揮する。
３．センターの職員には、次の者を含める。
(a)　土木研究所の理事長が雇用する者
(b)　センターの活動に貢献するため土木研究所の理事長が任命し、又は招請する研究者又は専門家

Article 8
ユネスコの貢献

１．ユネスコは、その戦略的な目標及び目的に従い、技術的援助の形態により、必要に応じ、センターの活動に対する援助を提供することができる。この援助には、次の形態を含めることができる。
(a) センターの専門分野においてユネスコの専門家による援助を提供すること。
(b) 適当な場合には、一時的な職員の交換を行うこと。関係する職員の給与は、派遣する機関が引き続き負担する。
(c) ユネスコの戦略的な計画において優先分野とされる活動又は事業をユネスコ及びセンターが共同で実施することが正当化される場合には、ユネスコ事務局長の決定により、例外的に、ユネスコの職員を一時的に派遣する。
２．この条に規定する援助については、その援助がユネスコの計画及び予算に規定されている場合に限り行うことができる。ユネスコは、その職員の使用及び関連する費用に関する勘定を加盟国に提供する。

Article 9
財政事項

１．政府は、日本国の法令に従い、センターが十分な資金を受領するために必要な適当な措置をとる。
２．センターの財源は、土木研究所が割り当てる資金、政府機関、政府間機関又は非政府機関から受領する拠出及びセンターが提供する役務に対する支払から生ずる。

Article 10
参加

１．センターは、センターの目的についての共通の関心に基づいてセンターとの協力を希望するユネスコの加盟国及び準加盟国の参加を奨励する。
２．センターの活動への参加を希望するユネスコの加盟国及び準加盟国は、この協定に基づき、参加を希望する旨の通告をセンターの所長に送付することができる。同所長は、協定の両当事者その他加盟国に対し当該通告を受領した旨を通報する。

Article 11
ユネスコの責任

ユネスコは、センターがユネスコから法的に独立していることから、センターの作為又は不作為に対して法的に責任を負わず、及び財政的な又は他のいかなる責任も負わない。ただし、この協定に明示的に規定する場合には、この限りでない。

Article 12
評価

１．ユネスコは、次の事項を確認するため、いつでもセンターの活動についての評価を実施することができる。
(a) センターが、ユネスコの戦略的な目標に貢献しているか。
(b) センターが実際に遂行する活動が、この協定に規定する活動に合致しているか。
２．ユネスコは、政府に対し、実施した評価に関する報告書をできるだけ早い機会に提出す

ることを約束する。
３．政府は、評価に関するユネスコの報告書について意見を述べ、及び修正を要請する権利を有する。

Article 13
ユネスコの名称及びロゴの使用

１．センターは、ユネスコとの協力関係について表示することができる。したがって、センターは、センターの名称の前に「ユネスコの賛助する」と表示することができる。
２．センターは、ユネスコの管理機関が定める条件に従い、ユネスコのロゴをセンターの書簡用紙（センターの名称等を上部に印字したもの）及び文書（電子的な文書及びウェブサイトを含む。）に使用することを認められる。

Article14
効力発生

この協定は、その署名の時に効力を生ずる。

Article 15
有効期間

この協定は、効力発生の後六年間効力を有するものとし、次条に定めるところに従っていずれか一方の当事者によって明示的に廃棄されない限り、更新されたものとみなす。

Article 16
廃棄

前条の規定にかかわらず、いずれの一方の当事者も、他方の当事者に対して六箇月前に書面による通告を行うことにより、いつでもこの協定を終了させることができる。

Article 17
改正

この協定は、両当事者間の合意によって改正することができる。

Article 18
紛争の解決

この協定の解釈又は適用に関する両当事者間の紛争は、両当事者間の交渉又は両当事者が相互に同意する他の適当な方法により解決する。

以上の証拠として、下名は、正当に委任を受けてこの協定に署名した。

二千十三年七月二十三日にパリで、英語により本書二通を作成した。

日本国政府のために

国際連合教育科学文化機関のために

第 1 回 ICHARM 運営理事会　手続規則

平成 25 年 12 月 6 日現在

(趣　旨)
第１条　この規則は、2013 年 7 月 23 日に締結された国際連合教育科学文化機関の賛助する水災害の危険及び危機管理のための国際センター(第二区分)に関する日本国政府と国際連合教育科学文化機関との間の協定第６条に規定する ICHARM 運営理事会（以下「運営理事会」という。）の第１回会合の開催について必要な事項を定めるものである。

(構　成)
第２条　第１回会合における運営理事会は、次の者により構成する。
a) 土木研究所理事長（議長とする。）
b) 国土交通省技監
c) 国際協力機構理事長
d) 政策研究大学院大学学長
e) 国際連合国際防災戦略事務局特別代表
f) ユネスコ代表者１名
g) ユネスコ国際水文計画代表者１名

（議事等）
第３条　第１回運営理事会会合は、土木研究所理事長が招集する。運営理事会は、構成員の２分の１以上の出席をもって成立する。
２　第 1 回運営理事会会合は、その以降の会合について規定する運営理事会の手続規則を審議及び採択する。
３　採択にあたっては出席者の２分の１以上の賛成を要するものとする。
４　第１回運営理事会の公式言語は英語とする。
５　運営理事会の事務局（第４条に規定する委員会の事務局をいう。）は、運営理事会の議事に関する記録を作成するものとする。

(事務局)
第４条　運営理事会の事務局は、ICHARM に置く。

(規則の有効期限)
第５条　この規則は、第１回運営理事会において運営理事会の手続規則が採択されるまで有効とする。

(雑　則)
第６条　この規則に定めるもののほか、運営理事会に関して必要な事項は、議長が運営理事会に諮って定める。

(附　則)
この規則は、平成 25 年 12 月 6 日から施行する。

United Nations
Educational, Scientific and
Cultural Organization

INTERNATIONAL CENTRE FOR WATER HAZARD AND RISK MANAGEMENT (ICHARM)

FINAL MINUTES

FIRST ICHARM GOVERNING BOARD MEETING

(Tokyo, 25 February 2014)

International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM) is an institute as an integral part of the Public Works Research Institute (PWRI) located in Tsukuba, Japan.

Public Works Research Institute (PWRI) is an incorporated administrative agency to improve civil engineering technologies by conducting research and development, providing technical guidance, and disseminating research results.

United Nations Educational, Scientific and Cultural Organization

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialized agency of the United Nations. It coordinates the activities of the educational, scientific and cultural services of 195 Members and 9 Associated Members.

FIRST ICHARM GOVERNING BOARD MEETING

(Tokyo, 25 February 2014)

TABLE OF CONTENTS

1. OPENING

The 1st ICHARM Governing Board Meeting was held on Tuesday 25 February 2014 at Room 310 Annex Building 3rd Floor, Ministry of Economy, Trade and Industry in Tokyo, Japan. Mr Kenzo Hiroki, Principal of ICHARM formally introduced Dr. Uomoto, Director General of Public Works Research Institute (PWRI) as the Chairperson of the Governing Board (GB). After self-introduction, the participants adopted the proposed meeting agenda with no amendment. Following the adoption of the agenda, Ms. Jimenez-Cisneros of UNESCO and Mr. Adachi of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) made brief remarks. UNESCO expressed satisfaction on ICHARM activities, as one of the UNESCO category 2 centres that had delivered concrete results and would contribute to Phase VIII of the International Hydrological Programme. MLIT, on behalf of the Japanese Government, expressed the strong intention to share the technology and experience of overcoming natural hazards, and to take the initiative to support disaster risk reduction in respective countries. MLIT expects ICHARM to continue to take the lead in water-related hazard research and to utilize the results from such advanced research to enhance the disaster reduction around the world. Meanwhile, MLIT, under the leadership of its minister, is expected to be engaged in disaster management collaboration dialogue with disaster-prone countries through cooperation among industry, government and academia so as to strengthen bilateral collaboration in disaster risk management and to ensure that the technology and know-how of ICHARM will be fully leveraged. The list of participants of GB including the members of GB, PWRI and ICHARM staff is provided in Annex I. The agenda adopted at the meeting is given in Annex II. The meeting materials are shown in Annex III.

2. RULES OF PROCEDURE FOR ICHARM GOVERNING BOARD

Chairperson informed GB members that GB was expected to adopt its own Rules of Procedure prior to the other matters in the agenda, subject to Article 6 of the agreement between the Government of Japan and UNESCO signed on 23 July 2013. The draft Rules were explained by the secretariat. GB members were informed that the draft shows simplified procedure of GB with its intent (Article 1), the composition (Article 2) including the chairpersonship of Dr. Uomoto, quorum and minutes (Article 3) including majority decision making, the secretariat's role (Article 4), amendment rule (Article 5), miscellaneous (Article 6) and supplementary provision. Following explanation by the secretariat, GB members adopted the Rules of Procedure with no amendment.

3. ICHARM ACTIVITY REPORT

ICHARM's Director, Dr. Takeuchi explained the basic history and mission of ICHARM to GB members as follows. Since its establishment in 2006 under the auspices of UNESCO, ICHARM has been hosted at PWRI, a Japanese research institute which has more than 90 years of history in engineering research. Director

explained that ICHARM aims to be the Global Centre of Excellence for water hazard and risk management, developing and also assisting implementation of best practicable strategies for managing water-related hazards, including flood, drought, landslide, debris flow and water contamination.

ICHARM pursues three pillars of activity (research, training and information networking) in parallel, translating outcomes and experience into local practices together with eminent partners such as UNESCO, the Japan International Cooperation Agency (JICA), Japan's National Graduate Institute for Policy Studies (GRIPS), Japan's Ministry for Education, Culture, Sports, Science and Technology (MEXT), and the Asian Development Bank (ADB). Director noted that transforming research and training into sound local practice is one of ICHARM's key challenges, a concept shared at ICHARM as "localism." With regard to ICHARM's training and educational programs, Director informed GB members that ICHARM has successfully graduated 72 Master's students and one PhD student, and that 12 Master's students and six PhD students are currently pursuing their degrees at ICHARM. In addition, every year ICHARM awards many certificates for short-term technical training and supports internships.

Director described ICHARM's development of the Integrated Flood Analysis System (IFAS), Rainfall-Runoff-Inundation (RRI) model, Block-wise TOPMODEL (BTOP) and flood risk assessment methodologies as major research achievements, applied to inform local practices in Nepal, Bangladesh, Indonesia, Cambodia, Philippine, Thailand and Pakistan. With regard to information networking, ICHARM's activities support mainstreaming of disaster risk reduction based on scientific knowledge, for instance through active participation in the International Conference on Flood Management, International Flood Initiative, the Global Risk Forum (GRF) of Davos, Integrated Research on Disaster Risk (IRDR), the UN Secretary-General's Advisory Board on Water and Sanitation (UNSGAB), High-Level Experts and Leaders Panel on Water and Disaster and the UN Special Thematic Session on Water and Disaster. Finally, Director presented quantitative diagrams outlining that the number of ICHARM staff and annual budget had been increasing, while keeping constant access through website, and maintaining relationships with international partners. The ICHARM activity report covered these activities from October 2010 to March 2014.

GB member asked ICHARM to describe the impact and sustainability of its training programs. In response, the secretariat cited the scope of the training program (for example, that 72 Master course students had been included in its alumni list only in seven and half years) and explained that the numbers of alumni are increasing. With regard to sustainability of training, the secretariat explained ICHARM's mechanisms for maintaining relationships with individual students and their organizations. For instance, ICHARM maintains contact and communication with graduates regarding their own research and initiatives even after they return to their organizations. One specific mechanism cited was the follow-up seminar, organized annually by ICHARM and hosted by organizations that employ ICHARM alumni. Such activities allow development of ICHARM alumni networks, allowing individual graduates and their institutes to continue engagement beyond a student's tenure at ICHARM. GB member followed up with second question regarding how training participants are targeted. The secretariat responded that the majority of ICHARM trainings target government staff as participants. Additionally, design of some trainings, including those organized in

partnership with UNESCO, specifically targeted government workers from particular agencies, for instance, Pakistan Meteorological Department, as a project objective. After careful examination, GB members were satisfied with the ICHARM activity report.

4. ICHARM PRGRAMMES

Director informed GB members that all ICHARM staff, including researchers, administrators and supporting staffs had collaborated to develop ICHARM's long-term and mid-term programmes, as well as its mission statement.

For the long-term programme, about a decade, ICHARM plans to engage in (i) innovative research, (ii) effective capacity building, and (iii) the efficient information networking, based upon the mission statement and emphasis on localism. For innovative research, the long-term programme includes observation and monitoring of exposure and vulnerability, and proposing practical policy tools. For effective capacity building, the emphasis would be put on training solution-oriented practitioners and developing local networks among local experts and institutions. Regarding effective information networking, the ICHARM broad knowledge and primary research findings would support comprehensive solutions on water-related hazard and risk management at the global and local scale.

For mid-term program in these five years, the Director informed GB members that:

the innovative research would

(1) cover flood observation; not only the discharge, but also river-bed dynamics as well as developing satellite-based observation of the topography and the inundation area.
(2) improve flood prediction and analysis tools, such as IFAS, RRI and BTOP models, to increase the lead time of forecast while expanding to new dimensions such as drought, sediment-related disasters, tsunami and storm surge and water contamination.
(3) seek the new methodologies to monitor exposure and vulnerability through indicators of global risk.
(4) develop policy tools for comprehensive risk management, like basin-wide or the integrated water resources management.

the effective capacity building would

(5) continue the close collaboration with GRIPS and JICA, and also seamlessly integrate training courses with ICHARM research activities.
(6) maintain communication among individual graduates and institutions supported by follow-up meetings and programs.

and the networking of local experts and institutions would

(7) accumulate reliable disaster records and experiences, working together with the other institutes, such as the EM-DAT, reinsurance companies, and UNISDR.
(8) support the mainstreaming of disaster risk reduction policies, based upon ICHARM's research outcomes and our information collected and analyzed, to support SDGs (Sustainable Development Goals), post-Hyogo Framework for Action and World Water Forum or Asia-Pacific Water Forum in the scope.

GB members reaffirmed ICHARM's very active and notable roles mainly in the Asian region as in the past since its establishment and emphasised the importance of exploring the possible activities in a new phase on:

- Collaboration with other UNESCO category 2 centre (C2C), such as in Mexico,
- Connection outside of Asia, for example, finding a counterpart in Africa,
- Drought, such as working with the Brazilian C2C, HidroEX,
- Water quality linked with floods not only in rural areas but also in urban areas, also for arid and semi-arid areas,
- Expansion of water quality work beyond nutrient transport to focus on microbial contamination during flooding, and
- Dissemination of information to policymakers in the format of policy briefings translated into multiple languages; see examples from the World Bank and IHP.

The secretariat responded that ICHARM is eager to support and contribute to building networks among C2Cs, and asked for coordination and direction from UNESCO towards this aim. ICHARM's initial focus to neighbours in the Asian region is due for expansion beyond the boundary of Asia, and ICHARM is ready to work together with potential researchers and experts both in and outside Japan for water related hazard beyond flooding such as drought (for instance, HidroEX) . While recognising the need to expand research into water quality disasters, including microbial contamination, expertise constraints would necessitate more partners, as ICHARM is primarily a hydrological/hydraulic research center. As for dissemination to policymakers, the secretariat informed GB members about ICHARM's information networking activities through, for example, UNSGAB and High- Level Experts and Leaders Panel on Water and Disaster. However, as ICHARM is primarily a scientific institution rather than political institution, the support of partners within UN system for guidance on policy briefing is desirable.

The Government of Japan noted ICHARM's role on leveraging Japan's extensive experience in disaster management. GB stressed the necessity of showing more Japanese rich experience on natural disaster which ICHARM's ambition is expected to make use of in its research works. The initial step to show Japanese experience described by GB member focused on the moment of decision making by a basin manager- when available information has been assessed and a course of action must be decided under pressure and uncertainty. Japan's extensive experience in such local-level decision making is a resource which may be disseminated. Further, GB member described development of risk indices for water quality as an area for future work to which ICHARM may contribute, perhaps in collaboration with GEMstat or the UNEP's World Water Quality Assessment. GB member suggested that further networking through EM-DAT and Munich Re insurance may be sought for database and archiving water disaster information as well as

ongoing trial to accumulate data focused on the hydrological runoff and inundation data and heuristic database collaborated with UNESCO, IHP and UNISDR. As Germany is also working on satellite issues, perhaps there would be opportunity for collaboration. For instance, GB member offered to connect ICHARM to German satellite agencies to improve our product offering.

While GB member recognized ICHARM's position of the most active centre and growing budget step by step, GB member suggested the possibility of making some clearer priorities and roadmaps of researches as the basis for policy recommendations, depending on client and marketing perspective. GB member made the following specific advices:

- As a research institute with goals to be practice-oriented, ICHARM must be on track to translate research outcomes to policy directions; to achieve this directive should develop broad base of expertise adept at linking science and research to policymaking.
- ICHARM will be able to deliver products in response to critical demands even when such products are still in research phase, but the limitation of these products must be clarified.
- Other countries look to Japanese expertise and experience hoping to find technology which has been tested in practice in Japan and honed over many years. For example, the RRI model developed in Japan but tested outside of Japan.
- The skills in showing how to present the products effectively should be more sophisticated.

The proposed long-term and mid-term programmes were strongly endorsed and adopted by GB.

5. ICHARM WORK PLAN

Director informed GB members that the draft of ICHARM Work Plan would cover the activities for FY 2014 (2014.4-2015.3) and FY2015 (2015.4-2016.3) based on the long-term and mid-term programmes. The Work Plan emphasized discharge observation by Acoustic Doppler Current Profiler, further development and application of IFAS, not only to flood but in a low-flow and long-term runoff, SAR satellite images analysis, WRF as a regional climate model, drought analysis by BTOP, sediment disaster, PEARL, which is a EU research project led by the UNESCO-IHE, flood and drought risk analysis, and pre-event disaster management as one of the practical policy tools. GB member recalled the necessity of prioritization, schedules and roadmaps with visible benchmarking while recognizing a very ambitious Work Plan as a Global Centre of Excellence. GB member also noted the celebration of the IHP 40 years which was related to the activity in the Work Plan. Also related to the activity in the Work Plan, JICA noted the importance of the 3rd Conference on Disaster Risk Reduction in Sendai in March 2015 as well as emphasizing the priority on such opportunity with UNISDR to facilitate more investment on disaster risk reduction. JICA also raised its own relationship with European countries like GIZ in variety of disaster aspects, like diseases. The proposed Work Plan was adopted without any objections.

6. ANY OTHER BUSINESS

The Chairperson noted with appreciation that GB members supported ICHARM activities as well as providing a wide ranges of suggestions.

7. CLOSING OF THE MEETING

The meeting adjourned on Tuesday 25th February at noon.

ANNEXES

ANNEX I

FIRST ICHARM GOVERNING BOARD MEETING
(TOKYO, 25 FEBRUARY 2014)

LIST OF PARTICIPANTS

Takashi Shiraishi

President, National Graduate Institute for Policy Studies (GRIPS)

Johannes Cullmann

Chairperson, International Hydrological Programme (IHP) Intergovernmental Council

Margareta Wahlström

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

Masami Fuwa

Director General of Global Environment Department, on behalf of
Mr. Akihiko Tanaka, President, Japan International Cooperation Agency (JICA)

Toshiyuki Adachi

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

Taketo Uomoto (Chairperson)

Chief Executive, Public Works Research Institute (PWRI)

Blanca Jimenez-Cisneros

Director of the Division of Water Science, on behalf of
Ms. Irina Bokova, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)

(Secretariats)

Hiroshi Fujisawa, Deputy Chief Executive, PWRI
Kuniyoshi Takeuchi, Director, ICHARM
Nario Yasuda, Deputy Director, ICHARM
Kenzo Hiroki, Principal, ICHARM
Minoru Kamoto, Chief Researcher, ICHARM
Toshio Okazumi, Chief Researcher, ICHARM
Yoichi Iwami, Chief Researcher, ICHARM
Masahiko Murase, Chief Researcher, ICHARM

ANNEX II

INTERNATIONAL CENTRE FOR WATER HAZARD AND RISK MANAGEMENT

TENTATIVE AGENDA FOR THE FIRST GOVERNING BOARD MEETING

25 FEBRUARY 2014

Room 310

Annex Building 3rd Floor,

Ministry of Economy, Trade and Industry (METI),
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo, Japan

Opening by Chairperson

Remarks from UNESCO

Remarks from MLIT

Examination and adoption of Rules of Procedure

Examination of ICHARM activity report

Examination and adoption of Long-term and mid-term programmes

Examination and adoption of Work plan

Closing

* 12:00-13:00 Photograph, Lunch and networking

ANNEX III

1st ICHARM Governing Board Meeting

Material Contents

1st ICHARM Governing Board Meeting

Date: February 25, 2014, Tuesday, 10:00-12:00

Venue: Room 310, Annex Building 3rd Floor,
Ministry of Economy, Trade and Industry (METI),
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo, Japan

Tentative agenda (draft)

Opening by Chairperson

Remarks from UNESCO

Remarks from MLIT

Examination and adoption of Rules of Procedure

Examination of ICHARM activity report

Examination and adoption of Long-term and mid-term programmes

Examination and adoption of Work plan

Closing

* 12:00-13:00 Photograph, Lunch and networking

1st ICHARM Governing Board Meeting
List of Participants

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

Johannes Cullmann
Chairperson, International Hydrological Programme (IHP) Intergovernmental Council

Margareta Wahlström
Special Representative of the Secretary-General for Disaster Risk Reduction (ISDR)

Masami Fuwa
Director of Global Environment Department, on behalf of Mr. Akihiko Tanaka, President, Japan International Cooperation Agency (JICA)

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

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

Blanca Jimenez-Cisneros
Director of the Division of Water Science, on behalf of Ms. Irina Bokova, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)

(Secretariats)

Hiroshi Fujisawa, Deputy Chief Executive, PWRI
Kuniyoshi Takeuchi, Director, ICHARM
Nario Yasuda, Deputy Director, ICHARM
Kenzo Hiroki, Principal, ICHARM
Minoru Kamoto, Chief Researcher, ICHARM
Toshio Okazumi, Chief Researcher, ICHARM
Yoichi Iwami, Chief Researcher, ICHARM
Masahiko Murase, Chief Researcher, ICHARM

Rules of Procedure for ICHARM Governing Board (draft)

Article 1 Intent

These Rules of Procedure (hereinafter referred to as "the Rules") shall state the necessary matters which shall guide proceedings of the International Centre for Water Hazard and Risk Management (ICHARM) Governing Board (hereinafter referred to as "the Governing Board") meeting, subject to Article 6 of the agreement between the Government of Japan and the United Nations Educational, Scientific and Cultural Organization (UNESCO) regarding the International Centre for Water Hazard and Risk Management (category 2) under the auspices of UNESCO, signed on 23 July 2013 (hereinafter referred to as "the Agreement").

Article 2 Composition

1) The members of the Governing Board will be composed as provided for by Article 6 of the Agreement. The Chief Executive of the Incorporated Administrative Agency Public Works Research Institute, Japan will be designated as Chairperson of the Governing Board.
2) The members of the Governing Board shall be appointed by the Chairperson.
3) The term of office for each Governing Board member appointed by the Chairperson shall be two years. This term may be extended by re-appointment.

Article 3 Board Meetings, Quorum, and Minutes

1) The functions of the Governing Board shall be prescribed as provided for by Article 6 of the Agreement.
2) The Chairperson shall convene the Governing Board meeting. Participation by a majority of Governing Board members shall be necessary to proceed with the Governing Board meeting.
3) The majority agreement of all attendees shall be necessary for the adoption.
4) The official language of the Governing Board meeting shall be English.
5) The secretariat of the Governing Board (referred to in Article 4) shall take minutes of the Governing Board meetings.

Article 4 Secretariat

ICHARM shall function as the secretariat of the Governing Board.

Article 5 Amendment of the Rules

The Rules may be amended during a Governing Board meeting by consent of the majority of attendees. The Chairperson can ask for electronic votes when urgent decision issues relevant to the Rules arise between meetings. The decisions in such cases shall be made by consent of the majority of the members who have voted by deadlines.

Article 6 Miscellaneous Provisions

Miscellaneous provisions necessary for the management of the Governing Board but not included in the Rules shall be decided by the Chairperson in consultation with the Governing Board members.

Supplementary Provisions

The Rules shall be enacted on 25 February 2014.

ICHARM Activity Report (Draft)

[from October 2010 to March 2014]

ICHARM Activity Report (Draft)

[from October 2010 to March 2014]

Contents

1. Outline

1.1 History

Signing ceremony on 3rd March, 2006

In September 2004, the IHP Intergovernmental Council adopted the resolution to support the proposal of the Japanese government to establish ICHARM as a part of the Public Works Research Institute (PWRI). In October 2005, at the 33rd UNESCO General Conference in Paris, the resolution to approve the proposal was adopted by 191 member countries, which was followed by the agreements between the Japanese government and UNESCO, and the Public Works Research Institute and UNESCO on 3 March 2006. Three days later, ICHARM was officially established on 6 March 2006.

Establishment of ICHARM on 6th March, 2006

After its establishment, ICHARM has implemented various activities actively. In January 2011, ICHARM received a high evaluation from UNESCO. Accordingly, in July 2013, the agreement on the establishment of ICHARM was renewed between the Japanese government and UNESCO. Under this agreement, ICHARM continues its activities as a category II center under the auspices of UNESCO. The new agreement requires setting up the Governing Board, instead of the Advisory Board in the previous agreement, which reviews and adopts mid- and long-term plans for ICHARM.

1.2 ICHARM Three-pillar Activities

Since its official launch, ICHARM has been committed to the implementation of the Action Plan advised by the Advisory Board, which was devised with the following three pillar activities: research using advanced technology, training for local administrative officers in developing countries, and information networking for worldwide publicity to promote the presence of ICHARM.

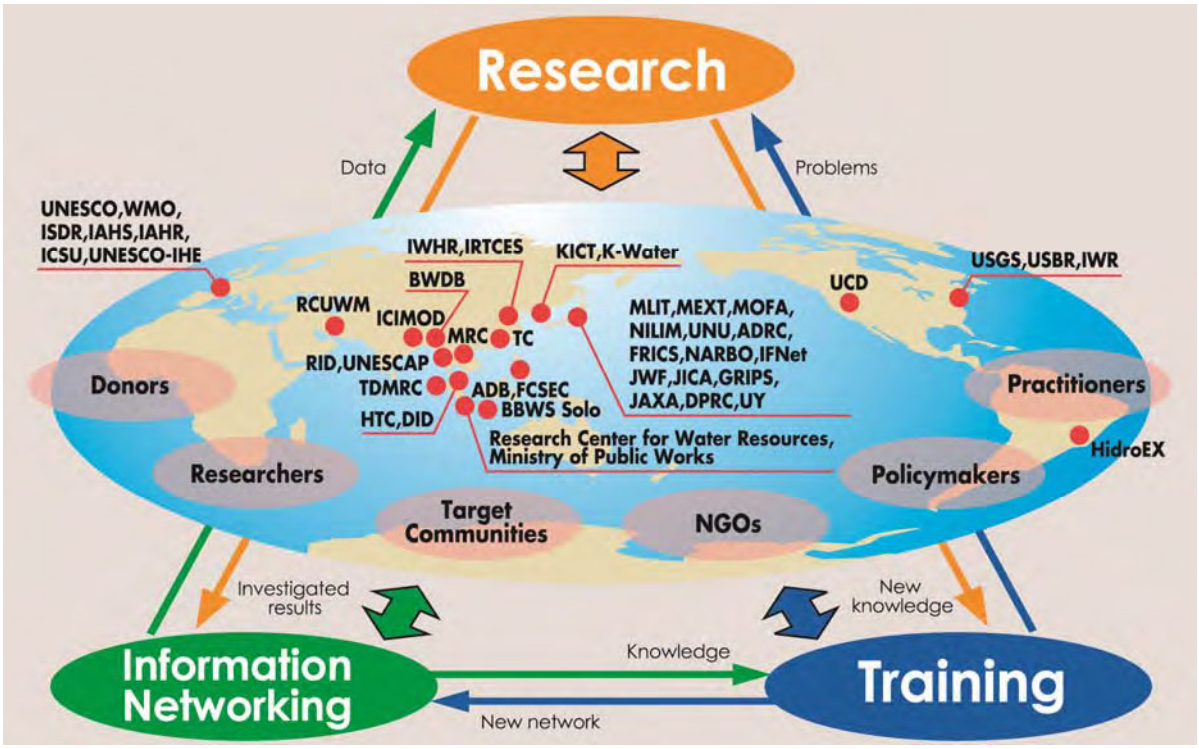


Figure 1-1 Three-pillar of ICHARM activities

1.3 Organization

Although ICHARM is under the auspices of UNESCO as a category II center, it has been part of the Public Works Research Institute (PWRI) as an independent institute from UNESCO. Today, it is recognized as one of the four main institutes of PWRI.

ICHARM has tripled the number of research and office staff as it has expanded its activity, becoming larger than any other research group of PWRI.

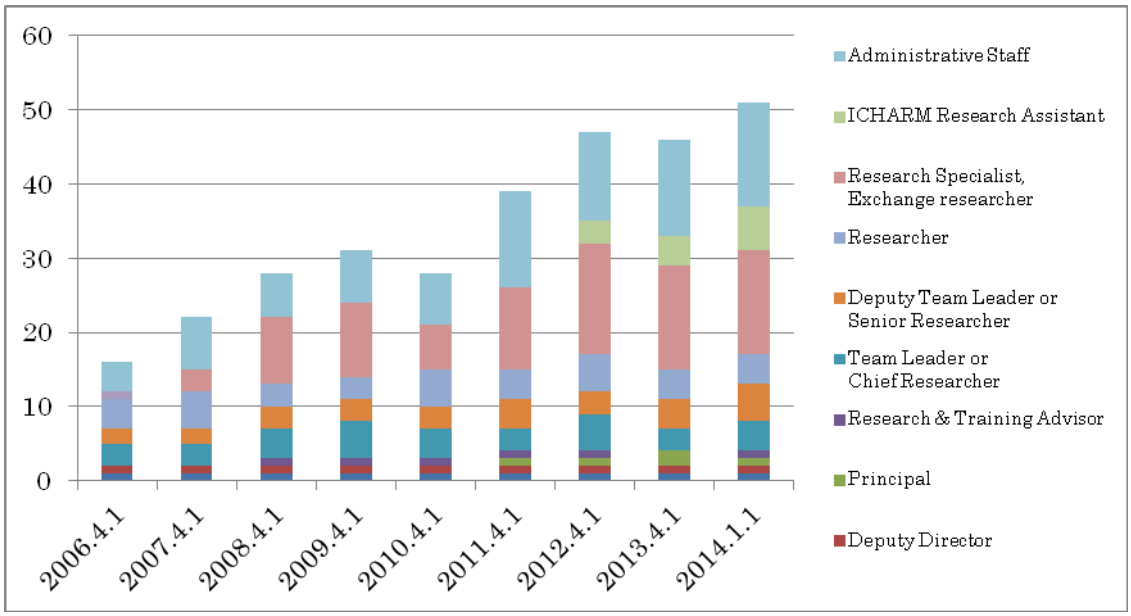


Figure 1-2 Trend of Number of ICHARM staff

1.4 Resources

The annual budget of ICHARM is funded by PWRI and other external sources. Figures 1-3 and 1-4 show changes in the ratio of the founding sources between 2006 and 2013. Although the total budget of PWRI is on a decreasing trend due to the current administrative and fiscal reform, the budget of ICHARM provided by PWRI has been on an increasing trend since its establishment in March 2006 (Fig. 1-3). Accordingly, the share of ICHARM in PWRI's budget has been on an upward trend (Fig. 1-4).

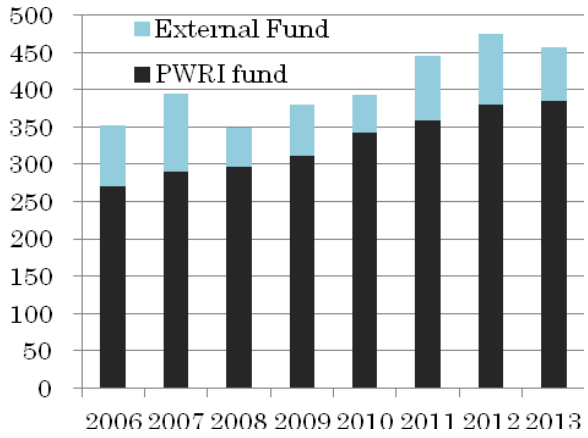


Figure 1-3 Trend of ICHARM Budget

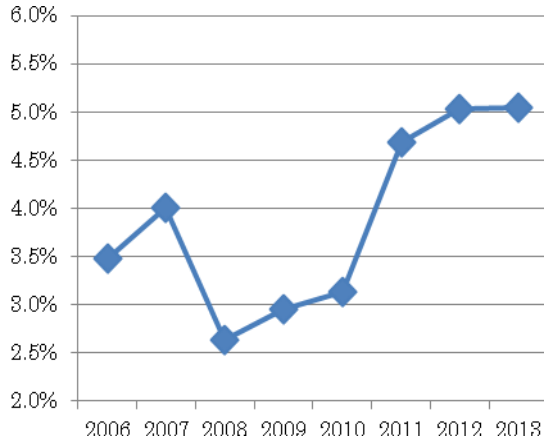


Figure 1-4 Trend of Budget Ratio (ICHARM/PWRI)

1.5 ICHARM Advisory Board and Achievement of ICHARM Action Plan

The 3rd ICHARM Advisory Board on 29th September 2010

The ICHARM Advisory Board was established based on the agreement in 2006, and 13 board members were elected. They provided advice on the ICHARM Action Plan submitted by the ICHARM Director, and reviewed the reports on the activities of the centre.

The current Action Plan 2010-2012, which was discussed in the 3rd Advisory Board, proposed its strategy to increase its capacity by quality improvement, namely, "consolidation". This consolidation sought to consolidate its activities by enriching contents in order to shift its work plan from example demonstration to substantive application.

The following concrete goals set this consolidation in detail:

Figure 1-5
ICHARM Action Plan

Five goals presented in the last ICHARM Action Plan (2010-2012)

1. **Improvement of education programs** on water-related disaster management.
2. **System development** to deliver flood forecasts based on globally available data for any basin, at any time, and anywhere in the world.
3. **Local customization of advanced technology** in partnership with local practitioners. Especially, establishment of partnership for local use of IFAS with local engineers by integrating satellite information with ground observations.
4. **Support of local disaster risk assessment and preparedness**. Especially for functioning as the Asia Pacific Knowledge Hub on Water and Disaster in collaboration with ADB, JICA and other funding agencies.
5. **Other collaborative engagement** on the activities of IFI, WWF, APWF, UNSGAB-HLEP, IRDR etc.

Goal 1: Educational and training programs have been improved annually to put more emphasis on local needs and localism by linking those programs more closely to issues that training participants face as an administrative officer in a developing country. In addition, in response to a higher level of research needs that cannot be met by a master's-level program, a doctoral program was launched in 2010 and graduated the first student in 2013.

Goal 2: ICHARM has been working on upgrading of IFAS and the RRI model. To increase their applicability to all types of river basins worldwide, further research and development of the systems are necessary.

Goal 3: In Indonesia, ICHARM applied an upgraded IFAS to improve flood forecasting in the Solo River basin. In Pakistan, it assisted local engineers in flood control by implementing Indus-IFAS in collaboration with the Meteorological Agency of Pakistan and other local agencies with support from UNESCO. In Thailand, in response to a request from JICA, it provided technical assistance in development of a master disaster management plan after the 2011 Chao Phraya flood, and reproduced the actual flood by means of the RRI model. In Bangladesh, with the support of the Asian Development Bank, ICHARM participated in the joint effort with the government of Bangladesh in development of a basic policy for a flood forecasting and warning system.

Goal 4: ICHARM assisted Cambodia in disaster risk assessment with the support of the Asian Development Bank. Particularly, as a member of the Asia Pacific Knowledge Hub, it provided the government of Cambodia with technological assistance for community-based flood control by developing a flood vulnerability assessment method applicable to the Mekong River flood plain. It also developed the Flood Disaster Preparedness Indices to assess disaster preparedness at the community level and applied them to local communities in cooperation with the Typhoon Committee.

Goal 5: ICHARM has been making efforts in enhancing worldwide collaboration with more organizations. It hosted ICFM5 in 2011 and has been active in addressing the mainstreaming of disaster risk reduction in the international community. It has also concluded an agreement with institutes in Iran and Russia to cover a wider range of water issues such as those in cold regions and droughts.

In recognition of these achievements, the MLIT Evaluation Committee for Incorporated Administrative Agencies graded ICHARM as an S on a five-grade evaluation from SS to C for its excellent international contribution. ICHARM researchers have been awarded for their outstanding accomplishments as well.

The following sections outline the projects of ICHARM between October 2010 and March 2014 in each of the three pillar activity areas, i.e., research, training and information networking. It is noted that this report includes the projects scheduled as and when it has been published in February 2014.

2. Research –Advanced Technology-

2.1 Overview

The basic policy for ICHARM's research activities is to reduce damage induced by water-related disasters around the world. More specifically, it has prioritized research needed to implement water-related risk management in developing countries. When the center was first established, the focus was more on research to understand rainfall and runoff characteristics, which is essential to assess flood risk. In recent years, however, it has been expanding the research scope covering assessment of flood damage risk and risk management including development and implementation of effective countermeasures.

The following describes main research achievements of ICHARM.

2.2 Development and dissemination of Integrated Flood Analysis System (IFAS)

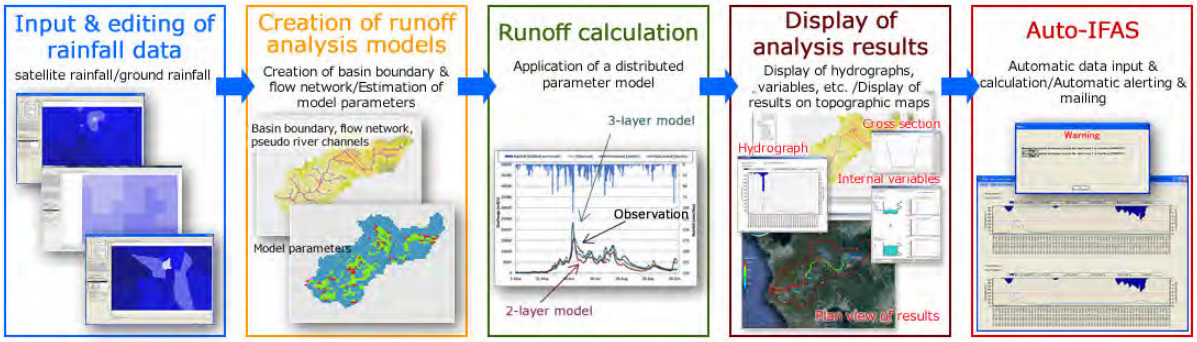


Figure 2-1 Calculation flow of IFAS

The Integrated Flood Analysis System (IFAS) is 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.

With IFAS alone, users can conduct a series of tasks necessary for runoff analysis including data acquisition, model creation, rainfall-runoff analysis and result display. With an additional module named Auto-IFAS, the system is capable of executing automatic functions such as downloading satellite rainfall information, loading ground rainfall information, performing runoff calculation, issuing a warning, etc. With these automatic functions, users can built a real-time flood forecasting and warning system though the functions are minimal as a device for such a purpose.

IFAS with this additional module is very useful even in areas with limited Internet access. It can perform calculation while collecting data regularly according to a predetermined time schedule. In this way, the network and the computer can avoid being overloaded with information processing, which thus enables fast runoff calculation and quick flood forecasting and warning.

The IFAS execute file is downloadable free of charge on the ICHARM website at

http://www.icharm.pwri.go.jp/Research/ifas/)

Since the official launch in December 2008, the traffic to this download site has been increasing every year as IFAS has gone through several upgrades.

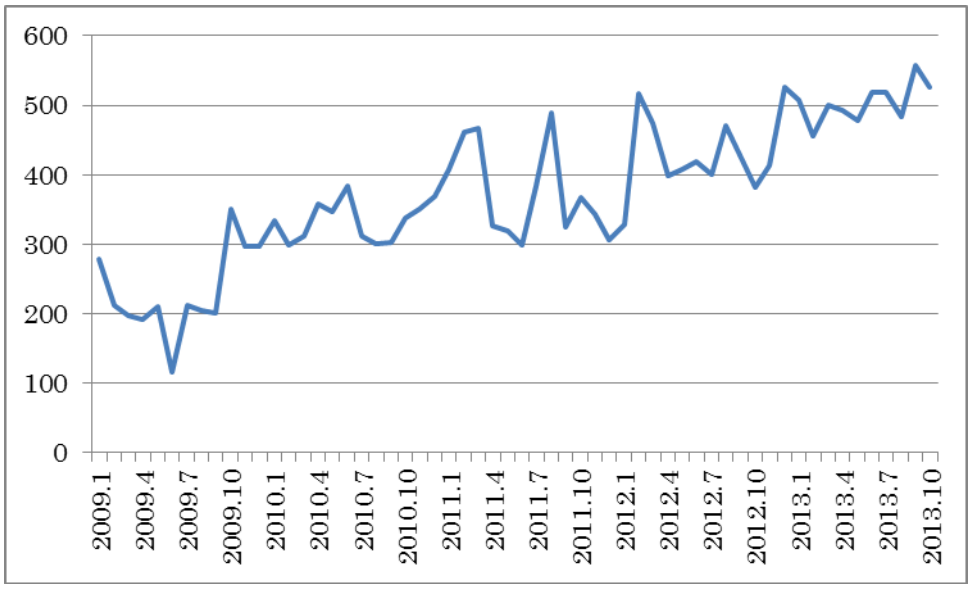


Figure 2-2 Changes in the number of access to the IFAS website

ICHARM has been conducted not only its development, but also its desemmination throughout the world on several occasions. In the duration of this report (October 2010-March 2014) ICHARM trained IFAS to about 560 participant out of total number of about 800.

IFAS trainng class in M.Sc. program

IFAS trainng class in Philippines

2.3 Development of RRI model

Conventional flood prediction models, which mainly focus on rainfall-runoff processes in mountainous areas, have difficulties in simulating floods on low-lying areas with large-scale

inundations, such as the 2010 Pakistan and 2011 Thailand floods. In addition, although it is important to quickly simulate a large-scale behavior of floodwaters in global-scale flood risk assessment and large-scale flood prediction, conventional models are not capable of quickly estimating river discharge and flooding from rainfall information. They can only predict river discharge.

To overcome this disadvantage, ICHARM has been developing a new numerical model called the Rainfall-Runoff-Inundation (RRI) model. The model simulates various hydrologic processes including rainfall-runoff, stream-flow propagation, and inundation over floodplains in an integrated manner.

By using the RRI model, we can assess future flood risks for different regions under different climate conditions including climate change. The model may also be applied to large-scale flood prediction on a near real-time basis by using satellite-based topography, land-use and rainfall information in a similar manner to the IFAS procedure.

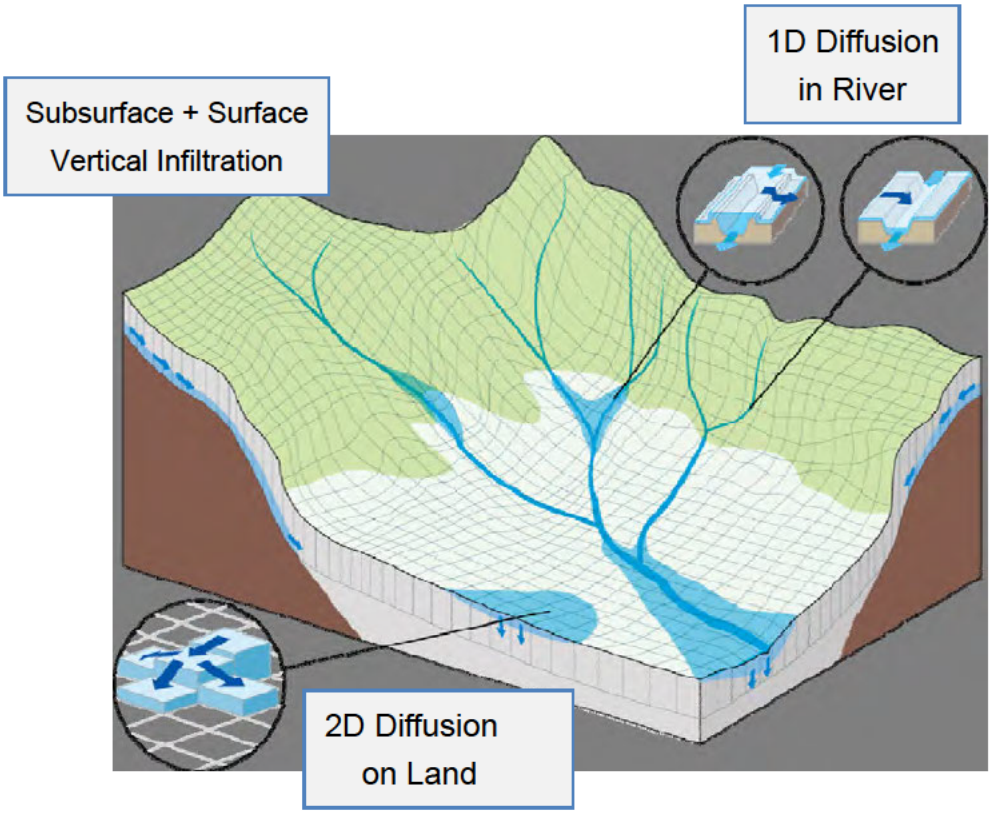


Figure 2-3 Schematic diagram of RRI Model

2.4 Contribution to MEXT research program (KAKUSHIN, SOSEI)

2.4.1 KAKUSHIN Program (FY2007 - 2011)

The Ministry of Education, Culture, Sports, Science, and Technology (MEXT) launched a five-year (FY2007 - 2011) initiative called the Innovative Program of Climate Change

Projection for the 21st Century (KAKUSHIN Program) in 2007. The program used the Earth Simulator (ES) to address emerging research challenges and was expected to contribute to the Fifth Assessment Report (AR5) to be published by the Intergovernmental Panel on Climate Change (IPCC).

ICHARM was a member institute of one of the three major projects, entitled the Extreme Event Projection, led by the Meteorological Research Institute (MRI). ICHARM's subject was the "assessment of the impact of climate change on flood disaster risk and its reduction measures over the globe and specific vulnerable areas."

ICAHRM developed the following products in the program.

1. Statistical bias correction method of daily precipitation simulated in climate models, such as MRI-AGCM (atmospheric GCM developed by MRI of JMA).
2. Scale-free hydrographical river basin dataset for hydrological simulation over small to large scale basins, which will be eventually made applicable over the entire globe with little scale effect regardless of grid-size selection.
3. Block-wise TOPMODEL (BTOP) as a hydrological model applicable to small to large basins on the globe using the scale-free hydrographical river basin dataset.
4. New flood risk evaluation method using geological and socio-economic datasets and knowledge in combination with extreme river discharge from BTOP simulation conducted based on present, near-future, and future climate simulation using MRI-AGCM.
5. The assessment of flood-induced agricultural and property damage under the present conditions and also under the future conditions based on climate change scenarios

2.4.2 SOUSEI program (FY2012 – 2016)

MEXT has launched the Program for Risk Information on Climate Change (SOUSEI program), which carries on the work of KAKUSHIN program. This project began in FY2012 and will continue for five years. The aim of this program is to generate information to evaluate the probability of the occurrence of the extreme climate changes and the risk of various scenarios, disasters, damage, etc., and to play a role in risk management.

The project's specific research is divided into five themes. ICHARM is a member institute of Theme D: Precise impact assessments on climate change. ICHARM's subject is the "Development of risk assessment and adaptation strategies for water-related disaster in Asia."

ICHARM is working on the quantitative projection of how flood and drought risks may change around the world, mainly in Asia, as global warming progresses in consideration with projection uncertainties. This will eventually lead to the development of a methodology for socio-economic impact assessment, which will include methods for the global- and basin-scale assessment of flood and drought hazards as well as for the assessment of social vulnerability to those hazards. Coupled with multiple scenarios of the fifth-generation CMIP and

GCM-based climate projections, the methods will make such assessments viable by improving previously-developed technologies for bias correction, global flood runoff analysis and inundation hazard analysis.

2.5 River discharge measurement

ICHARM is developing and disseminating a next-generation discharge measurement system that ensures highly reliable measurements while requiring less labor and cost. The system under development is unique in that automated measurement using fixed current meters such as non-contact current meters (radio current meters) is combined with an acoustic Doppler current profiler (ADCP) for accuracy control. Through observational experiments, the system has been proven applicable even to severe flow regimes, typically seen in Japanese steep rivers. We are further exploring methods to observe river bed fluctuations by use of this advanced automated system.

ADCP experience

2.6 Development of Water and Energy Transfer Processes (WEP) model

The Water and Energy Transfer Processes (WEP) model was originally developed as a basin-scale water cycle model. Responding to the recent need for the management of nutrient load and runoff in closed water bodies, ICHARM has been further improving the WEP model into a basin-scale water/material cycle model by adding the function of simulating the behavior of nitrogen and phosphorus in both dissolved and particulate forms.

2.7 Flood Risk Assessment

Risk assessment is generally conducted through a series of analyses on possible hazards, vulnerability to and countermeasures for the hazards. ICHARM carries out risk assessment, based on one of the most important institute principles: localism. We started the process with thorough local investigation in each target basin to understand its physical, social and economic conditions, while also using advanced hydrological and hydraulic modeling technology. We then assess the impact of socioeconomic risk on a basin and propose effective countermeasures to cope with such risk.

2.8 ICHARM Research & Development (R&D) Seminars

The ICHARM R&D Seminar is a series of seminars irregularly held to improve ICHARM's activities and update the expertise of its research staff. As many as 18 R&D seminars were organized from October 2010 to March 2014 as tabulated in the Table 2-1.

Table 2-1　List of ICHARM R&D Seminar

No.	Date	Lecturer	Position	Lecture Title
30	12-Nov-10	Prof. Shoji Fukuoka	Professor, Chuo University	Adaptation of River technology for climate change
31	25-Nov-10	Asso. Prof. Hiroshi Takebayashi	Associate Professor, Disaster Prevention Research Institute, Kyoto University	Application of bed deformation analysis on natural rivers
32	7-Feb-11	Asso. Prof. Frank van der Meulen	Associate Professor, UNESCO-IHE	Climate change and adaptation in Europe
33	13-Apr-11	Prof. Toshio Koike	Professor, University of Tokyo	Integrated Earth Observations and Predictions toward Flood and Water Use under the Climate Change
34	21-Jun-11	Dr. Rabindra Osti	Senior Researcher, ICHARM	Special lecture for ICHARM BEST PAPER AWARD
35	21-Sep-11	Prof. Djoko Legono	Gajah Mada University , Yogyakarta, Indonesia	THE TRUE COLLABORATIVE-BASED LAHAR FLOW MONITORING SYSTEM IN A CHAOTIC CONDITION
36	17-Oct-11	Asso. Prof. Pat Yeh	Special-appointed Associate, Institute of Insustrial Science, The University of Tokyo	Estimation of Evaporation and Terrestrial Water Storage Change over Global Large River Basins
37	13-Dec-11	Prof. Toshio Koike	Professor, University of Tokyo	GEOSS Water Cycle Integrator An Innovative Tool Contributing to Integrated Human Security and Green Growth
38	13-Dec-11	Prof. Takashi Asaeda	Professor, Department of Environmental Science, Saitama University	Ecological knowledge for natural disasters
39	28-May-12	Mr.Kenzo Hiroki	Principal, ICHARM	Water, Disasters, and Green Economy
40	11-Jun-12	1. Mr. Eisa Bozorgzadeh 2. Dr. Saied Yousefi	1. Deputy of technical and research affairs, 2. Sr. Technical Expert, IWPCO	1.Analytical Study of Drought Management: Remarks and Points 2. Forensic Management of Water Resources for Generating Hydropower in IWPCO
41	11-Sep-12	Mr. Imbe Masahiro	Executive, Association for Rainwater Storage and Infiltration Technology	Implementation of Well-balanced Hydrological System for the Development along the Tsukuba Express Line
42	26-Feb-13	Prof.Andras Szollosi-Nagy	Rector, UNESCO-IHE	How should a (flood) early warning system be developed in data poor nations?
43	27-May-13	Dr.Takahiro Sayama	Researcher, ICHARM	Rainfall-Runoff-Inundation of Large Scale Flooding：From Prediction to Process Understanding
44	12-Jun-13	Mr. Takezumi Ban	President, Association for World Peace Japan	Earthquake Disaster and Poverty Prevention – Work of Toyohiko Kagawa
45	18-Oct-13	Mr. Wouter T. Lincklaen Arriens	Leadership Coach and Advisor, UNESCO-IHE	Expectation for Japan for improvement in the water security in Asia
46	13-Dec-13	Mr. Hayato Nakamura	Project Formulation Advisor (DRM), JICA Philippine Office	Typhoon Yolanda: Gap between Philippine DRRM and Mega Disaster
47	16-Jan-14	Dr. Anthony Kiem	Hydroclimatologist/Senior Lecturer, Faculty of Science and IT, University of Newcastle	Understanding and Adapting to Hydroclimatic Variability and Change in the Asia-Pacific Region

3. Training -Capacity Development-

3.1 Overview

To cope with major water-related disasters like floods, it is important to empower not only individuals but also organizations involved in disaster management because there is a limit to what each individual can do.

Well aware of this, ICHARM provided many kinds of training programs that help improve both individual problem-solving capacity and organizational coping capacity in disaster management. After the courses, ICHARM has held follow-up activities such as seminars for ex-trainees, grasped their facing issues, and established new training courses. Most of these programs were intended for practitioners (i.e. for those with a certain level of field experience after college education) involved in river management and water resource development in developing countries. They are expected to disseminate the results of the training in their home countries.

In the duration from October 2010 to March 2014, ICHARM offered the following training program as shown in the table 3-1. The detailed number of the alumni is shown in the ANNEX 1.

Table 3-1 List of conducted training programs

Category	Course title	Duration	Num. of Participant	Collaboration
Ph.D. Program (3 years)	Disaster Management	2010.10-2013.9	1	GRIPS
		2011.10-2014.9	3 (2 were dropped out)	
		2012.10-2015.9	2	
		2013.10-2016.9	3	
M.Sc. Program (1 year)	Water-related Disaster Management Policy Program	2010.10-2011.9	12	JICA, GRIPS
		2011.10-2012.9	19	
		2012.10-2013.9	12	
		2013.10-2014.9	12	
Short Training Course/Workshop (several weeks)	Capacity Development for Integrated Flood Risk Management in Pakistan	2012.5	6	UNESCO
		2013.5	5	
	Capacity Development for Flood Risk Management with IFAS	2012.7-8,	13	JICA
		2012.12	7	
		2013.7-8	16	
	Local Emergency Operation Plan with Flood Hazard Map	2011,1-2	12	JICA, ADB
		2011.7-8	11	
	Capacity development for Adaptation to Climate Change in Asia	2011.2-3	7	JICA

3.2 Ph.D. Program

In October 2010, ICHARM and GRIPS jointly launched the Ph.D. program. This was the first and challenging attempt since PWRI establishment. 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. The program examines and selects candidates who have motivation and capabilities for doctoral level work, and are willing to take the lead for implementing water-related risk management learned at ICHARM after completion of this program. Until now, one Japanese student has graduated, and six students are in the program.

ICHARM/PWRI employed some Ph.D. students for ICHARM Research Assistant positions. This provides an excellent opportunity for them to learn and experience the practical work of ICHARM while they carry out their own research.

3.3 M.Sc. 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.

Graduation ceremony at GRIPS (Sep. 2013)

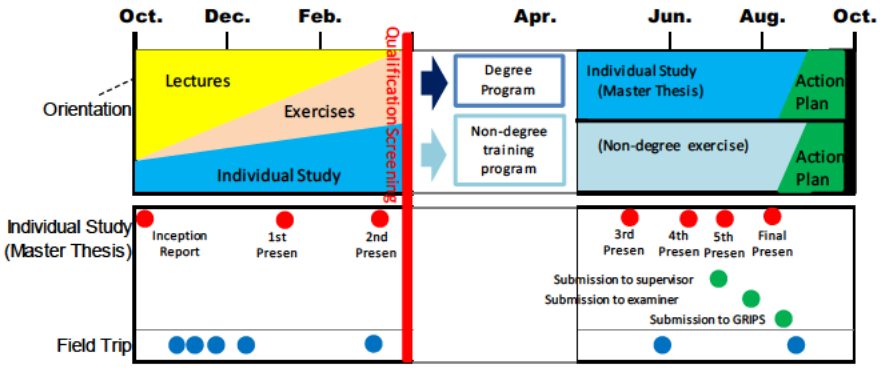


Figure 3-1 Outline of the annual schedule

From October 2010 to March 2014, ICHARM implemented four batches of the

program and 43 students in total have conferred a Master's degree. Training programs has been improved annually. Based on the results of the post-training evaluation by students, the 2013-2014 course was the most satisfying of all conducted in the past five years.

3.4 Short-term training/workshop program

Short-term training programs were mainly conducted jointly with JICA. Participants learnt knowledge and technologies relevant to water-related disaster risk management for a period of several weeks. ICHARM has made efforts to recognize the latest water-related problems in developing countries and improve course contents and teaching staff to meet the needs of trainees.

Site visit at a local city office

3.4.1 JICA training program "Local Emergency Operation Plan with Flood Hazard Map" (JFY2009- JFY 2011)

The ultimate goal of the program was to increase local flood resilience through the development of local emergency operation plans combined with flood hazard maps and flood forecasting and warning systems and thereby reduce flood damage in the project-target countries. To achieve the goal, the contents were arranged to give the trainees many opportunities to think about what was lacking in their countries to provide emergency information that promotes timely evacuation and also about what they could do to fill such gaps in local emergency operation plans.

Town watching exercise

3.4.2 JICA training program "Capacity Development for Adaptation to Climate Change" (JFY2010)

The purpose of the program was to strengthen the abilities of government officials in developing countries to evaluate the impacts of climate change on rivers and to design adaptation strategies to them.

Closing ceremony

Seven trainees participated in the training; one each from Bangladesh, Thailand, the Philippines, Viet Nam and three from Indonesia.

In the post-training evaluation, five out of the seven trainees listed training on IFAS,

PCM and Trend Analysis as the most useful of all subjects. Evaluation results like this have been reflected in other short-term training opportunities conducted after this.

3.4.3 JICA training program "Capacity Development for Flood Risk Management with IFAS" (JFY2012- JFY 2014)

The program was designed to enhance individual flood-coping capacities and eventually to contribute to flood damage mitigation in their countries. To create as great synergy as possible with JICA's current and future local flood projects, the following two conditions were considered:

- The target basins were those also selected for JICA local projects.
- The target participants were selected from three categories of responsible personnel (meteorologists, river administrators, disaster management officials for public evacuation) who are currently working at organizations involved in the JICA local projects.

Project Cycle Management (PCM) exercise

IFAS training

Questionnaire by the participants found the following activities particularly useful:

- Lecture on a river information system in Japan,
- Application practices of PCM,
- Application practices of IFAS,
- Application practices of Town Watching ,and
- Study trip to the Shinanogawa River basin

They are expected to share knowledge and experience they acquired in this training with others at their respective organizations through lectures and workshops.

3.4.4 Short-term workshop "Capacity Development for Integrated Flood Risk Management in Pakistan" (JFY 2012 and 2013)

The workshop was originally organized as part of a project, "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan," which was launched in response to the 2010 severe flood event in Pakistan. The project was funded by the Japanese government through UNESCO. In 2012 and 2013, ICHARM welcomed totally 11 participants of middle- to

Watarase retarding basin

high-ranking officials of the Pakistani government.

The participants praised the workshop for its excellent contents and organization. They were particularly impressed with river management in Japan, including how steadily plans are put into action. They also commented that retarding basins like the one they saw at Watarase retarding basin should be effective for flood control in the Indus River basin.

3.5 Follow-up activity

Follow-up activities of ICHARM are intended to encourage ex-trainees 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.

For these reasons, ICHARM has conducted three follow-up seminars as shown in the Table 3-2.

Short course “Early warning system for flood disaster mitigation”

Seminar on Sediment Hydraulics and River Management

3.6 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 14 students and researchers used these opportunities between October 2010 and March 2014.

Table 3-2　List of conducted follow-up activities

Date	Follow-up activity	Venue
Nov. 6-7, 2010	Short course “Early warning system for flood disaster mitigation”	Hanoi, Viet Nam
Feb. 20-23, 2012	Follow-up discussion (on the occasion of The Southeast Asia Flood Risk Reduction Forum)	Bangkok, Thailand
Feb.13-14, 2013	Seminar on Sediment Hydraulics and River Management	Dhaka, Bangladesh

4. Information networking

4.1 Outline

ICHARM promotes many types of information networks to disseminate research results and strengthen partnership with relevant organizations. The following introduces main networking activities.

4.2 International Flood Initiative (IFI)

IFI is a framework to promote collaboration in flood management among international organizations such as UNESCO, WMO, UNU and UNISDR. IFI focuses on research, information networking, education and training, community empowerment, and technical assistance in various areas including integrated flood management. ICHARM has been serving as its secretariat.

4.3 5th International Conference on Flood Management (ICFM5)

ICHARM organized ICFM5 in Tokyo on 27-29 September 2011. More than 450 people from 41 countries participated. Under its main theme, "Floods: From Risk To Opportunity," the participants had productive discussions on five topic areas including flood risk management. The conference finally adopted the ICFM5 declaration crafted based on the discussion results of each topic-area (http://www.ifi-home.info/icfm-icharm/icfm5.html). Selected papers presented at the conference have been published in the Red Book No.357, Journal of Disaster Research 7 (5), and a special issue of the Journal of Flood Risk Management (December 2012) .

Plenary Session

Special Session

4.4 Asia-Pacific Knowledge hub

In June 2008, the Asia-Pacific Water Forum (APWF) officially acknowledged ICHARM as a Knowledge Hub with particular focus on disaster risk reduction and flood management. As a Knowledge Hub, ICHARM is expected to promote local application of high value-added know-how and research results in order to realize water security in the Asia-Pacific region under the framework of the APWF.

4.5 Typhoon committee

The Typhoon Committee 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 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. Mr. Minoru Kamoto, chief researcher of ICHARM, took a role of the chairperson of the hydrology working group.

ICHARM implemented a project of the Flood Disaster Preparedness Indices (FDPI), which can measure the capacity of disaster preparedness by communities, and reported in 2012.

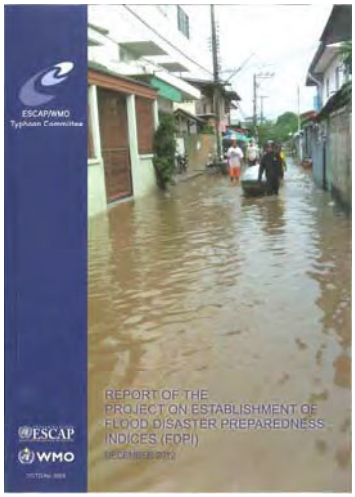


Figure 4-1 Report of the Project on Establishment of FDPI (December 2012)

4.6 Contribution to UNSGAB

The United Nations Secretary General's Advisory Board on Water and Sanitation (UNSGAB) is an independent body established in March 2004 by United Nations Secretary-General, Mr. Kofi Annan, to give him advice as well as to galvanize action on water and sanitation issues.

Mr. Kenzo Hiroki, ICHARM principal and a member of the UNSGAB, has contributed to the activities jointly with MLIT. As a part of the activities, on March 6, 2013, ICHARM supported a special high-level session on water and disasters, convened by the UN Secretary-General H.E. Mr. Ban Ki-moon. This event marked the first high-level UN thematic event discussing issues at the nexus of water and disasters.

"Special high-level session on water and disasters" (March, 2013)

4.7 Agreement with organizations

Since its establishment, ICHARM has signed a research partnership agreement with 13 overseas institutes (Table 4-1) to make collaborative efforts to address water issues around

the world.

In 2013, to include droughts and other water issues in cold regions, it concluded such an agreement with research institutes in Iran and Russia.

Table 4-1 List of ICHARM partners

1	Korea	Korea Disaster Prevention Association(KDPA)
2	U.S.A.	Bureau of Reclamation of the Department of the Interior of the United States of America
3	Netherlands	UNESCO-IHE Institute for Water Education(UNESCO-IHE)
4	Iran	Regional Centre on Urban Water Management(RCUWM-TEHRAN)
5	Philippines	Flood Control and Sabo Engineering Center (FCSEC)
6	Japan	Yamanashi University
7	CHINA	International Research and Training Center on Erosion and Sedimentation (IRTCES)
8	Brazil	HydroEx
9	Indonesia	Tsunami & Disaster Mitigation Research Center (TDMRC)
10	Japan	Kyoto University
11	Lao PDR	Mekong River Commission (MRC)
12	Iran	The Iran water and power resources development company(IWPC), Ministry of Energy, Tehran, I.R.IRAN
13	Russia	State Hydrological Institute (SHI)

4.8 Overseas business trip

To promote international activities described above and local practices explained below, ICHARM has sent roughly 440 staff members in total to overseas countries since October

2010 (Fig. 4-2). Particularly, overseas business trips dramatically increased due to the launch of the UNESCO Pakistan Project in 2011 (see 5-3 for more information). Participation in field studies, conferences and committees held abroad has been also on the rise as local projects progress further and ICHARM increases its presence worldwide.

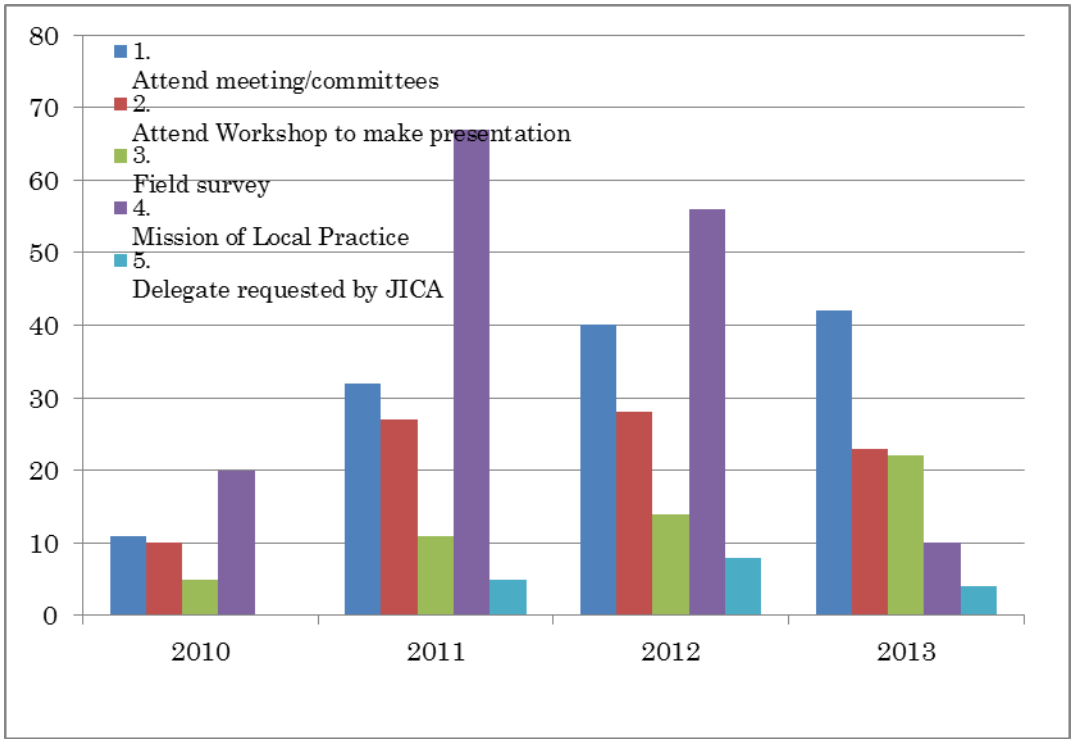


Figure 4-2　Trend of Overseas business trip

5. Local Practices -Localism-

5.1 Outline

ICHARM has participated in local projects organized by ADB and UNESCO and implemented activities in cooperation with local administrative and research organizations in order to test applicability of several models developed by ICHARM to local basins. Those projects have been successfully implemented despite difficulties in arrangement with local offices and problems in the actual implementation process. The following describes the outline of each project.

5.2 ADB Project: Technical Assistance No. 7276, Supporting Investments for Water-Related Disaster Management

Signing a collaborative agreement with ADB in November 2009, ICHARM conducted a project, "Regional Technical Assistance (RETA) 7276: Supporting Investment in Water-Related Disaster Management (TA7276)," which ended in March 2013. This project was planned to build an environment to encourage investment in disaster management in developing countries. In the 1st Asia-Pacific Water Forum in 2007, ICHARM was the lead organization of the water disaster session and assigned as a Knowledge Hub on disaster risk reduction and flood management. ICHARM's involvement in this project was part of the responsibilities as a Knowledge Hub. This was the first international project that the Public Works Research Institute (PWRI) had ever conducted under a collaborative agreement, and it was a major challenge for ICHARM to broaden its scope of activity as an international organization.

Figure 5-1 Target Project

Final Report to ADB
On 12th March, 2013

In this project, ICHARM first conducted field investigations to collect a wide variety of local data on past inundations, observation systems, livelihood on hinterland, urbanization in basins before flood prediction and flood risk assessment. Complying with our principal policy of localism, we proposed solutions that were considered best suited to target localities based on the needs and conditions confirmed from the field investigations.

ICHARM was involved in the following five projects:

1. Bangladesh: Development of a basic plan for a new flood forecasting and warning

system

2. Indonesia: Implementation of a satellite-based flood forecasting system in the Solo River
3. Cambodia: Development of a flood vulnerability assessment method for the Mekong flood plain
4. Philippines: Implementation of flood management training using a satellite-based runoff model in the Pampanga and Cagayan rivers.
5. Development of the prototype of flood risk assessment indices for the Asian region

Projects 1 to 4 are efforts to contribute to national flood risk reduction while Project 5 contributes to regional flood risk reduction. The results of TA7276 are very promising, for the technologies and concepts produced for the projects can be applied to other river basins with some technological customization based on local basin characteristics.

In March 2013, Taketo Uomoto, the chief executive of PWRI, and Kuniyoshi Takeuchi, the director of ICHARM, visited Seethapathy Chander, the director general of the ADB Regional and Sustainable Development Department to report the results of the TA7276 project. Mr. Chander expressed deep gratitude and highly praised ICHARM for its achievements and hoped for its involvement in future projects as well. Convinced that the strong trust built between ICHARM and the counterpart countries through this technical assistance is indispensible, we will continue our commitment to water-related disaster risk reduction in the Asia-Pacific region, maximizing our strong technological advantage and adequate experience in disaster risk reduction and flood management as a Knowledge Hub.

5.3 UNESCO-Pakistan project

In late July 2010, the monsoon brought a record rainfall over northern Pakistan and caused the worst flood in the past 80 years. The flood had serious damage on the area, affecting 20.3 million people in total, killing 1,985 and damaging or destroying 19 million houses (Pakistan 2010 Annual report, National Disaster Management Authority).

Training in August 2013 with three ICHARM M.Sc. Alumni

As a part of the restoration effort from this flood disaster, UNESCO started a project called “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan” in July 2011. This comprehensive project consisted of three components, and ICHARM has been assigned to two of these components: technical assistance and capacity development. In the first component, ICHARM assists Pakistani government in the development and implementation of “Indus-IFAS” and the production of flood hazard maps. Indus-IFAS is specifically designed to fit the conditions and needs of the Indus River basin by

combining IFAS and the RRI model. In the other component, ICHARM has provided the opportunity to participate in its M.Sc. program and short-term training programs for government administrators such as the Pakistan Meteorological Department, the Pakistan Space and Upper Atmosphere Research Commission and other agencies.

5.4 Thai Flood simulation

From July to November in 2011, a large-scale flood occurred in the Chao Phraya River basin of Thailand, causing tremendous damage to livelihood, businesses, and farming of local people. In mid-October, ICHARM started flood simulation with the Rainfall-Runoff-Inundation (RRI) model as part of emergency response in order to understand the prospective development of the flood in the basin. With the RRI model, it is possible to predict the progress of a flood, holistically considering the effects of discharge and inundation. In the case of simulation during emergency response, topographical information and estimated rainfall supplied by satellites are often used for simulation, because real-time local information is hardly available during a disaster. The Thai flood was simulated for the extent and duration of inundation by using estimated rainfall as input data. Part of the results were released to the public in a press conference held jointly with MLITT, and also provided to governmental agencies and media organizations, which drew a lot of media and public attention to ICHARM and the new technology.

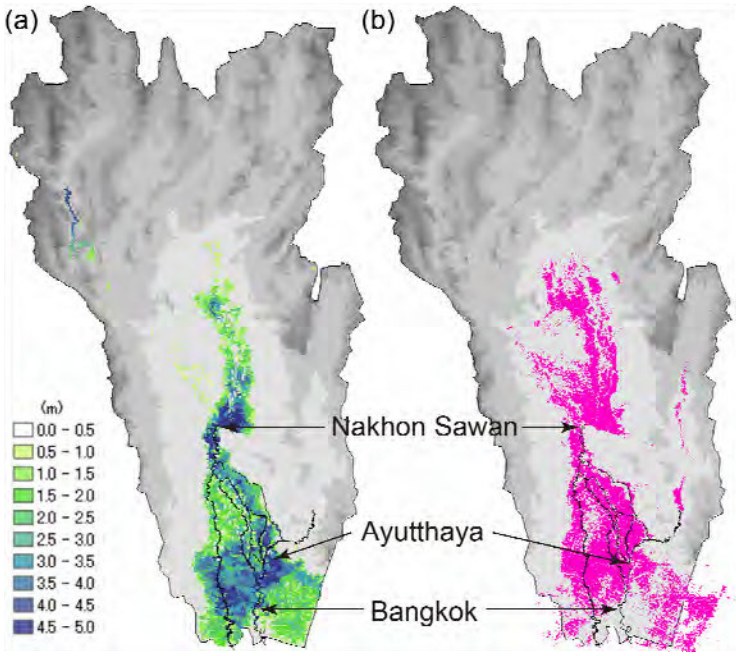


Figure 5-2 Inundation extent in the Chao Phraya River basin estimated (a) by the emergency response-type simulation and (b) by satellite remote sensing (provided by UNOSAT) for 2011 Thailand Flooding as of October 13, 2011

In response to this huge flood, JICA decided to provide assistance for the Thai government through the "Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin." ICHARM supported this effort by offering technical advice as a member of the advisory committee formed within Japan for this project.

6. Public Relationship

6.1 Website

As a means of public relations, ICHARM disseminates up-to-date information through its website at http://www.icharm.pwri.go.jp/index.html. In recent years, our website has been accessed 5,000 to 6,000 times monthly.

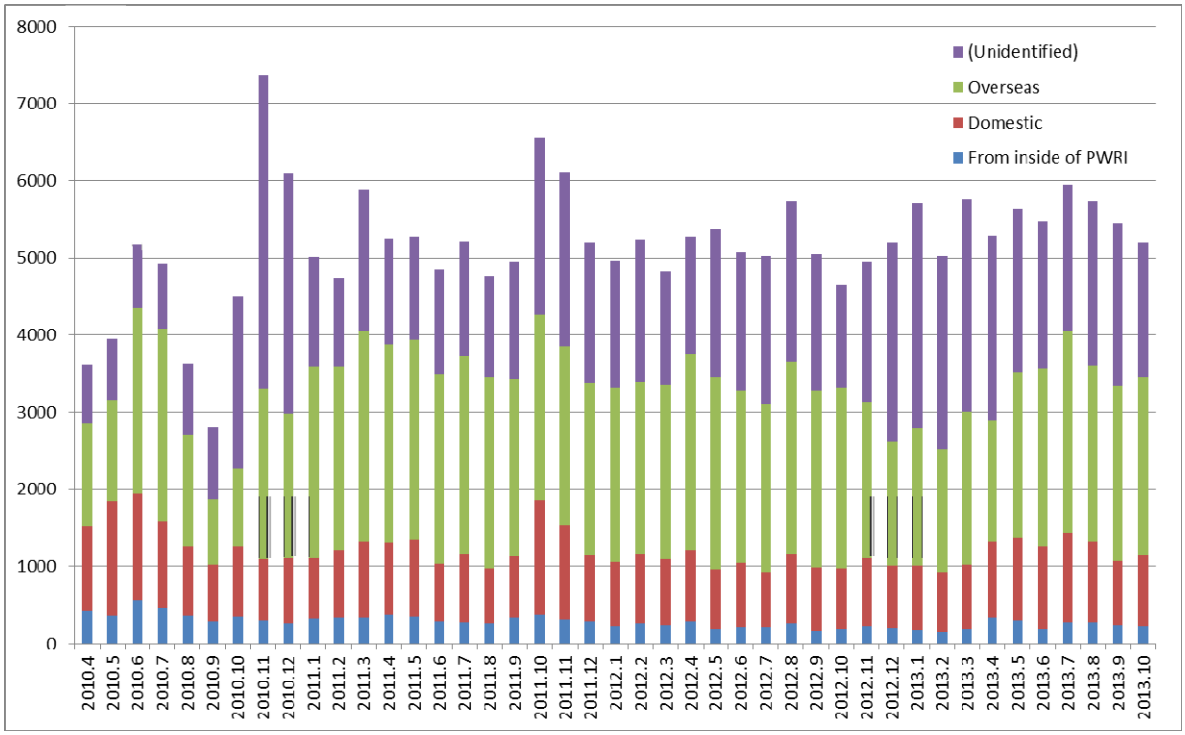


Figure 6-1 Trend of Access number of ICHARM web site

6.2 ICHARM Newsletter

ICHARM regularly publishes ICHARM newsletters on quarterly basis, to registered subscribers, and through other channels. ICHARM newsletters contain a variety of news and other articles such as message from Director, special topics, report of international meetings and seminars, visitors to ICHARM, ongoing research, training activities, and projects, etc.

Since the ICHARM establishment a total of 31 volumes of newsletters have been issued and of which 14 newsletters were published during the reporting period.

ICHARM Newsletter is available at http://www.icharm.pwri.go.jp/publication/index.html.

Newsletter

Volume 8 No. 4
Issue No. 31

January 2014

ICHARM

International Centre for Water Hazard and Risk Management
under the auspices of UNESCO

Contents

Message from Director

ICHARM has started the year 2014 with a refreshed enthusiasm under a renewed agreement between UNESCO and the government of Japan signed last July. The new agreement requires us to establish the Governing Board, which was the Advisory Board in the previous agreement. We expect that the Governing Board of top international executives will examine ICHARM's activity plan to ensure proactive implementation. We are making our best effort to prepare for the first board meeting, scheduled on February 25.

Near the turn of the year, we had another devastating disaster, when storm surges by Typhoon Haiyan (locally called Yolanda) hit Leyte Island of the Philippines on November 8. It was reportedly the strongest typhoon ever recorded among the landed. Many houses and towns were completely swept out, and more than 6,000 people were killed. It was only 7 years ago when Leyte experienced a giant landslide, which occurred after weeks of heavy rains and killed more than ten thousand people. Meanwhile, in Japan, people in Oshima Island were still at a loss after a deadly debris flow, unable to make any plans yet for recovery. Right after the turn of the year, we also saw many pictures of floods in Southwest England and Wales. Indeed, extreme hydro-met phenomena have been increasing.

Wallingford, England
photo by John Rodda 2014.1.11

Under such circumstances, the role of ICHARM is growing. One of the reasons is that it assumes the responsibility of the most critical part of disaster prevention; that is, as Chinese philosopher Sun Tzu says, "If you know the enemy and know yourself, you need no fear even against a hundred battles." In disaster prevention, to know the enemy is to know the characteristics of the hazards and their forecasts, and to know yourself is to assess exposure and vulnerability of human activities, coping capacities and institutional arrangements.

ICHARM, together with foreign students, is concentrating on acquisition and production of such knowledge on hazards and society in combination with capacity development programs, and apply the research results to local practices by helping practitioners of national and regional governments. Based on such substantive experiences, ICHARM also takes part in international efforts of policy and strategy making.

We hope ICHARM receives even further cooperation and support from the world to continue activities under the renewed agreement.

31 January 2014
Kuniyoshi Takeuchi
Director of ICHARM

East Samar, Leyte Island
photo by Mamoru Miyamoto 2013.12.13

ユネスコのカテゴリー2センターに関わるルールの見直しに伴い、昨年7月、ユネスコ・日本政府間の協定も改定されました。したがって2014年は、ICHARMにとって新協定下での新年になります。センター員一同、気持ちも新たに活動を開始しました。新協定では、従来の諮問委員会に代り、運営理事会にICHARMの運営を審査頂くことになります。理事会には内外関係機関のトップを迎え、大所高所からの審査とご指導を期待しています。第一回理事会は2月25日に開催の予定で、それに向けた準備を進めています。

昨年末には、また悲惨な災害が起きました。11月8日にレイテ島を中心に襲ったサイクロン・ハイヤン(台風30号)による高潮で、多くの町が壊滅し6000人以上の方々が亡くなりました。上陸した台風としては観測史上最大規模だったと報じられています。レイテ島ではわずか7年前、巨大地すべりで1000人以上の方が亡くなったところです。日本ではこれに先立つ台風26号で、大島の土石流災害により50人近くの方が亡くなり、避難された方々の帰還の計画も立たない時期でした。新年早々にはイギリスから、暮れからの雨で各地で洪水が発生したニュースが届けられています。気象の極端事象は進化の一途をたどっています。

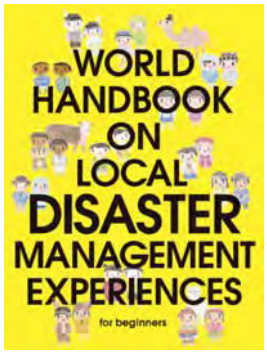
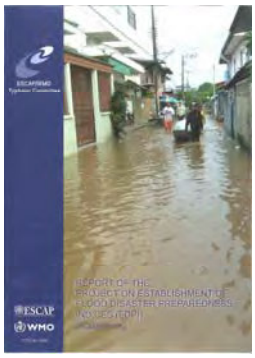
そんな中でICHARMへの期待はますます高まっています。水防災という戦いの中で最も重要な、「敵を知り己を知れば百戦危うからず」と言うところを分担しているからです。敵を知るのはハザードの特性研究、予報であり、己を知るのは人間活動の暴露と脆弱性の評価です。対策や社会の仕組みの評価も含まれます。これら敵と己を知る技術の研究を、能力開発プログラムを一体に、留学生と一緒に研究し、その成果を現地の実務者を通じて実践に移しています。その上で、リスク削減の国際政策や体制作りにも参加しています。

新しい協定の下でのICHARMの発展に、一層のご支援をお願いします。

6.3 Publication

ICHARM has published the following books and leaflets related to water disasters.

Table 6-1 List of Publication

IAHS Red Book "Floods: From Risk to Opportunity" 	HANDBOOK on Local Disaster 	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI) 	Large-scale Floods Report 
IAHS Publication No. 357 (2013), ISBN 978-1-907161-35-3, 480 pages	Leaflet, 2013, 38 Pages	Typhoon Committee, Leaflet, 2012 26 Pages	Book, 2011, 232 Pages
Dr. Ali Chavoshian, Dr. Kuniyoshi Takeuchi, Mr. Minoru Kamoto	Dr. Megumi Sugimoto	Mr. Tadashi Nakasu, Mr. Toshio Okadumi, Mr. Yoshikazu Shimizu	Dr. Ali Chavoshian, Dr. Kuniyoshi Takeuchi

6.4 Paper list

ICHARM members have 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 table 6-2. The list of these activities are shown in the Annex 2.

Table 6-2　List of Papers

	2013	2012	2011	2010
Book	1	1	1	1
Journal	12	4	8	4
Paper	12	8	6	10
Abstract or Conference	10	18	45	27
Articles or Others	4	7	14	9
PWRI Technical Note/PWRI research report	2	4	2	3
Total	**41**	**42**	**76**	**54**

7. Award

ICHARM researchers have been awarded several times since 2010 in recognition of their excellent work.

Awardee	Award	(reason)
Dr. Kamimera	Award from the Ministry of Natural Resources and Environment (MONRE) of Vietnam, 2013	Contribution to the development of hydrometeorology in Viet Nam
Dr. Sayama	15th Infrastructure Technology Development Award, July 5, 2013	Development of the Rainfall-Runoff-Inundation (RRI) model
Mr. Tatebe, Dr. Sayama, Dr. Tanaka	Best Research Exchange Award in 2013 SAT, Jan, 22, 2013	Flood simulation for emergency response in the case study of the 2011 Thai flood
Dr. Sayama	Young Scientists' Prize by the Minister of Education, Culture, Sports, Science and Technology , Apr, 2013	Development of the Rainfall-Runoff-Inundation (RRI) model
Dr. Takeuchi	International Hydrology Prize, Oct. 23, 2012	Outstanding contribution to hydrology internationally

8. External Evaluation

ICHARM has been evaluated for its achievements by external organizations such as the PWRI External Committee and the MLIT Evaluation Committee for independent administrative agencies. ICHARM has also evaluated recently by UNESCO for the renewal of the agreement between the Japanese government and UNESCO. Table 8-1 lists the evaluations and their results.

The MLIT Evaluation Committee awarded PWRI with three or five S's for its activities in the past three years, and one of the S's was always given to ICHARM in the three consecutive years, showing that the committee recognizes its high-quality international contributions.

Table 8-1 List of external evaluation

Month Year	Evaluator	Evaluation Result
Aug. 2013	MLIT 2012 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 3 out of 15 evaluation items. **ICHARM contributed to one of the three**. (i.e., training and educational programs, the International Hydrology Award received by ICHARM director, etc.)
Sep. 2012	MLIT 2011 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 3 out of 15 evaluation items. **ICHARM contributed to one of the three**. (i.e., training and educational programs, contribution to flood control measures in the Chao Phraya River of Thailand, etc.)
Sep. 2011	MLIT 2010 Performance evaluation of incorporated administrative agencies under MLIT	PWRI received the highest **rating "S"** for 5 out of 23 evaluation items. **ICHARM contributed to one of the five**. (i.e., training and educational programs, launch of the doctoral program, implementation of ADB projects, etc.)
Jan. 2011	UNESCO Evaluation Team	ICHARM was evaluated as **the most active** among the UNESCO water centers around the world.
Aug. 2010	Audit Report on the Division of Water Sciences of the UNESCO Natural Science Sector (UNESCO external auditors) [185 EX/32 Part II – page 14]	"…One characteristic of the field of water sciences is that there are 13 category 2 institutes or centres. **One of the most active is ICHARM,** which serves as the secretariat for the International Flood Initiative (IFI)."… http://unesdoc.unesco.org/images/0018/001888/188888e.pdf

ANNEX

Number of Alumni of ICHARM training program (as of February, 2014)

Ph.D. Program "Disaster Management"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
2010-												1																			1
2011-							1											1	1												3
2012-	1								1																						2
2013-	2								1																						3
Total	**3**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**

M.Sc. Program "Water-related Disaster Management Course of Disaster Management Policy Program"

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total	(Number of students conferred Master's degree)
2007-2008	2			3						1		3						1													10	10
2008-2009	2			2			1				1							1									2				9	7
2009-2010	2			1			1				3	1					1					1			2		1				13	12
2010-2011	2			2	1				1		1						1	3			1										12	12
2011-2012	2			2				1			2							2			6	1			1			1		1	19	19
2012-2013	2				1										2		1	1		1			1	1	1				1		12	12
2013-2014	2			1		1							1				1				1	2			2				1		12	
Total	**14**	**0**	**0**	**11**	**2**	**1**	**2**	**1**	**1**	**1**	**7**	**4**	**1**	**0**	**2**	**0**	**4**	**8**	**0**	**1**	**8**	**4**	**1**	**1**	**6**	**0**	**3**	**1**	**2**	**1**	**87**	**72**

JICA training program "Flood Hazard Mapping"

2004			2	2							2			3	2							2					2			1	16
2005			2	2							2			2	2							3					1			2	16
2006			2	2							2			2	2							2					2			2	16
2007			2	2							3			2	3							2			1		3			2	20
2008			1	2							0			2	2							1					1			1	10
Total			**9**	**10**							**9**			**11**	**11**							**10**			**1**		**9**			**8**	**78**

JICA training program "Local Emergency Operation Plan with Flood Hazard Map"

2009	1	1								2			1			1				1				1	1	1				10
2010	1	2								2			1			1	1			1				1	1	1				12
2011	1	2								2			2			1				1				1	1					11
Total	**3**	**5**								**6**			**4**			**3**	**1**			**3**				**3**	**3**	**2**				**33**

JICA training program "Capacity Development for Flood Risk Management with IFAS"

2012	3												3							2		2					3				13
2013	3												3							2		3					2			3	16
Total	**6**												**6**							**4**		**5**					**5**			**3**	**29**

JICA training program "Capacity Development for Flood Risk Management with IFAS (B)"

2012																												**7**	**7**

JICA training program "Capacity Development for Adaptation to Climate Change"

2010	**1**										**3**										**1**					**1**		**1**	**7**

UN/ISDR Training course "Comprehensive Tsunami Disaster Prevention"

2008										**2**	**4**					**2**								**3**					**11**

UNESCO Pakistan Project workshop

2012																				6									6
2013																				5									5
Total																				**11**									**11**

Country	Bangladesh	Bhutan	Cambodia	China	Colombia	El Salvador	Ethiopia	Fiji	Guatemala	India	Indonesia	Japan	Kenya	Laos	Malaysia	Maldives	Myanmar	Nepal	Netherland	Nigeria	Pakistan	Philippines	Republic of Albania	Serbia	Sri Lanka	Tajikistan	Thailand	Tunisia	Venezuela	Vietnam	Total
Total	**27**	**5**	**9**	**21**	**2**	**1**	**3**	**1**	**3**	**3**	**29**	**5**	**7**	**15**	**13**	**2**	**7**	**10**	**1**	**5**	**22**	**20**	**1**	**1**	**13**	**3**	**20**	**1**	**2**	**20**	**272**

ICHARM Publication List FY2010

	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Forms of community participation in disaster risk management practices		Rabindra Osti	Katsuhito Miyake				Forms of community participation in disaster risk management practices	NOVA Science Publisher			
2	Journal	Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		Rabindra Osti	Tara Nidhi BHATTARAI	Katsuhito Miyake			Natural Hazards	Springer	Vol 58, Issue 3	1209	1223
3		Flood-Related Disaster Vulnerability: an impending crisis of megacities in Asia		Yoganath Adikari	Rabindra Osti	Tomoyuki Noro			Journal of Flood Risk Management	Wily Interscience	Vol.3, Issue 3	185	191
4		Field Assessment of Tam Pokhari Glacial Lake Outburst Flood in Khumbu Reguon, Nepal		Rabindra Osti	Shinji Egashira	Katsuhito Miyake	Tara Nidhi BHATTARAI		Journal of Disaster Research	Fuji Technology Press Ltd	Vol.5, No. 3	264	273
5		環境社会学における自然災害研究の視角ー開発・環境・災害の因果サイクルモデルの視点からー	A Research Perspective on Natural Disasters and Environmental Sociology: Viewpoints on the Cause and Effect Cycle Model of Development-Environment-Disaster	中須正 Tadashi Nakasu					環境社会学研究 Journal of Environmental Sociology	有斐閣 Yuhikaku Publishing Co., LTD.	16	65	78
6	Paper	Development of a statistical bias correction method for daily precipitation data of GCM20		Hironori Inomata	Kuniyoshi Takeuchi	Kazuhiko Fukami			土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	247	252
7		Applicability of GSMaP correction Method to Typohoon "Morakot" in Taiwan		小澤剛 Go Ozawa	猪股広典 Hironori Inomata	白石　良樹 Yoshiki Shiraishi	深見和彦 Kazuhiko Fukami		土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	445	450
8		降雨流出氾濫モデルによるサイクロンナルギス高潮氾濫シミュレーション Storm Surge Inundation Simulation of Cyclon Nargis with a Rainfall-Runoff-Inundation Mode		佐山敬洋 Takahiro Sayama	Nay Myo Lin	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka	竹内邦良 Kuniyoshi Takeushi	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	529	534
9		実河川における掃流砂量の計測手法に関するー提案 PROPOSAL OF BEDLOAD-DISCHARGE OBSERVATION IN ACTUAL RIVERS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1171	1176
10		河川モニタリング動画を用いた非接触型流量計測法の精度検証と準リアルタイム計測システムの構築 MEASUREMENT ACCURACY OF NON-CONTACT DISCHARGE MEASUREMENT METHOD USING RIVER MONITORING MOVIE AND DEVELOPMENT OF QUASI REAL TIME MEASUREMENT SYSTEM		藤田一郎 Ichiro Fujita	原浩気 Hiroki Hara	萬矢敦啓 Atsuiro Yorozuya			土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1177	1182
11		ADCPを用いた洪水流観測の計測精度評価に関する総合的検討 DISCUSSION OF ACCURACY EVALUATION METHODS OF TOWING FLOOD FLOW OBSERVATION DATA MEASURED BY ADCP		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	土木学会　水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	55	1183	1188
12		非接触型電波式流速計を用いた洪水流量自動観測手法の一考察 A STUDY OF AN AUTOMATIC WATER DISCHARGE MEASUREMENT SYSTEM USING A NON-CONTACT CURRENT METER		萬矢敦啓 Atsuiro Yorozuya	大平一典 Kazunori Odaira	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	53	58
13		高速流におけるADCP観測のための橋上操作艇に関する提案 PROPOSAL OF TETHERED ADCP PLATFORM FOR HIGH-SPEED FLOW MEASUREMNTS		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	16	59	64
14		A Global Outlook of Sediment-Related Disasters in the Context of Water-Related Disasters		Yoganath Adikari	Tomoyuki Noro				International Journal of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol3, No1	110	116
15		Development of automatic water discharge measurement system		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami	大平一典 Kazunori Odaira		Environmental Hydraulics	Christodoulou & Stamou (eds) @ 2010 Taylor & Francis Group		839	844

16	Abstract	GSMaP補正手法の適用性に関する研究―マイクロ波放射計による観測頻度がGSMaP補正手法の精度に与える影響―	Applicability of a GSMaP correction method — Effect of frequency of microwave-radiometer observation on accuracy of a GSMaP correction method —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
17		流域貯水量の推定に基づく流域分類 Catchment classification based on storage estimations at the catchment scale		佐山敬洋 Takahiro Sayama	Jeff McDonnell				日本地球惑星科学連合2010年大会予稿集 Japan Geoscience Union Meeting 2010	日本地球惑星科学連合 Japan Geoscience Union			
18		衛星リモートセンシングによる土砂災害監視の可能性について Applicability for urgent monitoring of sediment-related disaster by the satellite remotesensing		清水孝一 Yoshikazu Shimizu	林真一郎 Shinichiro Hayashi	小山内信智 Nobutomo Osanai	西真佐人 Masato Nishi		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		36	37
19		多時期衛星画像解析及び数値計算による2004年スラウェシ島パワカラエン山で発生した巨大崩壊の土塊の侵食過程	Analysis of the erosion process of the soil mass from a 2004 large-scale landslide at Mt. Bawakaraeng in Sulawesi Island by using multi-temporal satellite images and numerical calculation	清水武志 Takeshi Shimizu	山越隆雄 Takao Yamakoshi	田村圭司 Keiji Tamura	清水孝一 Yoshikazu Shimizu		平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		448	449
20		ALOS(だいち)による崩壊地の抽出手法について	Extraction of landslide areas by using ALOS	吉川和男 Kazuo Yoshikawa	小山内信智 Nobutomo Osanai	清水孝一 Yoshikazu Shimizu			平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering		490	491
21		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	平成22年度研究発表会概要集 Proceedings of the Japan Society of Erosion Control Engineering, Nagano, Japan	砂防学会 Japan Society of Erosion Control Engineering			
22		局地的豪雨早期予測・探知のための高速降雨予測モデルの検討	Development of a fast rainfall-prediction model for early forecasting and detection of localized downpour	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		569	570
23		GPS基盤整備の乏しい地域におけるADCP観測の一考察	Proposal of ADCP observation in areas lacking GPS infrastructure	菅野裕也 Yuya Kanno	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		41	42
24		死者ゼロに向けた「早期避難」についての一考察	Study on early evacuation for zero causalities	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		101	102
25		人工衛星観測雨量でみた2010年メコン川渇水の検討	Analysis of the 2010 Mekong drought based on satellite rainfall data	川上貴宏 Takahiro Kawakami	鍋坂誠志 Seishi Nabesaka	小澤剛 Go Ozawa	深見和彦 Kazuhiko Fukami	竹内邦良 Kuniyoshi Takeushi	第65回土木学会年次学術講演会 The 65th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		105	106
26		Application of Artificial Neural Networks and Wavelet Analysis in Prediction of Water Level in Nan River of Thailand		Somchit AMNATSAN	Daisuke Kuribayashi	A. W. JAYAWARDENA			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
27		マイクロ波放射計による観測頻度がGSMaP補正値の誤差に与える影響 ―国内河川流域での事例解析―	Effect of frequency of microwave-radiometer observation on errors of GSMaP corrected values — Case analysis of rivers in Japan —	小澤剛 Go Ozawa	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		16	17
28		Flood Characteristics Analysis of Ganges-Brahmaputra-Meghna River system inside Bangladesh		Partha Pratim Saha	Shigenobu Tanaka	Mamoru Miyamoto			水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		18	19
29		広域降雨流出浸水予測モデルの開発 Development of a Rainfall-Runoff-Inundation Model		佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami	田中茂信	竹内邦良 Kuniyoshi Takeushi		水文・水資源学会2010年度研究発表会要旨集 Proceedings of the 2010 conference of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		20	21
30		GIS 及びALOS 衛星観測データによる氾濫域の流量算定 The estimation of overflow volume using GIS and ALOS Image Data: A Case study in Indus River Basin, Pakistan		郭 栄珠 Youngjoo Kwak	猪股広典 Hironori Inomata	深見和彦 Kazuhiko Fukami			第49回(平成22年度秋季) 日本リモートセンシング学会 学術講演会 Presentation at the 49th conference of Remote Sensing Society of Japan	日本リモートセンシング学会 Remote Sensing Society of Japan		93	94
31		Bed-load discharge measurement by ADCP in actual rivers		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		River Flow 2010	Dittrich, Koll, Aberle & Geisenhainer (eds) – © 2010 Bundesanstalt für Wasserbau		1687	1692
32		Experimental application of flood forecasting system (IFAS) using satellite-based rainfall		Tomonobu Sugiura	Takahiro Kawakami	Go Ozawa	Jun Magome	Kazuhiko Fukami	9th International Conference on Hydroinformatics, Beijing, Chin				

33		Rainfall-Runoff-Inundation Analysis for Flood Risk Asessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi]		5th Conference of Asia Pacific Association of Hydrology and Water Resources (APHW)	APHW		568	576
34		Comparison of MRI-AGCM precipitation output with ground observation and propose of a simple statistical bias correction method		Hironori Inomata	Kuniyoshi Takeuchi]	Kazuhiko Fukami			3rd International Workshop on Global Change Projection: Modeling, Intercomparison, and Impact Assessment				
35		Bedload discharge measurement in developing counties		Atsuhiro Yorozuya	Shoji Okada	Yuya Kanno	Kazuhiko Fukami		4th International Perspective on Current & Future State of Water Resources & the Environment				
36		Glacial Lake Outburst Flood (GLOF): a sediment-and flood-related disaster risk to downstream communities in the Bhutan Himalayas		Yoganath Adikari	Rabindra Osti	Yoshikazu Shimizu	Tomoyuki Noro	Katsuhito Miyake	Proceedings of the Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering			
37		Rainfall-Runoff-Inundation Analysis for Flood Risk Assessment at the Regional Scale		Takahiro Sayama	Kazuhiko Fukami	Shigenobu Tanaka	Kuniyoshi Takeuchi		Proceedings of Symposium on Robust and Resilient Society against Natural Hazards & Environmental Disasters and the Third AUN/Seed-Net Regional Conference on Geo-Disaster Mitigation			24	26
38		Recent Flood Disasters in Asia: the case of Typhoon Ketsana		Yoganath Adikari	Yoshiyuki Imamura	Katsuhito Miyake			Proceedings of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
39		Coastal Vegetation Characteristics for Tsunami Disaster Mitigation at Southern Coast of Java Indonesia		Dinar Istiyanto	Shigenobu Tanaka	Daisuke Kuribayashi	Katsuhito Miyake		Proceeding of the Twelfth International Summer Symposium	土木学会 Japan Society of Civil Engineers			
40		Storage excess: A new conceptual framework for subsurface water collection, storage and discharge at the watershed scale		Takahiro Sayama	Jeff McDonnell	Kate Sullivan			American Geophysical Union, Fall Meeting 2010	American Geophysical Union			
41		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Kwak Youngjoo	Hasegawa Akira	Inomata Hironori	Kazuhiko Fukami		Geophysical Research Absract	EGU			
42		Integrated Flood Analysis Sytem (IFAS) as an efficiency tool to implement floof forecasting/warning sytem		Kazuhiko Fukami	Tomonori SUGIURA	Go Ozawa	Takahiro KAWAKAMI		CGCM COE UNITEN-Technical Report	Universiti Tenaga Nasional (UNITEN), Malaysia	7		
43	Article. Others	2009 Typhoon Ondoy and Pepeng Disasters in the Philippines		Tadashi Nakasu	Teruko Sato	Takashi Inokuchi	Shinya Shimokawa	Akiko Watanabe	防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	9	16
44		Landslide Disaster around Baguio City caused by Typhoon Pepeng in 2009		Takashi INOKUCHI	Tadashi NAKASU	Teruko Sato			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	35	42
45		2009 Typhoon Ondoy Flood Disasters in Metro Manila		Teruko Sato	Tadashi NAKASU				防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	64	74
46		Representations over a Tropical Storm Disaster and the Restoration of Everyday Lives for Urban Poor Victims in the Philippines：The Case of Typhoon Ondoy		Akiko Watanabe	Tadashi NAKASU	Takaashi Inokuchi			防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	81	86
47		The Exacerbation of Human Suffering and Disaster Response Caused by Tropical Storm Ondoy and Typhoon Pepeng Disasters: Cases of NCR and Baguio City		Tadashi Nakasu					防災科学技術研究所主要災害調査 Natural Disaster Research Report of NIED	防災科学技術研究所 National Research Institute for Earth Science and Disaster Prevention	No 45	97	104
48		河川実務者の観点から見たADCPによる流量観測技術開発の論点 Key points for developing water discharge measurement techniques using ADCP from field engineers' perspective		萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources		46	55
49		Study on applicability of ALOS data for flood inundation simulation		Kazuhiko Fukami	Shigenobu Tanaka	Inomata Hironori	Hideo YAMASHITA		ALOS PI Report	Japan Aerospace Exploration Agency (JAXA)	PI NO.397	1	9

50		ラグナ湖の洪水貯留量を利用した低落差発電 Laguna Lake Low-Head Power Generation by using Flood Discharge Detention Volume		加本実 Minoru Kamoto					都市計画 Urban planning	(公社)日本都市計画学会 City Planning Institute of Japan	Vol 59, No.6	53	56
51		衛星リモートセンシング技術の土砂災害への応用	Satellite remote sensing technologies applied to sediment disaster countermeasures	水野正樹 Masaki Mizuno	林真一郎 Shinichiro Hayashi	清水孝一 Yoshikazu Shimizu	小山内信智 Nobutomo Osanai		土木技術資料 Civil Engineering Journal	土木研究センター Public Works Research Center	Vol53, No1	20	23
52	PWRI Publication	Planning and Design of Tsunami-mitigative Coastal Vegetation Belts		Shigenobu Tanaka	Dinar Istiyanto	Daisuke Kuribayashi			PWRI Technical Note	Public Works Research Institute	4177		
53		2009-2010 修士課程「防災政策プログラム水災害リスクマネジメントコース」実施報告書	Project report on the 2009-2010 Water-related Disaster Management Course of Disaster Management Policy Program	栗林大輔 Daisuke Kuribayashi	工藤啓 Kei Kudo	田中茂信 Shigenobu Tanaka			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4182		
54		Report on 2009-2010 Master's Program, "Water-related Disaster Management Course of Disaster Management Policy Program		Daisuke Kuribayashi	Kei Kudo	Shigenobu Tanaka			PWRI Technical Note	Public Works Research Institute	4190		

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1	Book	Large-scale Flood Report		Ali Chavoshian					ICHARM Book Series	ICHARM		1	207
2	Journal	Lessons learned from statistical comparison of flood impact factors among southern and eastern Asian countries		R. Osti	S. Hishinuma	K. Miyake	H. Inomata		Journal of Flood Risk Management	WileyInterscience	Vol.4, Issue 3	203	215
3		Development of reservoir control optimization simulator by integrating a distributed-rainfall-runoff-model and dynamic programming		Takahiro Sayama	Yasuto Tachikawa	Hiroki Kanno	Kaoru Takara		Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol. 29	33	45
4		How much water can a watershed store?		Takahiro Sayama	Jeffrey J. McDonnell	Amod Dhakal	Kate Sulivan		Hydrological Processes	John Wiley & Sons, Ltd	Vol. 25, Issue 25	3899	3908
5		Prediction and assessment of multiple glacial lake outburst floods scenario in Pho Chu River Basin, Bhutan		R. Osti	Shinji Egashira	Adikari Yoganath			Hydrological Processes	John Wiley & Sons, Ltd	Vol. 27, Issue 2	262	274
6		Rainfall-runoff-inundation analysis of the 2010 Pakistan flood in the Kabul River Basin		Takahiro Sayama	Go Ozawa	Takahiro Kawakami	Seishi Nabesaka	Kazuhiko Fukami	Hydrological Science Journal	IAHS	Vol. 57, Issue 2	298	312
7		Driftwood deposition from debris flows at slit-check dams and fans		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Natural Hazards	Springer	Vol. 61, Issue 2	577	602
8		Assessment of flood hazard, vulnerability and risk of mid-eastern Dhaka using DEM and 1D hydrodynamic model		Muhammad Masood	Kuniyoshi Takeuchi				Natural Hazards	Springer	Vol. 61, Issue 2	757	770
9		Causes of catastrophic failure of Tam Pokhari moraine dam in the Mt. Everest region		R. Osti	Tara Nidhi Bhattarai	Katsuhito Miyake			Natural Hazards	Springer	Vol. 58, Issue 3	1209	1223
10	Paper	X-band MPレーダーとC-bandレーダーを併用した 降雨推定手法の開発 QPE BY COMBINED USE OF X-BAND MP RADAR AND CONVENTIONAL C-BAND RADAR FOR SEAMLESS RAINFALL DISTRIBUTION		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	深見和彦 Kazuhiko Fukami			土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vo. 68, No.4	349	354
11		インダス川全流域を対象とした2010年パキスタン洪水の降雨流出氾濫解析 RAINFALL-RUNOFF-INUNDATION ANALYSIS OF PAKISTAN FLOOD 2010 FOR THE ENTIRE INDUS RIVER BASIN		佐山敬洋 Takahiro Sayama	藤岡 奨 Susumu Fujioka	牛山朋來 Tomoki Ushiyama	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	土木学会　水工学論文集 Journal of Hydroscience and Hydraulic Engineering	Japan Society of Civil Engineering	Vol.68, No.4,	493	498
12		X-band MPレーダー情報を用いたC-bandレーダー降水強度の改善手法の開発 A method to improve C-band radar rainfall by utilizing X-band MP radar information		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		河川技術論文集 Advances in River Engineering, JSCE	Japan Society of Civil Engineering	17	11	16
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14		気候変動による世界の水需給変化と社会的影響予測 Predicted World Water Supply and Demand Changes and Social Effects Attributable to Climate Change		三石真也 Shinya Mitsuishi	唐澤仁士 Hitoshi Karasawa	新井勝明 Katsuaki Arai			水文・水資源学会誌 Journal of Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources	VOL.25 NO.2	103	112
15		Analysis of Hydrodynamic Characteristics of Potential Outburst Floods from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		Nepal Engineers' Association Japan Center (NEA-JC) Newsletter	Nepal Engineers' Association Japan Center (NEA-JC)	Vol. 5, No. 1	10	14

16	Abstract	GCMの極端および月降水量の同時バイアス補正手法の全球陸域への適用 An application of a statistical bias correction to express both seasonal pattern and extremes to GCM precipitation on the land surface of the globe		長谷川聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	43	43
17		2010 年7 月5 日に発生した板橋豪雨の数値シミュレーション Numerical simulation of severe rainfall in Itabashi on 5 July 2010		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuiro Yorozuya	菅野裕也 Yuya Kanno	深見和彦 Kazuhiko Fukami		2011年度日本気象学会春季大会 The 2011 Spring meeting of Meteorological Society of Japan	社団法人　日本気象学会 Meteorological Society of Japan	100	67	67
18		MRI-AGCM3.1Sおよび3.2Sにおける気候変動に伴う日降水量の変化と統計的バイアス補正 Daily Precipitation change in MRI-AGCM simulations associated with climate change and a statistical bias correction aimed to reproduce both seasonal pattern and extreme values		長谷川　聡 Akira Hasegawa	猪股広典 Hironori Inomata	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami		極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		8	8
19		全球における気候変動に伴う洪水リスクの影響評価 Global-scale Assessment of Flood Disaster Risk under Climate Change		郭栄珠 Youngjoo Kwak	竹内邦良 Kuniyoshi Takeuchi	深見和彦 Kazuhiko Fukami			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		27	27
20		特定脆弱地域における気候変化に伴う洪水変化の影響評価 Evaluation of the Impact caused by Flood Situation Change along with Climate Change in Specific Vulnerable Areas		竹内邦良 Kuniyoshi Takeuchi	三宅且仁 Katsuhito Miyake	中須正 Tadashi Nakasu			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		28	28
21		超高解像度大気モデルMRI-AGCM3.1SならびにCMIP3 AOGCMsによる渇水の将来変化予測 Future Global Drought Changes Projected by MRI-AGCM3.1S and CMIP3 AOGCMs		菱沼志朗 Shiro Hishinuma	竹内邦良 Kuniyoshi Takeuchi	佐山敬洋 Takahiro Sayama			極端気象現象とその気候変動による影響評価に関するシンポジウム(II) Symposium on Extreme Weather and Impact Assessments (II)	文部科学省 Ministry of Education, Culture, Sports, Science and Technology		29	29
22		山地流域における雨水貯留と流出機構に関する研究 Watershed storages and runoff processes in mountainous river basins		Takahiro Sayama	Jeffrey J. McDonnell				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		2	3
23		Global-scale Assessment of Flood Disaster Risk under Climate Change		Youngjoo KWAK	Fukami Kazuhiko	Kuniyoshi Takeuchi			水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		92	93
24		Global Drought Changes Projection by MRI-AGCM3.1S and Other AOGCMs		Shiro Hishinuma	Kuniyoshi Takeuchi				水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		94	95
25		Identifying Physical Components to Compose Flood Vulnerability Index Considering Micro-Topographical Effect		Shigenobu Tanaka	Katsuhito Miyake	Youngjoo Kwak	Shigenobu Hibino		水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		168	169
26		Development of Early Warning System based on IFAS		Seishi NABESAKA	Takahiro KAWAKAMI	Mamoru MIYAMOTO	Kazuhiko FUKAMI	Katsuhito MIYAKE	水文・水資源学会2011年度研究発表論文集 Proceedings of 2011 Annual Conference, Japan Society of Hydrology and Water Resources	水文・水資源学会 Japan Society of Hydrology and Water Resources		234	235
27		インダス川全流域を対象とした2次元降雨流出氾濫解析 Rainfall-Runoff-Inundation Analysis in the Indus River Basin		佐山敬洋 Takahiro Sayama	鍋坂誠志	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	171	171
28		WRF による再現雨量を用いたパキスタン・カブール川洪水シミュレーション Streamflow simulation for Kabul River basin flood, Pakistan, by using forecast rainfall by WRF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	深見和彦 Kazuhiko Fukami			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	II	179	179
29		津波災害からの復興過程と地域社会：三陸沿岸部の高地移転	Restoration from the tsunami disaster and local communities: Relocation to higher ground in Sanriku coastal areas	中須正 Tadashi Nakasu	田中茂信 Shigenobu Tanaka	三宅且仁 Katsuhito Miyake			第66回　土木学会　年次学術講演会 The 66th JSCE annual meeting	Japan Society of Civil Engineering	IV	67	68
30		On Tsunami Elevation Variation in Narrow Bays During the East Japan Great Tsunami Disaster 3.11 Event		Dinar Istiyanto	Shigenobu Tanaka	Yoshikazu Shimizu	Katsuhito Miyake		JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		103	106
31		Assessment of Future Changes in Precipitation and Discharge in Motagua River Basin Using High Resolution Climate Model		Rodrigo Fernandez	Shigenobu Tanaka				JSCE 13th Int Summer Symposium	Japan Society of Civil Engineering		111	114
32		A Comparative Study on Disaster Recovery Process : Disaster Recovery Begins before the Disaster		Tadashi Nakasu	Kuniyoshi Takeuchi				5th International Conference on Flood Management (ICFM5)	ICFM5		23	23

33	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	5th International Conference on Flood Management (ICFM5)	ICFM5		117	117
34	Proposal of water discharge measureemnt with ADCP in mountainous area and accuracy evaluation methods		Shoji Okada	Atsuhiro Yorozuya	Takashi Kitsuda	Kazuhiko Fukami		5th International Conference on Flood Management (ICFM5)	ICFM5		147	147
35	FLOOD FORECASTING AND RIVER FLOW MODELING IN MOUNTAINOUS BASIN WITH SIGNIFICANT CONTRIBUTION OF SNOWMELT RUNOFF		Amin Nazari	Nasiri Saleh	Ali Chavoshian			5th International Conference on Flood Management (ICFM5)	ICFM5		151	151
36	NUMERICAL PREDICTION OF FLOOD RAINFALL IN PAKISTAN		Tomoki Ushiyama	Takahiro Sayama	Yuya Tatebe	Susumu Fujioka	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		155	155
37	Automatic water discharge measurement for mountainous areas		Atsuhiro Yorozuya	Kazuhiko Fukami	Kazunori Odaira			5th International Conference on Flood Management (ICFM5)	ICFM5		157	157
38	Large Scale Rainfall-Runoff-Inundation Analysis in the Indus River Basin		Takahiro Sayama	Susumu Fujioka	Tomoki Ushiyama	Yuya Tatebe	Kazuhiko Fukami	5th International Conference on Flood Management (ICFM5)	ICFM5		160	160
39	Nation-wide Flood Risk Assessment Using Inundation Level Model and MODIS Time-series Images		Youngjoo KWAK	Jonggeol Park	Fukami Kazuhiko			IEEE-IGARSS 2011	IEEE		4395	4398
40	A New Assessment Methodology for Flood Risk: A Case Study in the Indus River Basin Risk in Water Resources Management		Youngjoo KWAK	Hasegawa Akira	Inomata Hironori	Jun Magome	Fukami Kazuhiko	Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	55	60
41	Determination of Inundation Area Based on Flood Hazard for a Global Water Risk Assessment		Jonggeol Park	Kwak Youngjoo				Risk in Water Resources Management (Proceedings of Symposium H03 held during IUGG2011)	IAHS	347	61	64
42	人工衛星情報の土砂災害への活用について Sediment-related Disaster through Satellite Observation		Yoshikazu SHIMIZU					GIS-Landslide Workshop 3	GIS-Landslid研究会		8	8
43	Assessment of Debris Flow and Flood Inundation Hazards from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	The IHP Symposium on Extreme Events "Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future"	Regional Steering Committee for Southeast Asia and the Pacific UNESCO IHP		1	12
44	Hydrodynamic Characteristics of Potential Outburst Flood from Tsho Rolpa Glacial Lake in the Rolwaling Valley of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	30th Annual Meeting of the Japan Society for Natural Disaster Science	Japan Society for Natural Disaster Science		89	90
45	Towards Better Mitigation of Tsunami Disaster in Indonesia		Dinar C. Istiyanto	Shigenobu Tanaka	Toshio OKAZUMI			International Symposium on Engineering Lessons Learned from the Giant Earthquake	JAEE		556	567
46	Meta and Longitudinal Analyses of High Death Rates of Some Particular Municipalities in GEJET		Tadashi NAKASU	Kuniyoshi Takeuchi	Shigenobu Tanaka	Ken Yoneyama	Naoki Fujiwara	Integrated Research on Disaster Risk (IRDR) Conference 2011	IRDR		15	15
47	Development of rainfall observation with C-band radar combining with X-band MP radar		Tomoki Ushiyama	Atsuhiro YOROZUYA	Yuya KANNO	Kazuhiko FUKAMI		International Symposium on Weather Radar and Hydrology (WRaH 2011)	Weather Radar and Hydrology (WRaH) Scientific Committee			
48	2010年7月5日に板橋区で発生した局地的豪雨の数値実験 Numerical simulation of severe rainfall in Itabashi on 5 July 2010		Tomoki Ushiyama					第13回非静力学モデルワークショップ The 13th nonhydrostatic model workshop	社団法人　日本気象学会 Meteorological Society of Japan			
49	QPE by combined use of X-band MP radar and conventional C-band radar for seamless rainfall distribution		Tomoki Ushiyama					X-band Weather Radar Workshop	Delft University of Technology			

50		Challenge for sustainable water management		A.W.Jayawardena					International Symposium on Advances in Civil and Environmental Engineering Practices for Sustainable Development (ACEPS-2012)	Faculty of Engineering, University of Ruhuna, Galle, Sri Lanka			
51		Development and Application of Flood Disaster Preparedness Indices		Tadashi NAKASU					Working Group of Hydrology of 44rd Annual Meeting of Typhoon Committee	44rd Annual Meeting of Typhoon Committee			
52		Identification of Tsunami Wave Energy Damping Process by Coastal Vegetation Belt at Laboratory Scale Model Experiment		Dinar C. ISTIYANTO	Karuniadi S. UTOMO	Shigenobu TANAKA	Katsuhito MIYAKE		International Sessions in Conference o n Coastal Engineering	Japan Society of Civil Engineering	Vol. 2		
53		Aftermath of the 3/11 tsunami in Tohoku Region of Japan		A.W.Jayawardena					6th International Conference on Asian and Pacific Coasts	University of Hong Kong			
54		Suggestion for an Advanced Early Warning System Based on Flood Forecasting in Bengawan Solo River Basin, Indonesia		Mamoru MIYAMOTO	Ai SUGIURA	Toshio OKAZUMI	Shigenobu TANAKA	Kazuhiko FUKAMI	10th International Conference on Hydroinformatics				
55		Pollution Loading Modeling of Nutrient Salts and Application to Small-scale Semi-urbanized Basin		Mamoru MIYAMOTO	Hemantha RAJAPAKSE	Kazuhiko FUKAMI			5th international perspective on water resource & the environment	ASCE	34		
56		Analysis of potential outburst flood from Tsho Rolpa Glacial Lake in the Himalaya of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa				7th NESAJ Knowledge Transfer Symposium	Nepalese Students' Association in Japan (NESAJ)			
57		Flood Risk Assessment Using Inundation Depth Model and ALOS Images: A Case Study In Kabul River, Pakisatn		Youngjoo KWAK	Akira HASEGAWA	Hironori INOMATA	Kazuhiko FUKAM		European Geosciences Union General Assembly 2011 (EGU2011)	EGU	vol. 13		
58		A Critical Cause Analysis of Human Loss Exacerbation Caused by the 2011 GEJET Disaster – The Case of Rikuzentakata City in Iwate Prefecture		Tadashi NAKASU					2012 Advanced Institute on Forensic Investigations of Disasters				
59		Internationalization of SABO- Importance, Concept, Evolution and Internalization		Adikari Yoganath					International Sabo Forum 2011				
60		Flood Management: a lesson to be learned from Arakawa river, Japan		Narayan P. Gautam					Revo Science	Revo Science Media			
61	Article, others	伊勢湾台風災害と災害対策基本法の成立:その意味と教訓(Typhoon Isewan Disaster and Disaster Countermeasures Basic Act: Their Meaning and Lessons)		Tadashi NAKASU	三宅且仁 Katsuhito Miyake	清水孝一 Yoshikazu Shimizu			水利科学 (Water Science)	社団法人 日本治山治水協会 Japan Society of forest conservation and flood control	Vol. 55	100	119
62		降雨予測を活用したダム洪水調節におけるリスク管理に関する研究 Research on Risk Management of Dam Flood Control by Utilizing Rainfall Prediction		三石真也 Shinya Mitsuishi	角 哲也 Tetsuya Sumi	尾関敏久 Toshihisa Ozeki	矢神卓也 Takuya Yagami		ダム工学 Journal of Japan Society of Dam Engineers	ダム工学会 Japan Society of Dam Engineers	Vol.21 No.4	242	250
63		貯水池の連携運用等による効率的な発電の実施に向けて	Implementation of effective power generation through integrated reservoir operation	三石真也 Shinya Mitsuishi	豊田忠宏 Tadahiro Toyoda	猪股広典 Hironori Inomata			ダム技術 Engineering for Dams	ダム技術センター Japan Dam Engineering Cecter	No.301	34	42
64		Lower Mekong Basin -Existing environment and development needs-		加本実 Minoru Kamoto	M. Juntopas				Human and Natural Environment for the Mekong River	TERRAPUB, Tokyo		25	42
65		Dynamics of hydrometeorological and environmental hazards, Environmental Hazards		A. W. Jayawardena					The Fluid Dynamics and Geophysics of Extreme Events, Lecture notes series, Institute for Mathematical Sciences	National University of Singapore	Vol. 21	229	267
66		Dynamics of Hydro-Meteorological and Environmental Hazards		A. W. Jayawardena					Asia Pacific Mathematics Newsletter	World Scientific Publishing	Volume 1 No 4	32	36

67		Chapter 8: Adaptation Measures for Climate Change in Japan		Toshio OKAZUMI	Eiji Otsuki				Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		125	129
68		Chapter 13: Integrated Flood Analysys System: An Efficient Tool to Imolement Flood Forecasting and Warning Systems		Kazuhiko Fukami	Tomonobu Sugiura	Go Ozawa	Jun Magome	Takahiro Kawakami	Climate Change in Asia and the Pacific – How can countries adapt?–	Asian Development Bank Institute		178	195
69		日本におけるADCPを用いた高水流量観測手法 Method of water discharge measurement during flood using Acoustic Doppler Current Profiler in Japan		萬矢敦啓 Atsuiro Yorozuya	岡田将治 Shoji Okada	橘田隆史 Takashi Kitsuda	深見和彦 Kazuhiko Fukami		河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	34	41
70		日本におけるADCPを用いた流量観測データの品質管理手法の考察 QUALITY-ASSURANCE PLAN FOR DISCHARGE MEASUREMENTS USING ADCP IN JAPANESE RIVERS		岡田将治 Shoji Okada	萬矢敦啓 Atsuiro Yorozuya	橘田隆史 Takashi Kitsuda			河川流量観測の新時代 A new era of river discharge observation	水文水資源学会流量観測高度化WG WG for advanced discharge observation, Japan Society of Hydrology and Water Resources	2	28	33
71		洪水時の流量観測手法における新しい動向	A new trend in discharge observation during flooding	深見和彦 Kazuhiko Fukami					地質と調査 Geology and Survey	(一社)全国地質調査業協会連合会 Japan Geotechnical Consultants Association	No.131	22	28
72		復興理論と東日本大震災	復興理論と東日本大震災	中須正 Tadashi Nakasu					雑誌河川 Monthly magazine "Rivers"	(公社)日本河川協会 Japan River Association	Vol. 68, No.1	94	99
73		大規模水災害の減災に向けて －低頻度大規模水災害への対応－	Countermeasures for infrequent large-scale flood	田中茂信 Shigenobu Tanaka					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		28	31
74		洪水流量観測手法における新しい潮流	A new trend for flood river flow discharge measurement techniques	深見和彦 Kazuhiko Fukami					土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center		14	17
75	PWRI Publication	Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		ICHARM					PWRI Technical Note	Public Works Research Institute	4215		
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	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	Report of the Project on Establishment of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			ESCAP/WMO Typhoon Committee	ESCAP/WMO Typhoon Committee		1	26
2	Journal	Future Changes in Low Precipitation Patterns Projected by the Super-high-resolution MRIAGCM3.1S and CMIP3 AOGCMs		Shiro HISHINUMA	Kuniyoshi TAKEUCHI				Hydrological processes	Wiley	Vol. 27, Issue 23	3319	3331
3		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lake		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Volume 10, Issue 3	299	313
4		Glacila and sediment hazards in the Rolwaling valley, Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Hao Zhang		International Journal of Erosion Control Engineering	Japan Society of Erosion Control Engineering	Vol.5, No.2	123	133
5		Changes in Flood Risk under Global Warming Estimated Using MIROC5 and the Discharge Probability Index		Atsushi Okazaki	Pat YEH	Kei Yoshimura	Masahiro Watanabe	Masahide Kimoto	Journal of the Meteorological Society of Japan	Meteorological Society of Japan	Vol. 90, No. 4	509	524
6	Paper	Effect of density of gauges on accuracy of merged GSMAP: case study of typhoon Morakot		Go OZAWA	Hironori INOMATA	Kazuhiko FUKAMI			IAHS Publication	International Association of Hydrological Sciences	357	350	356
7		A New Approach to Flood Risk Assessment in Asia-Pacific Region Based on MRI-AGCM Outputs		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Hydrological Research Letters	Japan Society of Hydrology and Water Resources	6	70	75
8		Climate change impact study on FLOOD Risk in lower West Rapti River basin using MRI-AGCM outputs		Edangodage Duminda Pradeep PERERA	Akiko HIROE	Kazuhiko FUKAMI	Toshiya UENOYAMA	Shigenobu TANAKA	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol. 69, No.4	451	456
9		Development of flood vulnerability indices for Lower Mekong Basin in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	Japan Society of Civil Engineers	Vol.69, No.5	1	6
10		ALOS(だいち)合成開口レーダーを用いた崩壊地抽出手法と適用性 Applicability of methods for detecting landslides by using synthetic aperture radar of ALOS(Daichi)		林真一郎 Shin-ichiro Hayashi	水野正樹 Masaki Mizuno	小山内 信智 Nobutomo Osanai	西真佐人 Masato Nishi	清水孝一 Yoshikazu Shimizu	砂防学会誌 Journal of Japan Society of Erosion Control Engineering	砂防学会 Japan Society of Erosion Control Engineering	Vol. 65, No.4	3	14
11		タイにおける洪水災害に対する地域防災力評価指標の開発：ウボンラーチャタニー及びハートヤイの事例を中心に (Development of Flood Disaster Preparedness Indices (FDPI) in Thailand :Focus on the Cases of Ubon Rachathani and Hat Yai)		中須正 Tadashi Nakasu	岡積敏雄 Toshio Okazumi	清水孝一 Yoshikazu Shimizu			年報 タイ研究 The Journal of Thai Studies	日本タイ学会(The Japanese Society of Thai Studies)	12	65	81
12		記憶と解放、記憶と伝承ーインドネシア・アチェの津波経験を踏まえてー Memory and Release, Memory and Lore through tsunami disaster experience in Aceh, Indonesia		杉本めぐみ Megumi Sugimoto					情報知識学会誌 Journal of Japan Society of Information and Knowledge	情報知識学会 Japan Society of Information and Knowledge	Vol. 22, No.4	355	364
13		The Multiple Contributions of Dams and Reservoirs after the 2011 Great East Japan Earthquake		Toshio Okazumi	NAKANE, Tatsuto	KAMADAI, Takeshi	FUKUWATARI, Takashi		International Symposium on DAMS FOR A CHANGING WORLD	Organizing Committee, ICOLD 2012 Kyoto, JAPAN COMISSION ON LARGE DAMS		2-87	2-92
14	Abstract	LETKFを用いた2010年7月5日豪雨の再現実験 Forecast experiment of severe rainfall in 5 July 2010 by using LETKF		牛山朋來 Tomoki Ushiyama	深見和彦 Kazuhiko Fukami				日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	314	314

15	2010年パキスタン洪水をもたらした豪雨のダウンスケール再現実験 Forecasting experiment for severe rainfall causing Pakistan flood in 2010.		牛山朋來 Tomoki Ushiyama	Atif Rana Muhammad	佐山 敬洋 Takahiro Sayama	建部 祐哉 Yuya Tatebe	藤岡 奨 Susumu Fujioka	日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	379	379
16	OTT ParsivelとJoss-Waldvogelディスドロメータの雨滴粒径分布検証 Evaluation of raindrop size distribution observed by OTT Parsivel and Joss-Waldvogel disdrometer		牛山朋來 Tomoki Ushiyama	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	101	450	450
17	統計的バイアス補正されたMRI-AGCM3.2Hの降水量の気候変化 A Statistical Bias-Corrected Precipitation Change of MRI-AGCM3.2H due to Climate Change		長谷川聡 Akira Hasegawa	深見和彦 Kazuhiko Fukami	田中茂信 Shigenobu Tanaka			日本気象学会2012年度春季大会予稿集 Proceedings of the 2012 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	102	548	548
18	Prediction of potential outburst floods from Tsho Rolpa Glacial Lake of Nepal		Badri Bhakta Shrestha	Hajime Nakagawa	Toshio Okazumi	Kenji Kawaike	Yasuyuki Baba	第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-031	61	62
19	MODIS時系列データによる広域の洪水氾濫域抽出：タイ国チャオプラヤ川流域2011洪水の事例 Detection of large flood inundation area using MODIS time series: A Case study of 2011 flood in Chao Praya River basin		郭 栄珠 Youngjoo Kwak	萬矢敦啓 Atsuhiro Yorozuya	深見和彦 Kazuhiko Fukami			第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS4-049	97	98
20	東北地方太平洋沖地震津波による過去の津波記念碑の被害と災害教訓の伝承	Tsunami damage to monuments of past tsunamis during the 2011 off the Pacific coast of Tohoku earthquake and lessons from the disaster to learn and to pass on to future generations	杉本めぐみ Megumi Sugimoto	岡積敏雄 Toshio Okazumi				第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	Japan Society of Civil Engineers	CS10-019	37	38
21	ネパール西ラプティ川において気候変動が洪水流出量に与える影響の検討	Study on the effect of climate change on flood discharge of the West Rapti River in Nepal	廣江亜紀子 Akiko Hiroe	深見和彦 Kazuhiko Fukami	上野山智也 Toshiya Uenoyama	長谷川聡 Akira Hasegawa		第67回土木学会年次学術講演会 The 67th Annual Meeting of the Japan Society Civil Engineers	土木学会 Japan Society of Civil Engineers		139	139
22	海外における広域土砂災害危険度推定の試み －衛星観測降雨情報を用いて－	Application of wide-area landslide prediction to overseas cases － Using satellite rainfall information －	清水孝一 Yoshikazu Shimizu	Badri Shrestha	岡積敏雄 Toshio Okazumi	小山内　信智 Nobutomo Osanai	石塚忠範 Tadanori Ishizuka	日本災害情報学会　第14回研究発表大会 The 14th meeting of Japan Society for Disaster Information Studies	日本災害情報学会 Japan Society for Disaster Information Studies	14	320	323
23	デジタル地形情報の洪水氾濫解析への利用～ICHARMにおける取り組み～	Applications of digital topographical information to flood and inundation analysis －researches at ICHARM－	深見和彦 Kazuhiko Fukami					平成24年度特別講演およびシンポジウム予稿集 Proceedings of the 2012 meeting of Japan Society of Engineering Geology	一般社団法人　日本応用地質学会 Japan Society of Engineering Geology		38	46
24	衛星観測雨量を用いた土砂災害の危険度推定に関する研究 Study on prediction of landslides through the satellite rainfall data		清水孝一 Yoshikazu Shimizu					第4 回GIS-Landslide and Natural Hazard 研究集会 The 4th meeting of the GIS-Landslide and Natural Hazard study group	GIS-Landslide 研究会 GIS-Landslide study group			
25	衛星観測雨量を用いた海外における土砂災害の危険度評価に関する可能性	Applicability of landslide prediction using satellite rainfall data to overseas cases	清水孝一 Yoshikazu Shimizu					2012東京大学空間情報科学研究センター　全国共同利用研究発表会 The 2012 national meeting on joint usage and research	東京大学空間情報科学研究センター Center for Spatial Information Science, the University of Tokyo		8	8
26	Early warning and early evacuation from tsunamis, floods, volcano and other hazards		Megumi Sugimoto	Toshio Okazumi				American Geophysical Union 2012 Fall meeting	American Geophysical Union			
27	SUGGESTION FOR AN ADVANCED EARLY WARNING SYSTEM BASED ON FLOOD FORECASTING IN BENGAWAN SOLO RIVER BASIN, INDONESIA		Mamoru Miyamoto	Ai Sugiura	Toshio Okazumi	Shigenobu Tanaka	Seishi Nabesaka	Proceedings of 10th International Conference on Hydroinformatics	IWA IAHR	10	－	－
28	Estimation of flood volume in Chao Phraya river basin, Thailand from MODIS images coupled with flood Inundation level		Kwak Youngjoo	Jonggeol Park	Atsuhiro Yorozuya	K. Fukami		the 32nd annual IGARSS symposium 2012	IEEE Geoscience and Remote Sensing Society		887	890
29	Assessment of Flood Risk and Future Change due to Climate Change in Asia-Pacific Region Based on MRI-GCM Model		Kwak Youngjoo	K. Takeuchi	K. Fukami	J. Magome		Geophysical Research Absract	EGU General Assembly	14	－	－
30	Application of a Distributed Hydrological Model in the Karun River Basin, Iran		Shiro HISHINUMA					IAHS PUB symposium 2012	IAHS			

31		A study of ground-based, satellite-estimated and radar rainfall relationships at downstream of Shinano River, Japan		Narayan P. Gautam					4th TRMM and GPM International Science Conference	JAXA and NASA			
32	Article, others	Prediction of potential outburst floods from glacial lake due to moraine dam failure		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Floods: from Risk to Opportunity	IAHS Red book Series, IAHS	Vol.57	241	252
33		巨大津波後のアウターライズでの地震から露呈した津波防災の課題とまだ隠れている課題	Issues on tsunami disaster management exposed by outerrise earthquakes after the mega tsunamis and other hidden issues	杉本めぐみ Megumi Sugimoto					巨大津波災害に関する合同研究集会 Joint meeting on mega tsunami disasters				
34		生きる防災　アチェの誓い―津波被害のインドネシアで調査・教育に奔走―	Practical disaster management: Promise of Aceh – Strong commitment to research and education in tsunami-ridden Indonesia –	杉本めぐみ Megumi Sugimoto					日本経済新聞2012年12月25日 Nihon Keizai Shimbun (Dec. 25, 2012) *a Japanese newspaper	日本経済新聞 Nihon Keizai Shimbun Inc.		32	
35		水文・水理現象に関する調査 Investigation on Hydrology and Hydraulics		深見和彦 Kazuhiko Fukami	吉谷純一 Junichi Yoshitani				雑誌河川2012年9月号 Monthly magazine "Rivers" (Sep. 2012)	(公社)日本河川協会 Japan River Association	No.794	16	19
36		総合洪水解析システム(IFAS)による水文データ不足流域における洪水予測	Flood forecasting in poorly-gauged river basin using Integrated Flood Analysis System (IFAS)	深見和彦 Kazuhiko Fukami					2012年度(第48回)水工学に関する夏期研修会講義集 Proceedings of the 2012 summer meeting on hydraulic engineering	土木学会水工学委員会・海岸工学委員会 Coastal engineering committee of hydraulic committee, JSCE	48	A-2-1	A-2-19
37		災害調査と東日本大震災	Disaster Research and Great East Japan Earthquake and Tsunami Disaster	中須正 Tadashi Nakasu					社会と調査 Society and Survey	有斐閣 Yuhikaku Publishing Co., LTD.	12	64	69
38		工業団地の設立と新しいリスクマネジメント:2011年タイ、チャオプラヤ川洪水における連鎖的経済被害と地域社会	Development of industrial parks and new risk management: Chain reaction of economic damage during the 2011 Chao Phraya flood in Thailand and local communities	中須正 Tadashi Nakasu	Munetaka Kurahara				都市社会研究 Research on urban society	せたがや自治政策研究所 Setagaya center for policy studies	5	159	168
39	PWRI Publication	2011-2012修士課程「防災政策プログラム「水災害リスクマネジメントコース」実施報告書 Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		栗林大輔 Daisuke Kuribayashi					土木研究所資料第4245号 PWRI Technical Note No. 4245	土木研究所 Public Works Research Institute	4245		
40		洪水災害準備体制指標の開発 Development of Flood Disaster Preparedness Indices (FDPI)		中須正 Tadashi Nakasu	Toshio Okazumi	Yoshikazu Shimizu			土木研究所資料第4245号 PWRI Technical Note No. 4246	土木研究所 Public Works Research Institute	4246		
41		Development of Flood Disaster Preparedness Indices (FDPI)		Tadashi NAKASU	Toshio Okazumi	Yoshikazu Shimizu			Technical note of PWRI No.4247	Public Works Research Institute	4247		
42		Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi					Technical note of PWRI No.4251	Public Works Research Institute	4251		

ICHARM Publication List FY2013

	Category	Title	Title (Tentative English ver.)	1st Author	2nd Author	3rd Author	4th Author	5th Author	Books, Conference	Publisher, Conference organizer	Vol.	Start page	End page
1	Book	IAHS Red Book on "Floods: From Risk to Opportunity"		Ali Chavoshian	Kuniyoshi TAKEUCHI					IAHS	357		
2	Journal	Method for evaluating flood disaster reduction measures in alluvial plains		K. Taki	T. Matsuda	E. Ukai	T. Nishijima	S. Egashira	Journal of Flood Risk Management	Wiley	Vol.6	210	218
3		Reply to comment by Henriette I. Jager and Ryan McManamay on "Cumulative biophysical impact of small and large hydropower development in Nu River, China"		Kelly Kibler	Desiree Tullos				Water Resources Research	Wiley	49		
4		International comparison of measures taken for vulnerable people in disaster risk management laws		Karina Vink	Kuniyoshi TAKEUCHI				International Journal of Disaster Risk Reduction	Elsevier	4	63	70
5		Glacial hazards in the Rolwaling valley of Nepal and numerical approach to predict potential outburst flood from glacial lak		Badri Bhakta Shrestha	Hajime Nakagawa	Kenji Kawaike	Yasuyuki Baba	Hao Zhang	Landslides	Springer	Vol.10	299	313
6		Approach to estimate the flood damage in Sukhothai Province using flood simulation		Anurak Sriariyawat	Kwanchai Pakoksung	Takahiro Sayama	Shigenobu Tanaka	Sucharit Koontanakulvong	Journal of Disaster Research	Fuji Technology Press	Vol. 8, No. 3	406	414
7		Numerical simulation of 2010 Pakistan flood in the Kabul River basin by using lagged ensemble rainfall forecasting		Tomoki Ushiyama	Takahiro Sayama	Susumu Fujioka	Yuya Tatebe	Kazuhiko Fukami	Journaof of Hydrometeorology	American Meteorological Society	15	193	211
8		Influence of Jamuna Bridge on River Morphology		Atsuhiro Yorozuya	Md.S. Islam	M. Kamoto	S. Egashira		Advances in River Sediment Research	Taylor & Francis Group		299	308
9		Influence of river bed evolution on inundation processes at Narayani River in Nepal		Atsuhiro Yorozuya	Krishna Prasad Rajbanshi	S. Egashira			Advances in River Sediment Research	Taylor & Francis Group		2043	2048
10		Effect of contemporary forest harvesting practices on headwater stream temperatures: Initial response of the Hinkle Creek catchment, Pacific Northwest, USA		Kelly Kibler	Arne Skaugset	Lisa Ganio	Manuela Huso		Journal of Forest Ecology and Management	Elsevier	310	680	691
11		Biophysical, Socioeconomic, and Geopolitical Vulnerabilities to Hydropower Development on the Nu River, China		Desiree Tullos	Eric Foster-Moore	Darrin Magee	Aaron Wolf	Kelly Kibler	Ecology and Society	Resilience Alliance	Vol. 18, No. 3	–	–
12		Flood vulnerability assessment in the light of rice cultivation characteristics in Mekong River flood plain in Cambodia		Toshio OKAZUMI	Shigenobu TANAKA	Youngjoo KWAK	Badri Bhakta SHRESTHA	Ai SUGIURA	Paddy and Water Environment	Springer	–	–	–
13		Investigating the impact of climate change on future runoff of river Satluj		Narayan P Gautam	Manohar Arora	N.K. Goel	A.R.S. Kumar		Journal of Hydrology and Meteorology	SOHAM-Nepal	Vol. 8	10	21
14	Paper	2011年タイ洪水を対象にした緊急対応の降雨流出氾濫予測 An Emergency Response-Type Rainfall-Runoff-Inundation Prediction for 2011 Thailand Flood		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	萬矢敦啓 Atsuhiro Yorozuya	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 1	14	29
15		レーダ雨量の不確実性を反映した降雨場の生成に関する研究	Stochastic rainfall field generation representing uncertainty in radar rainfall estimates	藤岡奨 Susumu Fujioka	佐山敬洋 Takahiro Sayama	三浦祐司 Yuji Miura	越田智喜 Tomoki Koshida	深見和彦 Kazuhiko Fukami	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_319	I_324

16		チャオプラヤ川流域における長期降雨流出氾濫解析	Long-term analysis of rainfall, runoff and inundation over the Chao Phraya River basin	建部祐哉 Yuya Tatebe	佐山敬洋 Takahiro Sayama	牛山朋来 Tomoki Ushiyama	藤岡奨 Susumu Fujioka	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_457	I_462
17		大規模洪水氾濫の時空間起源分析に関する研究 Analysis on Spatio-Temporal Sources of Large-scale Flooding		佐山敬洋 Takahiro Sayama	建部祐哉 Yuya Tatebe	藤岡奨 Susumu Fujioka	牛山朋来 Tomoki Ushiyama	田中茂信 Shigenobu Tanaka	土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_463	I_481
18		河床変動及び強風を伴う河川表面流速の特性と風による影響の補正に関する検討 STUDY ON CHARACTERISTIC OF SURFACE VELOCITY IN RIVERS WITH RIVER BED CHANGE AND STRONG WIND AND REVISION OF WIND EFFECT		本永良樹 Yoshiki Motonaga					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_745	I_750
19		氾濫解析のためのPRISM DSMの活用とGPSを用いたその修正方法に関する研究 Study on PRISM DSM Application to inundation analysis and its modification method		萬矢敦啓 Atsuhiro Yorozuya					土木学会 水工学論文集B1 Journal of JSCE, Ser. B1 (Hydraulic Engineering)	土木学会 Japan Society of Civil Engineers	Vol. 69, No. 4	I_1549	I_1554
20		途上国へ適用可能な洪水リスク評価技術(総説) Applicable Methodologies for Flood Risk Assessment in the River Basin in Developing Countries		岡積敏雄 Toshio Okazumi	田中茂信 Shigenobu Tanaka				河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	17	20
21		メコン川下流域を対象にした家屋洪水被害推定手法の検証 Validation of a method for estimating flood damage to houses in the Lower Mekong Basin		上米良 秀行 Hideyuki Kamimera					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	51	56
22		異なる河床変動特性に応じた流速補正係数に関する考察 STUDY ABOUT VELOCITY INDEX ABOVE DIFFERENT RIVERBED CONDITION		本永良樹 Yoshiki Motonaga					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	195	198
23		アンサンブルカルマンフィルターを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using EnKF		牛山朋来 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	319	324
24		人工衛星データを用いた洪水氾濫水位の算出手法の検討～メコン川下流域を例として～ Study about Estimation of Water Surface Elevation on Inundated Area Applying Satellite Based Information		萬矢敦啓 Atsuhiro Yorozuya					河川技術論文集 Advances in River Engineering, JSCE	土木学会 Japan Society of Civil Engineers	19	341	344
25		Monthly adjustment of Global Satellite Mapping of Precipitation (GSMaP) data over the VuGia-ThuBon River basin in central Vietnam using an artificial neural network		T. Ngo-Duc	J. Matsumoto	H. Kamimera			Hydrological Research Letters	Japan Society of Hydrology and Water Resources	7	85	90
26	Abstract	WRF-LETKFを用いた2011年台風12号・15号の降雨流出予測実験 Rainfall and streamflow forecasts in typhoon Talas and Roke, 2011, by using WRF-LETKF		牛山朋来 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	日本気象学会2013年度春季大会予稿集 Proceedings of the 2013 Spring meeting of Meteorological Society of Japan	日本気象学会 Meteorological Society of Japan	103	344	344
27		衛星雨量による土砂災害の危険度推定に関する事例研究 Feasibility study on prediction of sediment-related disaster risk by the satellite rainfall data		清水孝一 Yoshikazu Shimizu	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			第52回日本地すべり学会研究発表会講演集 Proceedings of the 52nd meeting of Japan Landslide Society	(公社) 日本地すべり学会 Japan Landslide Society		58	59
28		衛星観測降雨の土砂災害への適用に関する基礎的検討 Fondamental study on prediction of sediment-related disaster risk by the Satellite rainfall data		Yoshikazu SHIMIZU	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha			平成25年度砂防学会研究発表会概要集B Proceedings of the 2013 meeting of Japan Society of Erosion Control Engineering	(公社) 砂防学会 Japan Society of Erosion Control Engineering		B210	B211
29		インドネシア国アンボン島の天然ダム決壊災害の減災はなぜ成功したか Good practice on evacuation from landslide dam break desaster on Ambon island, Indonesia		清水孝一 Yoshikazu Shimizu	森田耕司 Koji Morita	岡積敏雄 Toshio Okazumi			第5回GIS-Landslide研究集会 The 5th meeting of GIS-Landslide study group	GIS-Landslide研究集会 GIS-Landslide study group			
30		Importance of riverbed evolution in predicting inundation process		Shinji EGASHIRA	A. Yorozuya	E. K. P. Rajbanshi			Proc. HYDRO 2013 International	Indian Institute of Technology (IIT) Madras		646	654
31		Minimizing geopolitically ungauged catchment area of transboundary river basins to support disaster risk reduction		Kelly Kibler					7th Global FRIEND-Water Conference: Hydrology in a Changing World: Environmental and Human Dimensions	UNESCO-IHP, etc.	363		
32		Prediction on sediment related disaster through the satellite rainfall data		Yoshikazu SHIMIZU	Toshio OKAZUMI	Tadanori ISHIZUKA			USMCA 2013	USMCA2013			

33		Ensemble forecasts of rainfall and discharge in Japan for typhoon TALAS and ROKE in 2011 using EnKF		牛山朋來 Tomoki Ushiyama	佐山敬洋 Takahiro Sayama	藤岡奨 Susumu Fujioka	建部祐哉 Yuya Tatebe	深見和彦 Kazuhiko Fukami	AOGS2013	AOGS			
34		Assessment of Flood Hazards and Vulnerability in Cambodian Floodplain		Badri Bhakta Shrestha	Toshio Okazumi	Shigenobu Tanaka	Ai Sugiura	Youngjoo Kwak, Shigenobu Hibino	6th International Conference on Water Resources and Environment Research	German research programme KLIWAS and the European sediment network SedNet			
35		Lessons Learnt From Two Unprecedented Disasters in 2011: Great East Japan Earthquake and Tsunami in Japan and Chao Phraya River flood in Thailand		Toshio OKAZUMI	Tadashi NAKASU	Megumi SUGIMOTO	Yoganath ADIKARI		Global Assessment Report on Disaster Risk Reduction 2013	UNISDR			
36	Article, others	Numerical Approach to Analyze Natural Dam Failure by Seepage Flow		Badri Bhakta Shrestha					NEA-JC Newsletter	Nepal Engineers' Association, Japan Center	Vol.6	13	18
37		世界の大規模洪水を監視・予測する先端技術 -2011年タイ洪水を事例に-	Advanced technology for monitoring and forecasting large-scale floods around the world - Application to the 2011 Thai flood -	佐山敬洋 Takahiro Sayama					河川文化 River culture	(公社)日本河川協会 Japan River Association	39	93	127
38		光学衛星画像による大規模崩壊の土砂移動状況の経年把握	The yearly monitoring of sediment movement by optical satellite images after a large-scale collapse	水野正樹 Masaki Mizuno	江川真史 Masafumi Ekawa	清水孝一 Yoshikazu Shimizu	筒井 健 Ken Tsutsui		土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-12	38	41
39		アジア開発銀行との連携協定による地域技術協力プロジェクト (ADB TA7276)最終報告	Final report on the ADB-ICHARM regional technical assistance project (ADB TA7276)	日比野繁信 Shigenobu Hibino	岡積敏雄 Toshio Okazumi	バドリ・シュレスタ Badri Shrestha	鍋坂誠志 Seishi Nabesaka	宮本守 Mamoru Miyamoto	土木技術資料 Civil engineering journal	土木研究センター Public Works Research Center	55-6	38	43
40	PWRI publication	Report on 2012-2013 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"		Daisuke Kuribayashi	Minoru Kamoto	Shun Kudo			PWRI Technical Note	Public Works Research Institute	4278		
41		2012-2013 修士課程「防災政策プログラム 水災害リスクマネジメントコース」実施報告書	Project report on the 2012-2013 Water-related Disaster Management Course of Disaster Management Policy Program	栗林 大輔, Daisuke Kuribayashi	加本実 Minoru Kamoto	工藤俊 Shun Kudo			土木研究所資料 PWRI Technical Note	土木研究所 Public Works Research Institute	4271		

2014.2.25

ICHARM Program (draft)
-Submitted to 1st ICHARM Governing Board-

1. Mission of ICHARM

The mission of ICHARM is to serve as the Global **Centre of Excellence** for Water Hazard and Risk Management by, inter alia, observing and analyzing natural and social phenomena, developing methodologies and tools, building capacities, creating knowledge networks, and disseminating lessons and information in order to help governments and all stakeholders manage risks of water-related hazards at global, national, and community levels. The hazards to be addressed include floods, droughts, landslides, debris flows, tsunamis, storm surges, water contamination, and snow and ice disasters.

We envision a Center of Excellence housing a group of leading people, superior facilities, and a knowledge base which enables conducting i) innovative research, ii) effective capacity building, and iii) efficient information networking. Based on these three pillars, ICHARM will globally serve as a knowledge hub for best national/local practices and an advisor in policy making.

2. Long-term Programme (around 10 years)

ICHARM will engage in the following activities in order to fulfill the Mission, keeping in mind *localism*, a principle that takes into account local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends:

(i) Innovative research

High-quality research outcomes and a wide scope of knowledge relevant to water-related risk management establish ICHARM as a global leader and resourceful partner for promoting water-related risk management world-wide.

(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.

(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.

(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.

(ii) Effective capacity building

Local capacity is essential to sound management of water-related risks. Through provision of cutting-edge training which emphasizes development and application of advanced knowledge and

solutions, ICHARM supports a global network of exemplary practitioners of water-related hazard and risk management.

(4) Foster the development of solution-oriented practitioners 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.
(5) 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.

(iii) Efficient information networking

ICHARM's broad knowledge base and primary research findings support powerful and comprehensive opinions which guide water-related hazard and risk management solutions from global to local scales.

(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.
(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.

3. Mid-term Programme (around 5 years)

In order to achieve the mission above, we will focus ICHARM activities in the next 5 years to:

(i) Innovative research:

(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.

Flood observation: River discharge and river-bed dynamics during flood events are often not adequately or accurately measured. ICHARM will conduct monitoring and validation of river-bed dynamics and river-bed roughness coefficients for more systematic basin-wide flood management. Towards this goal, ICHARM will develop an automatic observation system for river discharge which simultaneously monitors water depth, flow velocity, and discharge. Particularly for areas where ground observation of river conditions is difficult, ICHARM will pioneer and validate new technology for satellite image analysis capable of identifying potential inundation extent and affected houses.

Flood prediction and analysis: ICHARM will upgrade its Integrated Flood Analysis System (IFAS) to better simulate evapotranspiration, multiple-dam operations and snow melt. With this enhanced flexibility and accuracy, IFAS will be applied to flood forecasting and water resources management both in and outside Japan, including at the Japanese Common Modeling Platform (Common MP) for water-material circulation analysis by MLIT et al.

The Rainfall-Runoff-Inundation (RRI) model, which simulates various hydrologic processes including rainfall-runoff, stream-flow propagation and inundation over floodplains in an integrated manner, will be upgraded to encompass groundwater analysis and improve long-term accuracy, and will be validated at small- and medium-scale basins in Japan.

The Block-wise topographical (BTOP) model will be combined with the Flood-Inundation-Depth (FID) method to assess flood hazard and exposure globally, with initial focus to Asia.

In order to increase lead time of predicted flood-causing precipitation from several hours to several days, ICHARM will develop new techniques for meso-scale ensemble precipitation forecasting, and predicted precipitation will feed into hydrologic run-off models.

Further efforts on the analysis of the impact of climate change to the flood hazard at some river basins in Asia and around the world will be made to develop a bias correction method through statistical or physical downscaling of climate data projected in the Coupled Model Inter-comparison Project Phase 5(CMIP5) of IPCC Fifth Assessment Report (AR5) process.

Drought: ICHARM will upgrade the BTOP model to support more accurate, elaborate modeling of some river basins, additionally considering dam operations and water withdrawals. Additionally, ICHARM will pioneer a water demand model capable of factoring socio-economic conditions, facilitating assessment of socio-economic impacts of droughts on both global and basin scales.

Sediment-related disasters: ICHARM has developed a sediment-related disaster forecasting model based on technologies available in Japan, which uses satellite information available in developing countries. The model aims to identify disaster risk areas and their risk levels by using satellite observation. ICHARM will promote dissemination of this model for risk assessment related to landslides and debris flows.

Tsunami & storm surge: ICHARM will survey the fields affected by tsunami and storm-surge hazards in developing countries. The storm-surge disasters will be forecasted by the model available in the ADB Myanmar project, which is working for storm surge risk assessment in coastal area in Myanmar.

Water contamination: Few studies document the dynamic runoff mechanisms which influence sources and transport of diffuse water pollution during runoff events. ICHARM will upgrade the Water and Energy Transfer Processes (WEP) model to support finer resolution of simulated runoff loads of suspended solids (SS), nitrogen (N) and phosphorus (P) during runoff events. This research direction will eventually clarify understanding of

relationships between basin management and water quality, for instance involving urban, forestry and agricultural areas.

(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.

Global Risk Indices will be developed, improved and disseminated to quantify water-related disaster risk for vulnerable basins in Asia, including Japan. A risk assessment model for smaller basins and communities will also be developed at a finer resolution. The communication methods will be explored to show the effectiveness of risk reduction measures in an easier-to-understand manner.

(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.

Policy tools for comprehensive risk management will be evaluated and applied, with initial focus in Asia. Some examples include pre-event disaster management, analysis of effectiveness of risk reduction measures such as disaster information and evacuation policies, and flood preparedness indices.

(ii) Effective capacity building

(4) Foster the development of solution-oriented practitioners 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.

In stronger collaboration with GRIPS and JICA, ICHARM will continue to build and improve its Master's and PhD programs in Water-related Disaster Management, as well as its short-term capacity development trainings and mentoring program for interns. Training schedules and programs, particularly at the PhD level, will be integrated seamlessly with ICHARM research activities, creating new opportunities for student involvement in a greater scope of research topics and methods, and supporting mentorship from a wider range of ICHARM researchers. New approaches will be explored to offer training programs as a module/package, or through e-learning/remote style that can contribute to more flexible and efficient training.

(5) 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.

As graduates from ICHARM training programs circulate across the globe, carrying with them the skills and knowledge they have acquired in their training, they become water

hazard and risk management leaders in their own localities. The next generation of ICHARM capacity development will continue to support individuals in their pursuit of academic excellence and successful application of learned skills. However, ICHARM will also broaden focus to joint development of individual and institutional capacity, so as to enable supportive spaces in which ICHARM alumni are able to realize their potential. Support of ICHARM alumni networks are a key resource for former participants, which will be encouraged and facilitated through follow-up meetings for former participants and their colleagues, to be hosted within the local offices and agencies that employ ICHARM graduates. Such meetings will help ICHARM to build and strengthen a global network of experts and organizations, to maintain research and training directions which are attuned to the needs of participant agencies, and to continue building capacities and collaborations within key organizations.

(iii) Efficient information networking

(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.

ICHARM, as the global knowledge center for water hazards will develop a database archiving information about water disasters. In order to collect and organize reliable data, ICHARM will strengthen partnerships with centers capable of archiving information related to water disasters. Meta-data collected from countries through ICHARM research and training will be sorted and accumulated, and (with permission from source organizations) a list (portal site) of disaster studies will be open to the public. To collect and disseminate the latest information about water disasters around the world, regular workshops will be held with their results published.

(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.

ICHARM will continue its contribution to worldwide efforts in mainstreaming disaster risk reduction in post-Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs), and post-Hyogo Framework for Actions (HFA), and immediately towards the 3rd World Conference on Disaster Risk Reduction in March 2015. ICHARM will strive to strengthen partnerships with other organizations also through its leadership in the 7th World Water Forum scheduled in April 2015 and future Asia-Pacific Water Forum meetings. Effective interaction between ICHARM research and training activities will make it possible to engage a broad institutional network, including international agencies, national and local governments, and civil society stakeholders at all levels. Primary research and

information networking undertaken at ICHARM will underpin policy recommendations regarding water-related hazard and risk management.

ICHARM Work Plan (Draft)

For

FY 2014 (2014.4-2015.3)
and
FY 2015 (2015.4-2016.3)

ICHARM

PWRI

UNESCO
United Nations
Educational, Scientific and
Cultural Organization

Category	Content	Activities and Expected result in FY2014	Activities and Expected result in FY2015
(1) Develop methodologies to observe, predict and analyze water-related hazards, supporting assessment of water-related risks.			
1.1 Flood observation: River discharge and river-bed dynamics during flood events are often not adequately or accurately measured. ICHARM will conduct monitoring and validation of river-bed dynamics and river-bed roughness coefficients for more systematic basin-wide flood management. Towards this goal, ICHARM will develop an automatic observation system for river discharge which simultaneously monitors water depth, flow velocity, and discharge. Particularly for areas where ground observation of river conditions is difficult, ICHARM will pioneer and validate new technology for satellite image analysis capable of identifying potential inundation extent and affected houses.			
Development of technology of hydrological observation and prediction	Developing a next-generation discharge measurement system requiring less labor and cost	● Analysis and accumulation of observed data by ADCP and movie ● Domestically technology diffusion ● Publication of the manual about the water discharge measurement with new technology	● Republication of the manual ● Domestically technology diffusion ● Study about the H-Q relationship without discharge measurement
1.2 Flood prediction and analysis: ICHARM will upgrade its Integrated Flood Analysis System (IFAS) to better simulate evapotranspiration, multiple-dam operations and snow melt. With this enhanced flexibility and accuracy, IFAS will be applied to flood forecasting and water resources management both in and outside Japan, including at the Japanese Common Modeling Platform (Common MP) for water-material circulation analysis by MLIT et al. The Rainfall-Runoff-Inundation (RRI) model, which simulates various hydrologic processes including rainfall-runoff, stream-flow propagation and inundation over floodplains in an integrated manner, will be upgraded to encompass groundwater analysis and improve long-term accuracy, and will be validated at small- and medium-scale basins in Japan. The Block-wise topographical (BTOP) model will be combined with the Flood-Inundation-Depth (FID) method to assess flood hazard and exposure at a global level, with initial focus to Asia.			
Development of models/systems for flood analysis and water resource management	Development of the Integrated Flood Analysis System (IFAS) to help create a runoff analysis model easily by using satellite data	● Standardization of a parameter-setting method for modeling hydrological processes in consideration of main climate zones and land conditions ● Development of modules for low-water analysis and long-term runoff	● Development of a module capable of handling the effect of operation of advanced flood-control and water-use facilities and structures ● Development of a module capable of runoff analysis for low-lying areas in

		calculation	consideration of the effect of inundation and tide levels ● Enhancement of compatibility of IFAS with Common MP
	Development of Rainfall-Runoff-Inundation (RRI) Model	Improvement particularly in the subsurface flow module for better representation of hydrologic processes	Integrate ensemble WRF predictions and the RRI simulation for ensemble flood predictions with quantified uncertainty information. The performance will be assessed also in data limited regions in Asian countries
	Development of a method for estimating large flood area, volume and damage using remote sensing data	Development of an algorithm for estimating building loss, its location in inundation area by using image fusion of multi temporal data combining high resolution SAR images with optical images	● Development of a method for estimating flood volume ● Review of a practical application system for support restoration activity
	Research on flood prediction applicable to flash floods -Quantitative Precipitation Forecasting-	Application of Ensemble Kalman Filter (EnKF) for a weather forecasting model (WRF model) and validate the performance with various storm events including in Japanese River basins.	Application and validation of EnKF with WRF model. In particular, the performance of the system will be tested in data limited humid- tropical regions.
1.3 In order to increase lead time of predicted flood-causing precipitation from several hours to several days, ICHARM will develop new techniques for meso-scale ensemble precipitation forecasting, and predicted precipitation will feed into hydrologic run-off models. Further efforts on the analysis of the impact of climate change to the flood hazard at some river basins in Asia and around the world will be made to develop a bias correction method through statistical or physical downscaling of climate data projected in the Coupled Model Inter-comparison Project Phase 5(CMIP5) of IPCC Fifth Assessment Report (AR5) process.			
Estimate of the change of discharge by global warming	Research on the impact of global warming on flood and drought characteristics in consideration of uncertainty	● Development of a method for estimating changes in precipitation extremes in selected areas in consideration of uncertainty	Estimation of changes in flood and drought characteristics in selected rivers in consideration of uncertainty

		● Estimation of changes in flood and drought characteristics in major river basins around the world in consideration of uncertainty	
1.4 Drought: ICHARM will upgrade the BTOP model to support more accurate, elaborate modeling of some river basins, additionally considering dam operations and water withdrawals. Additionally, ICHARM will pioneer a water demand model capable of factoring socio-economic conditions, facilitating assessment of socio-economic impacts of droughts on both global and basin scales.			
Drought	Estimate of drought risk by development of Block-wise TOPMODEL(BTOP)	Further calibration of the global BTOP model Development of a simulation model additionally capable of considering dam operations with 0.5 km mesh to apply to pilot study basins among the selected flood-vulnerable basins. This model will be used to estimate drought risk.	Further calibration of the global BTOP model Development of a BTOP model additionally capable of considering dam operations with 0.5 km mesh to apply to other selected flood-vulnerable basins. This model will also be used to estimate drought risk.
1.5 Sediment-related disasters: ICHARM has developed a sediment-related disaster forecasting model based on technologies available in Japan, which uses satellite information available in developing countries. The model aims to identify disaster risk areas and their risk levels by using satellite observation. ICHARM will promote dissemination of this model for risk assessment related to landslides and debris flows.			
Sediment-related disasters	Development of a method to identify sediment disaster risk areas and a model to identify their risk levels	Study on a method to identify sediment disaster risk areas as technology using satellite information available in developing countries Study on a model to identify sediment disaster risk levels by using long-term precipitation indices and satellite information	Test application of the method described on the left to the Pampanga River in the Philippines Further study on the risk-level identification model by using locally observed data

1.6 Tsunami & storm surge: ICHARM will survey the fields affected by tsunami and storm-surge hazards in developing countries. The storm-surge disasters will be forecasted by the model available in the ADB Myanmar project, which is working for storm surge risk assessment in coastal area in Myanmar.			
Tsunami and storm surge	Development of storm surge hazard model	Test and calibration of the developed storm-surge model Planning of the development of a storm-surge risk assessment mode	Development of a storm-surge risk assessment model using the developed storm-surge model described on the left
	Contribution to PEARL project	Participation in the Preparing for Extreme And Rare events in coastal regions (PEARL) project led by UNESCO-IHE, contributing Japan's knowledge and experience regarding the Great East Japan Earthquake and increasing partnership with other research institutes	(continue)
1.7 Water contamination: Few studies document the dynamic runoff mechanisms which influence sources and transport of diffuse water pollution during runoff events. ICHARM will upgrade the Water and Energy Transfer Processes (WEP) model to support finer resolution of simulated runoff loads of suspended solids (SS), nitrogen (N) and phosphorus (P) during runoff events. This research direction will eventually clarify understanding of relationships between basin management and water quality, for instance involving urban, forestry and agricultural areas.			
Water contamination	Understanding of the management of nutrient load and runoff in closed water bodies	Improvement of Water and Energy Transfer Processes (WEP) model	Validation of the WEP model for water pollution loads in relation to basin land use such as urban and forestry areas
(2) Pioneer new methods and models to assess, analyze and monitor exposure and vulnerability to water-related hazards, supporting risk management at both local and global scales.			
Global Risk Indices will be developed, improved and disseminated to quantify water-related disaster risk for vulnerable basins in Asia, including Japan. A risk assessment model for smaller basins and communities will also be developed at a finer resolution. The communication methods will be explored to show the effectiveness of risk reduction measures in an easier-to-understand manner.			

2.1 Development of global risk indices to compare risks among different basins	Development of a flood risk assessment method	Research on the correlation between damage types and floods based on existing studies and development of the prototype of a flood risk assessment method Development of global risk indices for international contribution including mainstreaming of disaster risk reduction	Further improvement of the developed indices for more accuracy Restructuring of the organizational arrangement to start risk monitoring
	Development of a drought risk assessment method	Review of the existing drought model and development of a water-demand prediction model Development of a drought risk assessment method based on analysis of the correlation between damage and droughts by using the drought and water-demand models Development of global risk indices as a global risk model	Further development of the global risk indices
2.2 Development of risk indices for selected river basins	Development of a flood risk assessment method	Development of the prototype of a flood risk assessment method based on analysis of the correlation between damage and floods after reproduction of flood hazards	Application of the developed method to other flood-vulnerable basins Generalization and uncertainty assessment of the developed method
	Development of a drought risk assessment method	Study on results of high-resolution BTOP model simulation Study on water demand models for domestic and industrial water use based on the water demand model for agricultural water use	Development of high-resolution BTOP models for other basins Study on water-demand projections for agricultural, domestic and industrial water use and development of a water-stress assessment model for selected drought-vulnerable areas Development of a socio-economic impact model using the water stress model

		Development of basin flood/drought risk indices	Planning of study on basin-scale risk indices based on social impact assessment using the flood and drought risk assessment models	Study on basin-scale risk indices by using the flood and drought risk assessment models
	2.3 Collaboration with other research programs	MEXT Program for Risk Information on Climate Change (FY2013-)	Development of a quantitative risk assessment method for five river basins in Asia and the globe in consideration of uncertainty, using climate data projected in the Coupled Model Inter-comparison Project Phase 5 (CMIP5) of IPCC Fifth Assessment Report (AR5) process	(continue)
(3) Propose practical policy tools for integrated and comprehensive water and risk management to enhance human and ecosystem resilience, for instance through preparedness, early warning, and hard-soft integration.				
	Policy tools for comprehensive risk management will be evaluated and applied, with initial focus in Asia. Some examples include pre-event disaster management, analysis of effectiveness of risk reduction measures such as disaster information and evacuation policies, and flood preparedness indices.			
	3.1 Study on comprehensive risk management	Study on pre-event disaster management and emergency restoration response	Development of a collaborative research system with local organizations for producing a new emergency restoration plan for model basins and planning of simulation using a basic model	Review of the rough plan of emergency restoration and discussion on the plan with local organizations Preparation of a draft emergency restoration plan to propose with additional review considering application to other basins
		Study on disaster information and evacuation	Hearings on disaster information and evacuation at local communities affected by disasters in the past Review of information important during disaster including how and when it should be provided based on analysis of the results	Study on disaster information as a non-structural measure The results should be presented to be useful for future discussions on the development of indices and quantification of the effect of non-structural measures

		from the hearings	
	Study on disaster preparedness indices	Review of past studies on flood disaster preparedness indices (FDPI) for wider application to future research	Review of past studies on FDPI to promote their use for visualization of the effectiveness of non-structural measures
3.2 Local practices to implement the results of research	ADB Myanmar Project –Risk assessment of Urban management in Myanmar- (Yangon, Mandalay, Mawlamyaing)	Collection of hydrological, meteorological, damage and social data and information	Collection of additional data and information
		Application of a flood model (RRI) and a storm-surge model to local areas	Use of the models for simulation and the development of a risk model
		Collection and analysis of basic information on a risk evaluation model	Development of a risk evaluation model
		Design, planning, arrangement and preparation of capacity development training programs	Implementation of the training programs and technical assistance in operation of the training programs
	UNESCO Pakistan Project -2nd phase-	(now planning with UNESCO)	(now planning with UNESCO)
	JST-JICA Malaysia project	Further implementation of the IFAS project in Malaysia	(continue)
(4) Foster the development of solution-oriented practitioners 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.			
In stronger collaboration with GRIPS and JICA, ICHARM will continue to build and improve its Master's and PhD programs in Water-related Disaster Management, as well as its short-term capacity development trainings and mentoring program for interns. Training schedules and programs, particularly at the PhD level, will be integrated seamlessly with ICHARM research activities, creating new opportunities for student involvement in a greater scope of research topics and methods, and supporting mentorship from a wider range of ICHARM researchers. New approaches will be explored to offer training programs as a module/package, or through e-learning/remote style that can contribute to more flexible and efficient training.			
4.1 Nurture professionals who can train	Doctor Course "Disaster Management"	2-3 students (2014-2017)	2-3 students (2015-2018)

	researchers and take leadership			
	4.2 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: Thailand, Brazil, Pakistan, Philippines, India, Malaysia, Bangladesh, Ethiopia, Sri Lanka, Myanmar, Kenya, Jamaica, Nigeria, Nicaragua, Sudan, Colombia, East Timor, Fiji, Guyana	10-15 students Candidate countries to be decided consulting with JICA
	4.3 Training to learn knowledge and technologies relevant to water-related disaster risk management for a period of several days or weeks	JICA training program "Flood Risk Management with IFAS"	14-21 person from candidate countries: Nigeria, Thailand, Bangladesh, Philippines, Vietnam, Kenya, Bhutan	
		2nd Phase JICA training program "Flood Risk Management with IFAS"		Candidate countries to be decided consulting with JICA
		Workshop for high rank officers	From Pakistan (5-6 person), Afghanistan	
		Technical training for working level officers		Pakistan (5 person (to be confirmed)

(5) 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.

As graduates from ICHARM training programs circulate across the globe, carrying with them the skills and knowledge they have acquired in their training, they become water hazard and risk management leaders in their own localities. The next generation of ICHARM capacity development will continue to support individuals in their pursuit of academic excellence and successful application of learned skills. However, ICHARM will also broaden focus to joint development of individual and institutional capacity, so as to enable supportive spaces in which ICHARM alumni are able to realize their potential. Support of ICHARM alumni networks are a key resource for former participants, which will be encouraged and facilitated through

follow-up meetings for former participants and their colleagues, to be hosted within the local offices and agencies that employ ICHARM graduates. Such meetings will help ICHARM to build and strengthen a global network of experts and organizations, to maintain research and training directions which are attuned to the needs of participant agencies, and to continue building capacities and collaborations within key organizations.			
5.1 Follow up and encouragement for ex- trainees	Seminar in ex-trainees country	● Make and maintain list of graduates ● Implement internet networking ● Organize follow up session	(continue)
(6) Accumulate, analyze and disseminate major water-related disaster records and experiences as the comprehensive knowledge center for practitioners.			
ICHARM, as the global knowledge center for water hazards will develop a database archiving information about water disasters. In order to collect and organize reliable data, ICHARM will strengthen partnerships with centers capable of archiving information related to water disasters. Meta-data collected from countries through ICHARM research and training will be sorted and accumulated, and (with permission from source organizations) a list (portal site) of disaster studies will be open to the public. To collect and disseminate the latest information about water disasters around the world, regular workshops will be held with their results published.			
6.1 Accumulate disaster archives	Workshop and publication for Large-Scale Floods	Organize the Workshop and invite 4-5 resource person after major floods	Publish the Large-scale floods report
	Disaster information	Collect information and set up meta-archives	(continue)
6.2 Collaboration	To make network with institute or organization related water disaster archives	Collaborate with other UNESCO center and international organization (UNISDR, Red cross etc) for usable disaster archives	(continue)
(7) Mainstream disaster risk reduction policy by facilitating active collaboration and communication within an influential global institutional network and through dissemination of technical knowledge for water-related hazard and risk management.			
ICHARM will continue its contribution to worldwide efforts in mainstreaming disaster risk reduction in post-Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs), and post-Hyogo Framework for Actions (HFA), and immediately towards the 3rd World Conference on Disaster Risk Reduction in March 2015. ICHARM will strive to strengthen partnerships with other organizations also through its leadership in the 7th World Water Forum scheduled in April 2015 and future Asia-Pacific Water Forum meetings. Effective interaction between ICHARM research and training activities will make it			

possible to engage a broad institutional network, including international agencies, national and local governments, and civil society stakeholders at all levels. Primary research and information networking undertaken at ICHARM will underpin policy recommendations regarding water-related hazard and risk management.			
7.1 Collaboration with relevant organizations	International Flood Initiative (IFI)	Function of its secretariat in collaboration with relevant organizations	
	Strengthen relationship with International framework (Typhoon Committee, International Flood Network (IF-Net), Japan Water Forum (JWF), Network of Asian River Basin Organizations (NARBO), etc.)	< Contribution to Typhoon Committee > ● Chair Working Group of Hydrology in Typhoon Committee and to implement ● Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	
7.2 Mainstreaming of disaster management	United Nations Secretary-General's Advisory Board (UNSGAB)	Contribution to worldwide efforts in mainstreaming disaster risk reduction through participation and advice as special advisor in international meetings	
	UNISDR Asia Consultation	Further research on global risk indices, whose progress was reported in Dec. 2013, as contribution to UNISDR Asia	Maintenance of the institutional network with UNISDR and further research on global risk indices to prepare for continued consultation
	6th Asian Ministerial Conference on Disaster Risk Reduction: AMCDRR	Creation of occasions to present results of the risk index study previously reported in Dec. 2013 to show a high reliability of the indices underpinned by advanced technology	(continue)
	3rd World Conference on Disaster Risk Reduction: WCDRR (14-18 March, 2015)	Continue the efforts described above based on the GAR15 paper and use The 3rd WCDRR as an occasion to emphasize the effectiveness of the indices by claiming a high technological capability of ICHARM. Also continue preparation for HFA2, in which the final decisions on important international goals will be made, to make tangible contribution to the decision-making process.	
	7th World Water Forum (12-17 April, 2015)	Activities from the preparation stage to become a primary actor in the forum.	
	Asia-Pacific Water Forum (APWF)	Appeal ICHARM activities on the occasion of its Governing Council	

	7.3 Synergy effects	Alumni networking	• Continue to update ICHARM Alumni List • Continue to keep in touch with ex-trainees by disseminating ICHARM newsletter, etc
	7.4 Public relations	ICHARM web site	Continue updating
		ICHARM Newsletter	Publish four times a year (January, April, July, and October)