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Report on 2008-2009 "Water-related Risk Management Course of Disaster Management Policy Program"

February 2010

International Centre for Water Hazard and Risk Management
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Public Works Research Institute(PWRI)

United Nations
Educational, Scientific and
Cultural Organization

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February 2010

Report on 2008-2009

"Water-related Risk Management Course of Disaster Management Policy Program"

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Synopsis:

ICHARM conducted a one-year Master's program entitled the "Water-related Risk Management Course of Disaster Management Policy Program" from 29 September 2008 to 19 September 2009 in collaboration with the Japan International Cooperation Agency (JICA) and the National Graduate Institute for Policy Studies (GRIPS).

The nine students were mainly technical officials, engineers or researchers in the field of river management or water-related disasters in developing countries.

This course aims to foster solution-oriented practitioners with solid theoretical and engineering bases who can serve for planning and practices of flood management within the framework of integrated river basin management at all levels from nations to localities.

In the first half of the course, the students attended mainly lectures and exercises; in the second half, they worked on their individual studies to complete the Master's theses and visited many places across Japan through several field trips to learn up-to-date flood control countermeasures at work.

This report details the course activities and the achievements thereof.

Key Words: Training, Disaster prevention, Flood disaster

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Chapter 1: Background of Disaster Management Policy Program, "Water Hazard Risk Management Course"

Natural disasters cause human tragedy and economic loss and hamper the development of countries wherever they occur. In particular, due to recent urbanization in developing countries, there is a common tendency that the poor are forced to settle in buildings and areas that are vulnerable to natural disasters. This considerably discourages developing countries' efforts to alleviate poverty. Among natural disasters, especially, water-related disasters such as floods and droughts are major challenges that need to be overcome in order to ensure sustainable human development and poverty alleviation. Such devastating disasters have been not only increasing in frequency (Figure 1-1), but also expanding in terms of the extent of damage and impact due to rapid population growth and high concentrations of population and property in urban areas. They also expose high-value assets to the greater risk of disaster damage. According to a UN population projection (UN World Urbanization Prospects 2005), urban population will continue growing in number and proportion across the world, and most of the growth will be seen in developing countries. For example, between 2000 and 2030, urban population in Asia and Africa is projected to rapidly increase from 1.36 to 2.64 billion and 294 to 742 million, respectively (Figure 1-2). Even in 10 years' time, a rapid population growth is projected in major water-front cities in Asia, e.g. Dhaka (Bangladesh), Mumbai (India) and Jakarta (Indonesia). If appropriate measures are not taken to protect those cities from disasters, their vulnerabilities to major water disasters, such as floods, storms and tsunamis, are likely to become increasingly high (Figure 1-3).

Asia alone accounts for over 80% of the worldwide fatalities due to water-related disasters (Figure 1-4). Looking ahead, precipitation and its distribution patterns are predicted to change due to climate change, and this may exacerbate the intensity and frequency of water-related disasters. Sea level is expected to rise worldwide due to global warming, which in turn will worsen the exposure of coastal areas, delta areas at the lower reaches of rivers, and small islands.

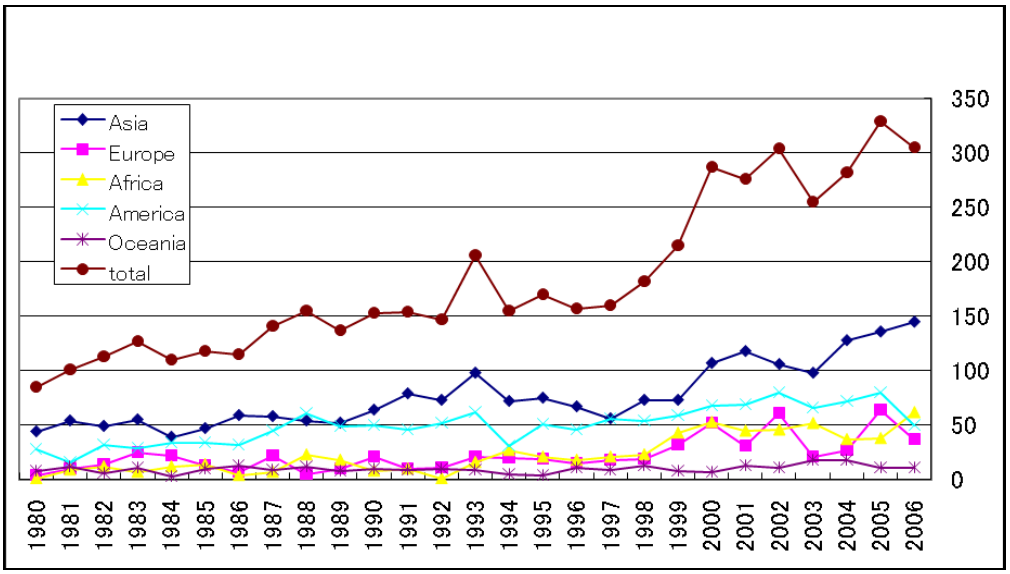


Figure 1-1 Annual change in the number of water-related disasters
(Made by ICHARM based on CRED EM-DAT)

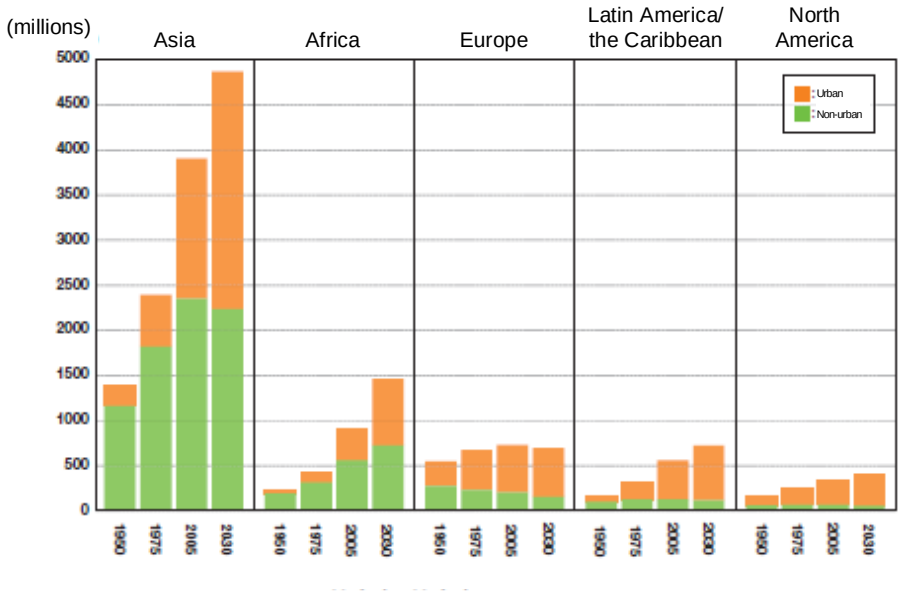


Figure 1-2 Demographic change in urban and non-urban areas by region
(Made by ICHARM based on *World Urbanization Prospects: 2005 Revision* by the Population Division, Department of Economic and Social Affairs, UN)

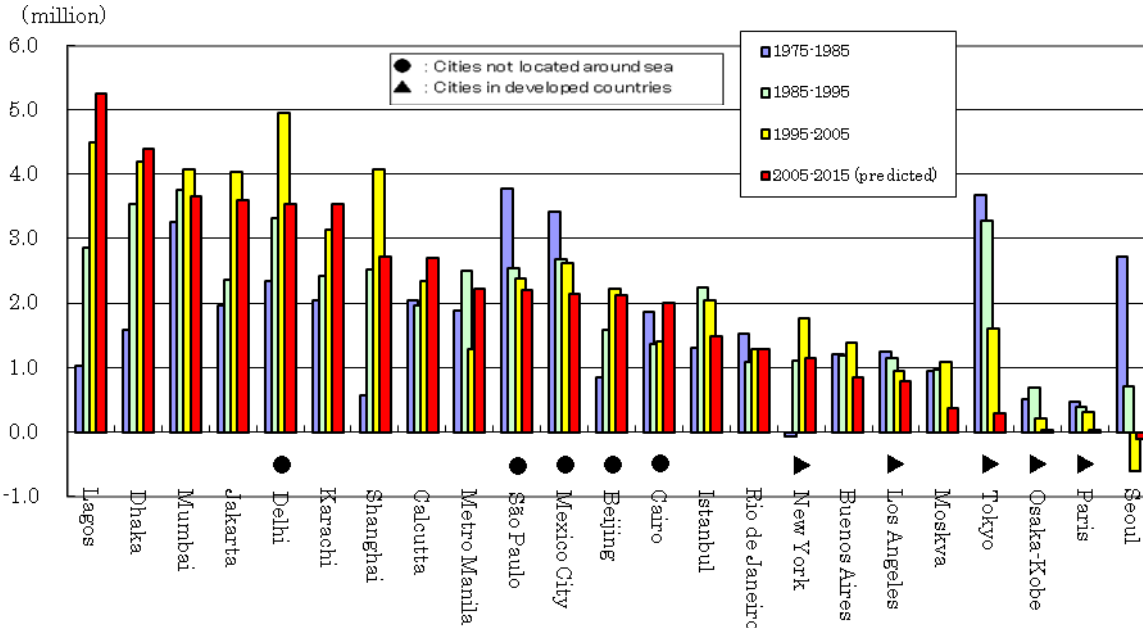


Figure 1-3 Demographic change in major cities worldwide between 1975 and 2015
(Made by ICHARM based on *World Urbanization Prospects*: *2005 Revision* by Population Division, Department of Economic and Social Affairs, UN)

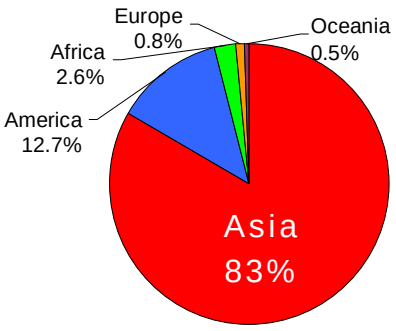


Figure 1-4
Distribution of fatalities due to water-related disasters (1980-2006)
(Made by ICHARM based on CRED EM-DAT)

In order to reduce the impacts of natural disasters, well-balanced risk management before, during, and after disasters must be established in a multi-disciplinary way. To meet this need, disaster management experts must be fostered through professional education and training so that they can develop appropriate disaster management policies and techniques based on local conditions and needs, and communicates with local people to raise awareness toward disaster prevention in communities.

Under such circumstances, in order to enhance the capacity of experts in developing countries to cope with natural disasters, ICHARM, the National Graduate Institute for Policy Studies (GRIPS) and the Japan International Cooperation Agency (JICA) jointly launched a Master's degree program entitled the "Water-related Risk Management Course of DISASTER MANAGEMENT POLICY PROGRAM" in 2007.

The United Nations designated 2005–2014 as the Decade for Education and Sustainable Development under the initiative of the United Nations Educational Scientific and Cultural Organization (UNESCO). This Master's course is exactly in step with the spirit of the Decade. ICHARM is honored to be one of the organizers considering that the centre is established under the auspices of UNESCO.

Chapter 2: Purpose and features of the course

2.1 Objectives of the Master's course

To cope with the situations as explained in Chapter 1, it is urgently needed to foster experts in water-related disaster management in developing countries. They need to learn a wide range of knowledge necessary for disaster risk management from technical and social viewpoints in preparedness, restoration and rehabilitation.

This Master's course aims to foster solution-oriented practitioners with solid theoretical and engineering bases who can serve for planning and practices of flood management within the framework of integrated river basin management at all levels from nations to localities.

Through the Master's training course, students are required to:

- Acquire basic knowledge and techniques for water-related disaster mitigation in the field of hydrology, hydraulics, integrated flood risk management, hazard mapping, sustainable reservoir development, and control measures for landslides and debris flows;
- Learn theories on which water-related risk management policies are based and study and understand Japanese policies and systems; and
- Improve the problem-solving capability to develop appropriate technologies and policies specific to local conditions.

2.2 Features

This Master's course is characterized by the following four points:

I. Problem Solving-Oriented" course

To cope with major disasters, it is essential to develop organizational capabilities in disaster management as well as those of individuals in the organization, because there is always limitation for what each person can do.

Based on this course philosophy, the training course is designed to be not "a course in which students are somehow forced to study" but "a course in which they independently think and find solutions to issues of their interest." One of the graduating requirements of this course is to write a Master's thesis on an issue to which each student identifies and finds a solution by him/herself. Such assignment helps students develop the capacity to formulate integrated flood mitigation plans and also will help them address other issues at home.

II. Students from the same organization"

This training course is part of a project designed to conduct a Master's course three times within three years. As mentioned earlier, to develop organizational capabilities in disaster management, the course organizers strategically recruit several students from the same organization to the training. The organizers also make direct requests for organizations in the target countries to send capable students.

III. "Practical rather than Theoretical"

To make the training course solution-oriented, lectures and exercises which are practical rather than theoretical are provided in the course to prepare students to be fully functional in actual situations. In this sense, field trips are a crucial part of the training course.

IV. "One-year Master's course"

The target population of this Master's training course is incumbent practitioners working in administrative organizations. For that reason, the course is designed for them to earn a Master's degree within a single year rather than the usual two years so that they don't have to be absent from work too long.

2.3 Unit goals of the course

Through this course, students will become:

(1) Knowledgeable about the recent practices in integrated flood risk management in various localities in the world.

(2) Able to define requirements for local/national effective risk reduction, including public policies, and arrange local/national risk management frameworks, institutional coordination, and management mechanisms including all stakeholders.

(3) Able to develop local/national indicators to detect and monitor changes in policies for emergency response and disaster risk reduction, as well as to monitor the status and effectiveness of those policies.

(4) Able to contribute to the implementation of plans based on new integrated risk management policies developed in clear financial, institutional and legislative frameworks.

(5) Able to develop risk management strategies covering all the management cycle components of emergency response, recovery, mitigation and preparedness, considering risk detection and communication issues as well as emerging threats, such as global warming and climate change.

After the course, students are expected to:

(1) Identify issues and tasks that their home countries are facing based on the understanding of the historical, institutional and legislative backgrounds of flood disaster management in Japan, and finally draw up action plans to overcome those issues and to undertake relevant tasks.

(2) Realize the need of flood disaster reduction schemes in their home countries, and plan flood-disaster prevention/reduction projects and finally draw up workable action plans.

(3) Understand and acquire knowledge and techniques in flood risk assessment and risk reduction and create flood hazard maps.

(4) Understand and acquire knowledge and techniques in project planning for flood control (including dams and sediment control), figure out tasks to be performed in target river basins in their home countries, and finally draw up detailed action plans, which need to be tested for its validity during the training course.

2.4 Targets

The candidate countries, target organizations, number of the students and duration of the course for 2008-2009 are as follows:

Candidate Countries:

8 countries (Bangladesh, China, Ethiopia, India, Indonesia, Nepal, Philippines, Thailand)

Eligible/Target Organization :

Technical officials, engineers or researchers in the field of river management or water-related Disasters

Total Number of Students:

9students (2 Bangladesh, 2 China, 1 Ethiopia, 1 Nepal, 1 Indonesia, 2 Thailand)
(One of these students returned to his home country due to health problems in November 2008.)

Duration:

29th September 2008 - 19th September 2009

Under the circumstances explained in Chapter 1, to attract a wide range of students worldwide, recruitment was carried out in two ways: through JICA and by general recruitment. The former was conducted through JICA local offices and students were considered to be JICA students.

To recruit students, General Information was prepared in a joint effort between JICA and ICHARM, since this Master's course is also a part of JICA training, and distributed to the target countries in May 2008, about six months before the training course started.

In order to increase the scope of application opportunities to countries that are not covered in the JICA training program, applications were also accepted on the GRIPS website for nearly two months. Unfortunately, however, there were no applications for this year's program.

Nine students were accepted to the program as a result of the selection procedure. The list of the first class of students is included in Reference 2-1 at the end of this report. Mr. Sarayuth Punbune from Thailand, unfortunately, had to return home in November 2008 before completing the training due to health issues.

2.5 Implementation structure

Based on the consignment of JICA Tsukuba International Center to implement the training program, the Public Works Research Institute (PWRI) implemented this training under the following program implementation structure.

PWRI, International Centre for Water Hazard and Risk Management (ICHARM) International Technical Exchange Team

Team leader	Shigenobu Tanaka (Sep. 2008 - Jul. 2009), Kei Kudo (Jul. 2009 -)
Senior researcher	Daisuke Kuribayashi
Researcher	Hideo Yamashita
Assistant staff	Sachiko Ebashi Mariko Suzuki (Sep. 2008 - May 2009), Eri Uchida (May 2009 -)

Chapter 3: Details of the course

3.1 General concept

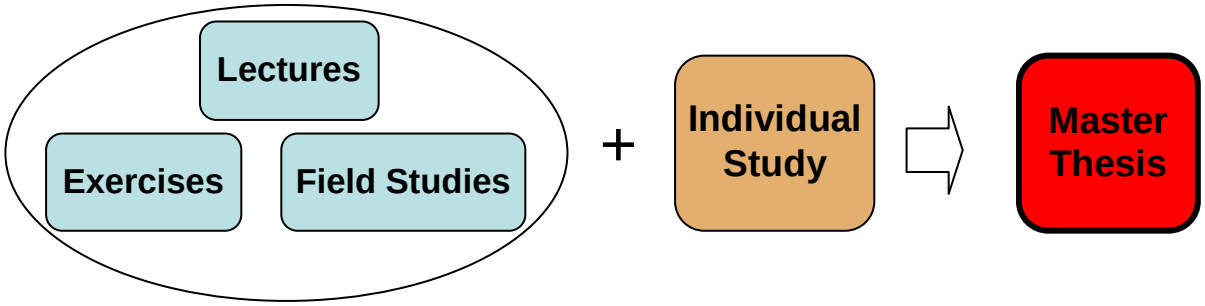


Figure 3-1 Concept of the Master's course

As described in Figure 3-1, this Master's course consists of lectures, exercises, several field studies to further the understanding of the lectures, and individual study.

Students are required to complete individual studies based on the knowledge they acquire through lectures, exercises, and field studies. Individual studies will be conducted as students consult with the expert researchers of ICHARM, and students are required to complete their studies as a Master's thesis.

3.2 Curriculum

The ICHARM secretariat and chief instructors had a meeting on April 24, 2008, to discuss the curriculum for this year's program. They agreed on making the following improvements:

- Reduce the number of instructors in individual subjects to promote lectures that enable mutual interaction between instructors and students.
- Reorganize lectures that require more hours and lectures and exercises with overlapping content as follows.
  - Divide the Hydrology class into basic and application levels.
  - Add Practice on Inundation Analysis and Computer Programming lectures.
  - Reorganize three lectures (IFRM (1) to (3)) into two lectures, "Basic concept of IFRM" and "Flood Hydraulics and Sediment Transport."

Individual lectures and exercises correspond to the objectives of the Master's course as described in Table 3-1.

This Master's course consists of 11 lectures, 8 exercises, several field studies to further understanding of the lectures, and an individual study. Each lecture and exercise consists of 15 classes. Reference 3-1 shows the list of the curriculum of this Master's course (list of lectures/exercise names and instructors). As this Master's course is a problem solving-oriented, practical course, the lectures cover not only the fundamentals but also applications and many kinds of exercises in water-related risk management. Reference 3-2 shows a detailed syllabus of the individual lectures. All lectures are required (2 credits), all exercises are elective (1 credit), and an individual study is worth 10 credits. Students need to earn at least 30 credits to receive a Master's degree, and 16 of the 30 credits must be from the required classes. A student can be conferred a Master's degree in disaster management if his/her Master's thesis is accepted after satisfying the credit requirement. Reference 3-3 shows a sample of the original certificate issued by GRIPS and ICHARM.

The course was taught by not only ICHARM researchers but also many prominent researchers and professors from PWRI, the National Institute for Land and Infrastructure Management, and universities to teach up-to-date knowledge. The program has about 50 lecturers, both in-house and guest. Reference 3-4 shows the list of lecturers.

Table 3-1 Curriculum for this year

			Credit
Lecture	Introduction to International Cooperation		2
	Basic Study for Water-related Disaster Management	Disaster Management Policy	2
		Disaster Risk Management	2
		Basic Hydrology	2
		Hydraulics	2
		Basic Concepts of Integrated Flood Risk management (IFRM)	2
	Application Study for Water-related Disaster Management	Advanced Hydrology	2
		Flood Hydraulics and Sediment Transport	2
		Local Disaster Management and Hazard Mapping	2
		Sustainable Reservoir Development & Management	2
		Control Measures for Landslide & Debris Flow	2
Exercise	Computer Programming		1
	Practice on Advanced Hydrology		1
	Practice on Hydraulics		1
	Practice on Inundation Analysis		1
	Practice on River Training		1
	Practice on Hazard Mapping & Evacuation Planning		1
	Practice on Sustainable Reservoir Development & Management		1
	Practice on Control Measures for Landslide & Debris Flow		1
Field Trip			
Individual Study			10

Table 3-2 Lecturers and exercises on water-related disasters

Unit objectives and training details[jica1]	
1) To learn recent approaches employed across the world in integrated flood risk management	○ Basic Concepts of Integrated Flood Risk management (IFRM) ○ Introduction to International Cooperation
2) To become able to clarify what is necessary to effectively reduce flood risks at the local and national levels, including public policies. Additionally, to become able to plan a risk management system at the local and national levels as well as develop a management system which includes various stakeholders and cooperation among organizations.	○ Disaster Management Policy ○ Disaster Risk Management ○ Local Disaster Management and Hazard Mapping ○ Practice on Hazard Mapping & Evacuation Planning
3) To become able to develop indices at the local and national levels to detect and monitor changes in emergency response and disaster risk reduction as well as to become able to monitor the status and impacts of policies using such indices.	○ Computer Programming ○ Basic Hydrology ○ Hydraulics ○ Practice on Hydraulics ○ Advanced Hydrology ○ Flood Hydraulics and Sediment Transport ○ Practice on Advanced Hydrology ○ Practice on Inundation Analysis ○ Practice on River Training ○ Sustainable Reservoir Development & Management ○ Practice on Sustainable Reservoir Development & Management ○ Control Measures for Landslide & Debris Flow ○ Practice on Control Measures for Landslide & Debris Flow
4) To become able to contribute to the implementation of plans developed based on integrated risk management policies which are formulated in clearly-defined financial, institutional, and legal frameworks.	Write Master's thesis
5) To become able to develop a risk management strategy which incorporates major critical management factors, such as emergency response, restoration, mitigation, and preparedness. The strategy should also pay due consideration to issues in risk detection and information dissemination, as well as emerging threats such as global warming and climate change.	○ (Basic Concepts of Integrated Flood Risk management (IFRM)) ○ (Local Disaster Management and Hazard Mapping)

3.3 Schedule

The lectures started from the second week in October 2008, which includes the International Day for Natural Disaster Reduction. Figure 3-2 shows an overview of the entire schedule. Of the one-year schedule, the first half mostly includes lectures and exercises, and the second half provides time for individual studies. Field studies were appropriately implemented throughout the year so that students were able to learn about Japan's flood control technologies.

Reference 3-5 shows a detailed schedule of the entire course.

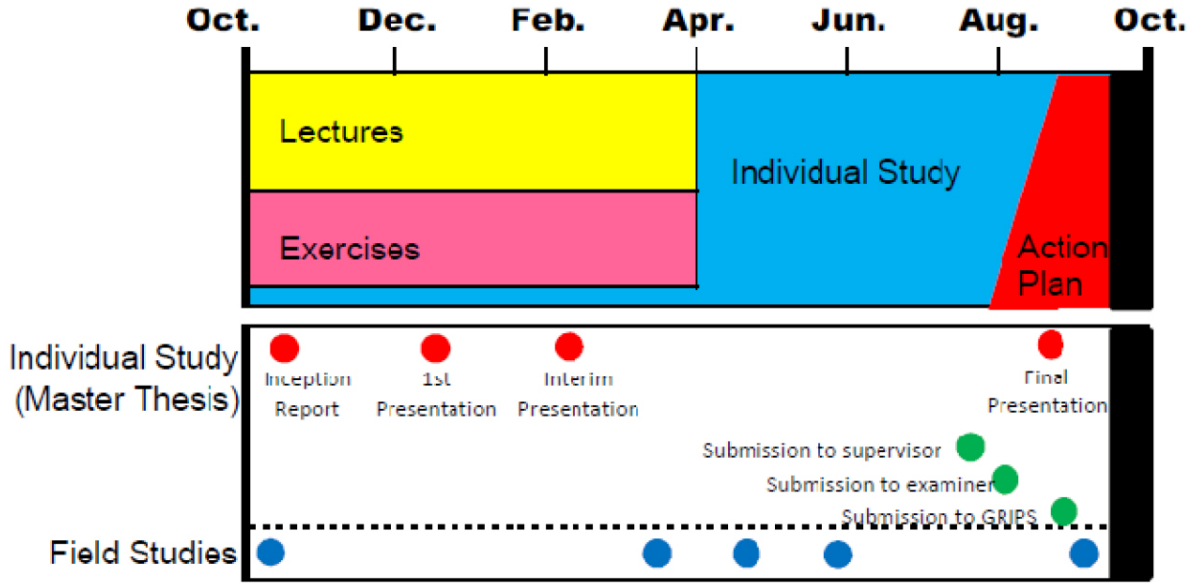


Figure 3-2 Overview of the schedule

The program also provides opportunities for students to attend ICHARM R&D Seminars, which ICHARM occasionally hosts, and invites experts to, so that the students can encounter the latest knowledge. It also has students participate in the Tone River flood fighting drill to actually observe flood fighting in Japan. A monthly homeroom meeting is held to listen to student opinions.

The major annual schedule is as shown below.

<September>	
28th	Arrival in Japan
<October>	
3rd	Opening Ceremony at GRIPS and Opening Party in ICHARM
7th	Field trip (1) to the Tokyo Metropolitan Area
11th -12th	Project Cycle Management (PCM) Practice
21st	Field trip (2) to the Tokyo Metropolitan Area
23rd	Homeroom
24th	Presentation on Inception Report
< November >	
During November	Joint classes with the Flood Hazard Mapping training course
11th-14th	Field trip (3) to Chubu Region & Biwa Lake

13th	Town Watching exercise in Ise City
28th	Homeroom
< December >	
8th	Interview on Master Thesis
16th & 17th	Project Cycle Management (PCM)
24th	Interview on Master Thesis, Homeroom
< January >	
21st	Interview on Master Thesis
23rd	ICHARM R&D Seminar by Prof. Egashira on “Importance of introducing sediment transport process in river planning”
<February>	
9th	ICHARM R&D Seminar by Ms.Mandira on “Koshi Flood Disaster 2008”
<March>	
9th-12th	Field trip (4) to the Chugoku and Kinki Regions
27th	Homeroom
<April>	
2nd	ICHARM R&D Seminar by Prof. Kuroda on “Future activities of ICSU (International Council for Science)“
3rd	Cherry blossom viewing and tea ceremony at PWRI
7th	ICHARM R&D Seminar by Prof. Tamura on wind-related disaster reduction
14th	ICHARM Open Day
<May>	
16th	Field trip (5) to the 58th Tone River Flood Fighting Drill in Sano City
27th	Interim Presentation of Master Thesis
<June>	
3rd-5th	Field trip (6) to Tohoku Region
<August>	
7th	Final Presentation on Master Thesis
18th 21st	Presentation at Japan Society of Hydrology and Water Resources & Field trip (7) to Hokuriku Region
28th	Submission of Master Thesis
<September>	
11th	11th International Summer Symposium
16th	Graduation Ceremony at GRIPS
18th	Closing Ceremony at JICA
19th	Departure from Japan

3.4 Field study

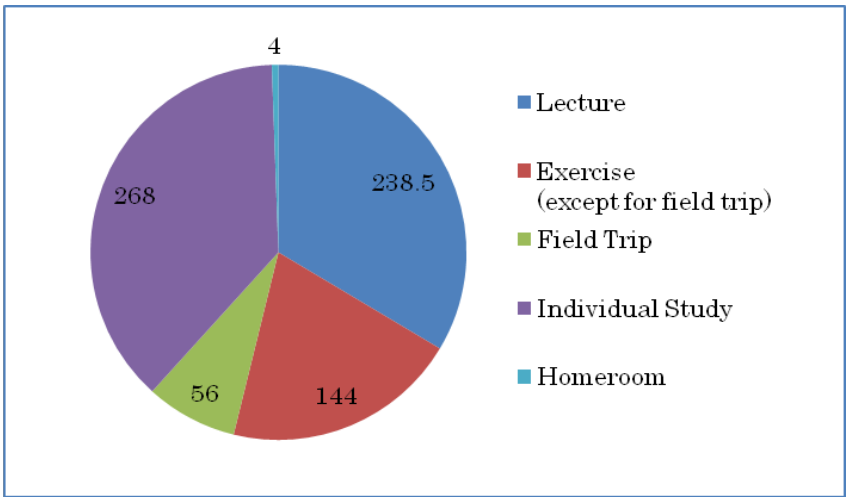
This Master’s course conducted seven field studies in order learn more about Japan’s flood control strategies. Reference 3-6 shows the list of field study destinations and facilities.

Field study destinations were carefully selected so that students could actually observe flood prevention facilities and famous facilities in Japan that are covered in the lectures, such as the Watarase Retarding Basin and Shinano-Ohkouzu Rivers Diversion Channel. Also, some of the trips were designed to give an overall view of an entire basin from the upper to lower reaches; the Hii and Kurobe Rivers were such examples.

Field trip reports were assigned to the students so that the trips were not just visits to famous or rare places but part of the study so that they could gain a better understanding of what they had learned. Reference 3-7 shows the schedule of the seven field trips.

3.5 General time allocation

As described earlier, this Master's course consists of lectures, exercises, field studies, and an individual study. Figure 3-3 shows the time allocated to these elements in the approximately one-year program.



Note:
Since the length of individual study varies among students, the duration is calculated under the assumption that a student receives 1.5 hours a day of advice from ICHARM staff in February and March and 2.5 hours a day from April to August.

Figure 3-3 Time allocation throughout the course (unit: hours)

Of the total of about 710 hours, about 40% was allocated for Individual study, which was considered sufficient to complete the Master's thesis. Starting next year, however, thesis themes will be decided earlier to allow plenty of time to work on the thesis.

Chapter 4: 2008-2009 Activity report

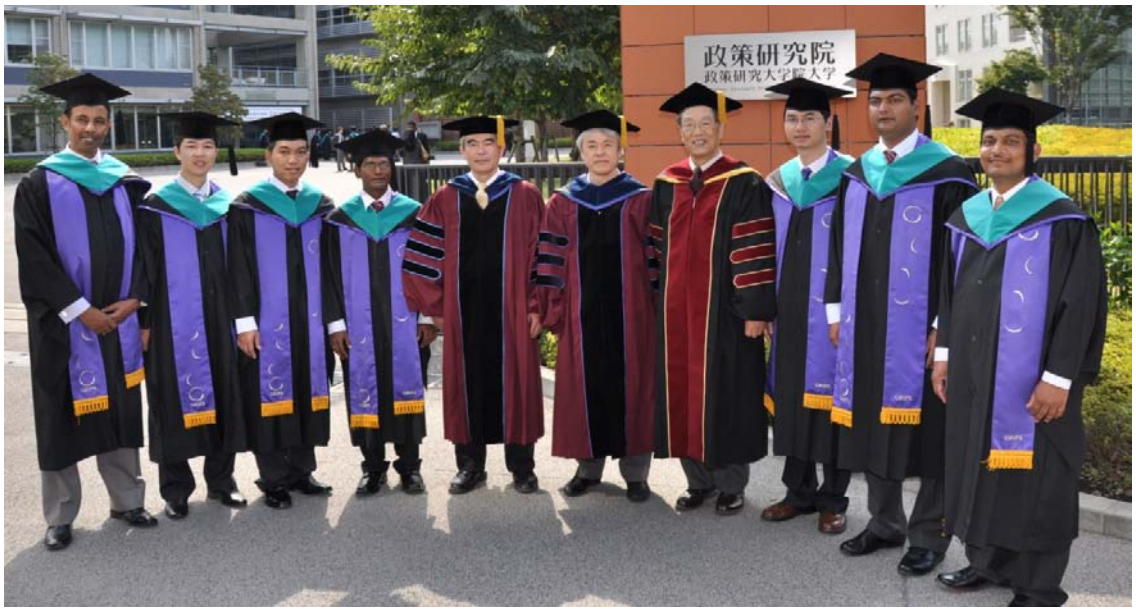


Photo 4-1 Group picture at the front gate of GRIPS (September 16, 2009)

ICHARM implemented the Master's program Water-related Risk Management Course of Disaster Management Policy Program for about one year from September 30, 2008 to September 19, 2009 as a joint program with Japan International Cooperation Agency (JICA) and the National Graduate Institute for Policy Studies (GRIPS).

Of the nine students who initially started this program, seven (two each from China and Bangladesh, one each from Nepal, Indonesia, and Ethiopia) were able to fulfill the graduating requirements and were granted a Master's degree in disaster management. After the graduation ceremony, they proudly went back to their home countries with their enhanced expertise.

Photo 4-2 Students listen to a lecture by Dr. Kuniyoshi Takeuchi, the director of ICHARM

This Master's program is unique in several points. For example, students need only one year to earn a Master's degree. Also, the program emphasizes the problem-solving capability. To this end, it is designed to help students enhance their capacity to come up with and propose solutions to problems they are facing in their home countries. Additionally, the program focuses more on practical than theoretical aspects of disaster management.

The first half of the course focused on lectures and exercises.

The contents included fundamental lectures and exercises such as Disaster Mitigation Policy, Disaster Risk Management, Basic Concepts of Integrated Flood Risk Management, Hydrology, and

Hydraulics, as well as practical lectures and exercises such as Flood Hydraulics and Sediment Transport, Local Disaster Management & Hazard Mapping, Sustainable Reservoir Development & Management, Control Measures for Landslide & Debris Flow, and Project Cycle Management.

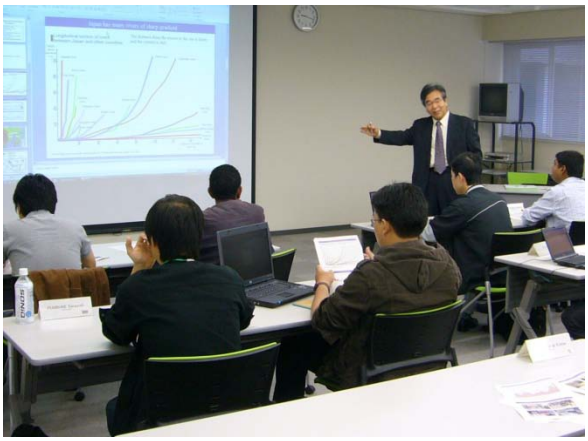


Photo 4-3 Lecture by
Prof. Shoji Fukuoka of Chuo University

Photo 4-4 Lecture by
Dr. Shinji Egashira of Newjec

Photo 4-5 Lecture by
Prof. Taikan Oki of Tokyo University

Photo 4-6 Lecture by
Prof. Jayawardena of ICHARM

In November 2008, the program implemented joint lectures and exercises with the JICA training, Flood Hazard Mapping, that ICHARM separately implemented. This joint class consisted of a total of 19 students 11 countries, including Bangladesh, Cambodia, China, Ethiopia, Indonesia, Laos, Malaysia, Nepal, the Philippines, Thailand, and Vietnam. It was an inspiring experience for each student to study with this many people with different nationalities and backgrounds. Specifically, Town Watching was implemented in groups in Ise City, Mie. Each group discussed what should be implemented in advance to improve awareness among residents as they drew routes that they had actually walked.

Photo 4-7 Students working joint class with the “Flood Hazard Mapping” training course

Photo 4-8 Students participating in the Town Watching exercise in Ominato, Ise

Photo 4-9 Students participating in a group discussion during the Town Watching exercise

There were seven opportunities throughout the course to conduct field studies in various parts of Japan and interviews with residents on community-based efforts to prevent disasters. These exercises were intended to enhance the study on Japan's flood control strategies and residents' awareness of disaster prevention.

First, in October 2008, students observed Watarase Retarding Basin, Metropolitan Diversion Channel, Edo River Super Levee, Kanda River Underground Regulating Pond, and Tsurumi River Multi-purpose Runoff Retardation Area and studied an overview of Japan's flood prevention facilities. These field trips were jointly conducted with the JICA training, Comprehensive Management of River and Dam, which provided an ice-breaking opportunity for the students, who had just arrived in Japan.

Photo 4-10 At the observation tower of Watarase Retarding Basin
[Tone River Upstream Work Office, MLIT]

Photo 4-11 Inside the surge tank of the Metropolitan Diversion Channel
[Edo River Work Office, MLIT]

Photo 4-12 An instructor explaining about the Kannana Underground Regulating Pond at the Zenpukuji River intake facility
[Tokyo Construction Bureau, Construction Office IIII]

Photo 4-13 Observing Tsurumi River Multi-purpose Runoff Retardation Area from the rooftop of the Basin Center
[Lecture by Mr. Masahiro Imbe, the director of Association for Rainwater Storage and Infiltration Technology]

Students experienced on-site learning about Toyogawa River Kasumi-tei levee, Kiso rivers separation project, Miyagawa River improvement project and water resource management in Lake Biwa in November 2008. They also listened to the stories of community leaders of the Enza and Ominato areas of Ise City about community-based disaster prevention. This opportunity allowed them to think about the importance of mutual assistance, which is the basis of disaster prevention.

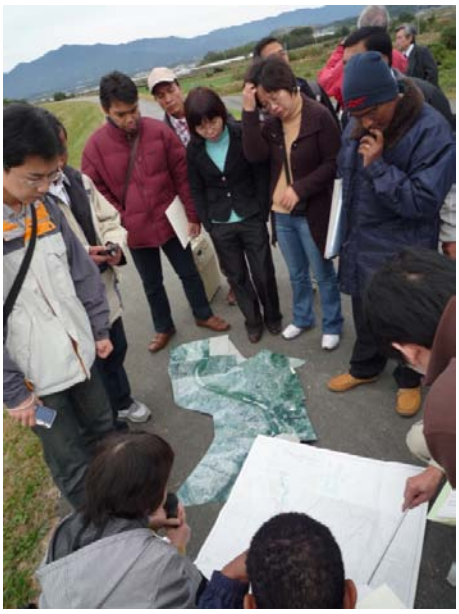


Photo 4-14 At the Toyogawa River Kasumi-tei levee in Aichi
[Toyohashi River Work Office, MLIT]

Photo 4-15 Student s listening to an explanation of the river separation project at the national Kiso-Sansen Park
[Kiso River Downstream Work Office]

Photo 4-16 At the museum of Lake Biwa
Students listening to an explanation of the water resource projects in Lake Biwa

Photo 4-17 Students listening to an explanation of the Miyagawa River improvement project
[Mie River and National Routes Work Office]

Photo 4-18 Students to listening to an explanation of disaster prevention activities at an apartment complex and situations in the 2004 flooding (Mr. Takeo Ueda, at Enza area, Ise City)

Photo 4-19 An explanation of disaster prevention activities in the Ominato area (Mr. Hiroshi Kanamori, at Ominato area, Ise City)

The following field trips were conducted in March 2009: a visit to Wako Iron Museum in Yasugi City to understand the relationship between the tatara iron manufacturing in the mountains of the Chugoku area and the transportation of river sediments; coastal erosion control at the Kaike Coast; three-in-one flood control projects of the Hii River, the Obara dam; flood control projects and sabo constructions at the Ota River, at the mouth of which is the large Hiroshima City; an informational interview session regarding the community-based disaster prevention activities at Takatori area, Kobe City; and observation of the Disaster Reduction and Human Renovation Institution in Kobe.

Photo 4-20 Visit to Wako Museum in Yasugi City

Photo 4-21 Students listening to an explanation of the Kaike Coast project at Sakaiminato Public Marina [Hino River Work Office, MLIT]

Photo 4-22 Students listening to an explanation of the Hii River improvement project at the Ohashi River Community Center
[Izumo River Work Office, MLIT]

Photo 4-23 Students listening to an explanation of projects implemented downstream of the Hii River
[Izumo River Work Office, MLIT]

Photo 4-24 Observation of the Hii River diversion channel construction site
[Hii River and Kando River General Development and Construction Office, MlIT]

Photo 4-25 Observation at the Obara Dam construction site
[Hii River and Kando River General Development and Construction Office, MLIT]

Photo 4-26 Students listening to an explanation at the Ota River Office
[Ota River Work Office, MLIT]

Photo 4-27 Students listening to an explanation at the Ota River Office
[Ota River Work Office, MLIT]

Photo 4-28 Students listening to an explanation of the Ota River Gion Floodgate
[Oshiba Blanch Office of Ota River Work Office]

Photo 4-29 Visit to the Disaster Reduction and Human Renovation Institution (Kobe)

Photo 4-30 Students listening to an explanation of community-based disaster prevention activities at Takatori Community Center
[Lecture by Mr. Hiroshi Kanaji]

The students participated in the 58^{h} Tone River Flood Fighting Drill conducted in Sano City, Tochigi in May 2009. In this exercise, they learned about Japan's flood fighting activities by observing displays of construction methods to control floods and participating in sandbag preparation.

Photo 4-31, 32 At the Flood Fighting Drill

In June 2009, students visited sites in Tohoku region and engaged in activities such as observation of Tokusui-en (Oshu City, Iwate), the diversion facility for irrigation water, Isawa Dam construction site, and Ichinoseki Retarding Basin, an informational interview session with residents in the Hata area of Oshu City, Iwate, and lectures on disaster prevention activities in Kesennuma City, Miyagi. The discussion with the residents of Hata area was featured in the local paper (*Tanko Nichinichi Shimbun*).

Photo 4-33 Students listening to an explanation at Tokusui-en (Oshu City)

Photo 4-34 Observation at the Isawa Dam construction site
[Isawa Dam Construction Office, MLIT]

Photo 4-35 Informational interview session with the residents of the Hata area of Oshu City (at Hata Community Center)

Photo 4-36 Students listening to a lecture at Karakuwa Visitor Center (Kesennuma City)
[Kesennuma City Crisis Management Department]

Photo 4-37 Students listening to an explanation of the Kitakami River flood management project at "Ai Port" [Iwate River and National Route Work Office, MLIT]

Photo 4-38 Signs that show water levels of floods caused by previous typhoons (At Roadside Station Kawasaki)

In August 2009, the students took a field trip to the large-scale sabo project site at the Imo River which was closed after suffering massive earthquake damage due to its location at the epicenter of the 2004 Mid Niigata Prefecture Earthquake, as well as to the Shinano River diversion channel, the Kurobe River sediment project site, and Kurobe Dam.

Photo 4-39 Students listening to an explanation of river improvement works [Yuzawa Sabo Work Office, MLIT]

Photo 4-40 Students listening to an explanation of the Shinano River diversion project [Shinano River Work Office, MLIT]

When writing Master's theses, the content that each student wished to study in order to solve water hazards in their home countries were respected. ICHARM researchers met with individual students and appropriately provided supports for their study. Although the students struggled to get used to the unfamiliar lifestyle of Japan in this long program, they successfully completed their Master's theses thanks to the helpful advice of ICHARM researchers. On August 7, 2009, they presented their theses that they had worked so hard on over the previous year.

Photo 4-41～49 Final Presentation by students and Prof. Kenji Okazaki (GRIPS)

Programs of this kind helps not only students but ICAHRM as well. The program is a great opportunity for students to increase their professional knowledge by working on their theses. At the same time, it greatly helps ICHARM itself to build closer relationships with students and create and spread a global network through them. Such a network will surely contribute greatly to future ICHARM activities.

Starting with this year's program, the students were encouraged to submit their theses to Japanese academic societies. As a result, Mr. Biswas (Bangladesh) and Mr. Jin (China) presented their theses at the Japan Society of Hydrology and Water Resources in August and the International Summer Symposium of Japan Society of Civil Engineers in September, respectively. Moreover, Mr. Jin received a Certificate of Excellence in his session in the International Summer Symposium of Japan Society of Civil Engineers. Of course Mr. Jin's effort was the major factor in this achievement. Still, it is also the outcome of the two-year effort to improve this Master's course since its establishment so that the program will become as good as other university programs. The staff is committed to making further improvements in the future.

The program intends to provide more opportunities for students to present their studies outside the program to motivate them to work on their Master's theses.

Photo 4-50 Mr. Biswas' poster presentation at the Japan Society of Hydrology and Water Resources

Photo 4-51 Mr. Jin's presentation in the International Summer Symposium of Japan Society of Civil Engineers


JSCE

JAPAN SOCIETY OF CIVIL ENGINEERS

presents this

CERTIFICATE OF EXCELLENCE

to

Ke Jin

An Overview to Water Resources Management in Taihu Lake Basin: Challenges and Suggestions

in recognition for the distinguished presentation of his/her research achievements in an advanced comprehensible way during the 11th International Summer Symposium of Japan Society of Civil Engineers held on September 11, 2009 in Tokyo. The committees wish that this research may further flourish. Given this 11th day of September, 2009

Hitoshi FURUTA
Chair, International Activities Committee
Japan Society of Civil Engineers

Photo 4-52 Mr. Jin received a Certificate of Excellence from the representative of Japan Society of Civil Engineers

On September 16, 2008, the graduation ceremony was held at GRIPS, followed by the closing ceremony at the JICA Tsukuba Office on September 18. Mr. Biswas from Bangladesh is awarded the Outstanding Award for his distinguished achievement.

Photo 4-53 Degree conferral ceremony (GRIPS)

Photo 4-54 Receiving Outstanding Award

The purpose of this course is to train experts with the essential latest social technologies so that they can exhibit the importance of disaster management in national planning to policy makers. However, this cannot be achieved instantaneously; there is a necessity to provide continuous follow-up after the students return to their home countries.

Photo 4-55 Group picture of the closing ceremony held at the JICA Tsukuba office (September 18, 2009)

Chapter 5: Master's Thesis

As described above, one of the features of this Master's course is its problem solving-oriented structure that aims to provide training to make students think and solve problems on their own rather than simply providing one-way training. One of the graduation requirements of this course is to write a Master's thesis on an issue which each student identifies and finds a solution for by himself. This assignment helps students develop the capacity to formulate integrated flood mitigation plans and will also help them address other issues at home.

To achieve this objective, the course first required students to present Inception Reports to introduce problems in their home countries. Students presented information on areas that were expected to be covered in their Master's theses and the actions required to implement projects.

In addition, in December 2008, ICHARM supervisors and students discussed themes that they wished to work on. Students started working on their studies in the late March when they completed most lectures and exercises. Through discussions with ICHARM researchers, they continued working hard on their theses and submitted them to their examiners and supervisors by mid August. Seven of eight students were awarded a Master's degree in disaster management after a close examination of the submitted theses.

Table 5-1 shows the thesis title and examiner and supervisor of each student. Reference 5-1 shows a synopsis of each thesis.

Table 5-1 List of Master's Thesis Titles

Name	Title	Examiner/Supervisor
Robin Kumar Biswas (Bangladesh)	Water Level Prediction by Artificial Neural Networks in the Surma-Kushiyara River System of Bangladesh	Prof. Jayawardena Amithirigala (ICHARM) Prof. Shigeru Morichi (GRIPS), Prof. Shigenobu Tanaka (ICHARM), Asso. Prof. Kazuhiko Fukami (ICHARM)
Banda Mohd. Sarfaraz (Bangladesh)	Migration characteristics of meandering channels based on river morphodynamics	Prof. Shinji Egashira(Newjec) Prof. Kenji Okazaki (GRIPS), Prof. Shigenobu Tanaka (ICHARM), Asso. Prof. Katsuhito Miyake (ICHARM)
Jin Ke (China)	A methodological study to improve flood management of the Taihu Lake Basin	Prof. Kuniyoshi Takeuchi (ICHARM) Prof. Ikuo Shimomura (GRIPS), Prof. Shigenobu Tanaka (ICHARM), Asso. Prof. Jun Magome (ICHARM)
Xiao Fei (China)	HYDRAULIC MODELLING OF NENJIANG RIVER FLOODPLAIN IN NORTHEAST CHINA	Prof. Jayawardena Amithirigala(ICHARM) Prof. Shigeru Morichi (GRIPS), Asso. Prof. Junichi Yoshitani (NILIM), Asso. Prof. Katsuhito Miyake (ICHARM)
Alemu Yonas Tadesse (Ethiopia)	ANALYSIS OF SOCIO-ECONOMIC IMPACTS OF FLOODING IN DIRE DAWA, ETHIOPIA	Prof. Jayawardena Amithirigala(ICHARM) Prof. Kenji Okazaki (GRIPS), Asso. Prof. Junichi Yoshitani (NILIM), Asso. Prof. Jun Magome (ICHARM)
Maruli Tua Gregorius Simatupang (Indonesia)	IDENTIFICATION OF ILLEGAL RESIDENCE POTENTIAL EFFECT IN FLOODPLAIN AND SOCIO-ECONOMY EFFORTS FOR SOLUTION	Prof. Kuniyoshi Takeuchi (ICHARM) Prof. Shigeru Morichi (GRIPS), Asso. Prof. Junichi Yoshitani (NILIM), Asso. Prof. Pham Thanh Hai (ICHARM)
Manohar Kumar Sah (Nepal)	INUNDATION ANALYSIS AND DEVELOPMENT OF RAINFALL RUNOFF MODEL FOR TINAU RIVER BASIN IN NEPAL	Prof. Jayawardena Amithirigala(ICHARM) Prof. Hideo Fukui (GRIPS), Asso. Prof. Kazuhiko Fukami (ICHARM), Asso. Prof. Katsuhito Miyake (ICHARM),

Chapter 6: Course Evaluation and Issues for Future Improvement

6.1 Course evaluation by the students

In the first half of the course, homeroom sessions were held once a month to provide opportunities for students and ICHARM staff to exchange opinions. In the mid-term period of the course, ICHARM and GRIPS each conducted surveys on lectures and instructors. On the final day of the course, an evaluation session was conducted to evaluate the overall course.

Table 6-1 List of evaluations on the Master's course

Date	Main topics
Homeroom (held about once a month during the first half of the course)	General aspects such as about living at ICHARM, lectures and instructors, individual studies, etc.
March 2008 Mid-term survey (1)	(Survey by ICHARM) Evaluation of lectures and instructors over the past six months
April 2008 Mid-term survey (2)	(Survey by GRIPS) Evaluation of lectures and instructors over the past six months
September 2008 Evaluation session	(JICA survey) 1. Suitability of the goals with actual needs 2. Evaluation of the training curriculum 3. Length of the training 4. Lecture presentations of instructors 5. Textbooks, training tools, and facilities 6. Management of the training course 7. Fulfillment of expectations 8. Achievement level compared to original goals

In the following sections, 6.1.1 discusses the evaluation of lectures found in the Mid-term survey, 6.1.2 discusses the evaluation of instructors found in the Mid-term survey, and 6.1.3 discusses the evaluation of the overall course found in the evaluation session.

6.1.1 Lecture evaluation

In the survey done by GRIPS, individual lectures and exercises were evaluated in five levels based on the 14 perspectives listed in Table 6-2. Figure 6-1 shows a graph of average points of individual categories of lectures and exercises. Figure 6-2 shows the average scores of individual lectures. Figure 6-3 shows the average scores of individual categories.

Figure 6-2 List of GRIPS survey categories

Lectures	1. The course was well-designed in order to provide students with good understanding of the content.
	2. The level (difficulty)of this course was appropriate.
	3. The course helped me think logically.
	4. I would like to recommend this course to other students.
	5. The issues and the topics discussed during the class were appropriate and relevant to the goal of the course.
	6. The course was intellectually stimulating.
	7. What I learned in the course will be useful for my future professional activities.
	8. The quantity, content, and level of assignments were adequate.
Instructors	9. The examination(s) and grading method were appropriate for the class.
	10. The instructor taught this course according to the syllabus.
	11. The instructor presented ideas clearly and logically.
	12. The instructor provided useful study materials.
	13. The instructor was well prepared for each class.
Overall evaluation	14. As an overall evaluation, the course was useful and meaningful.

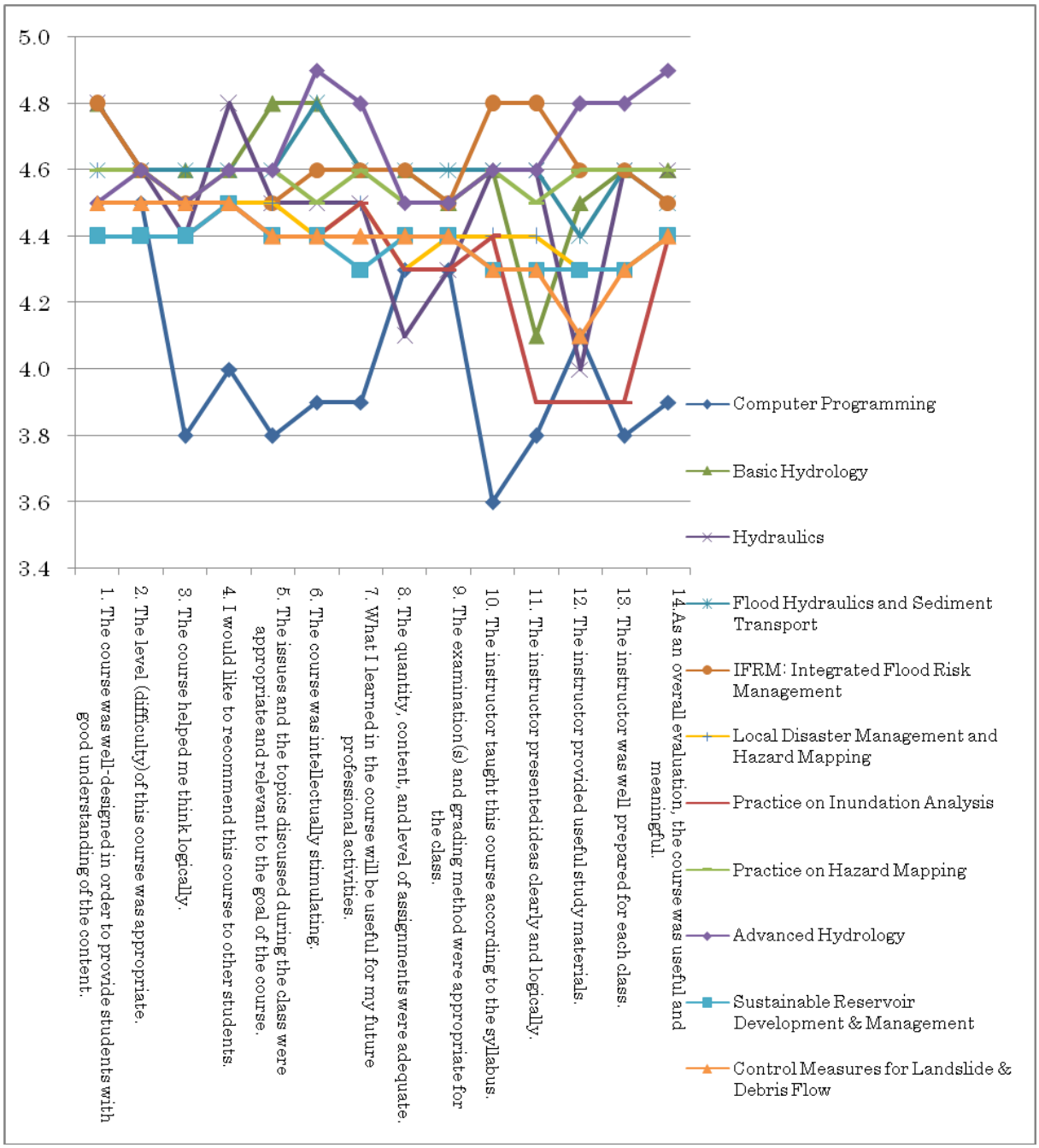


Figure 6-1 Evaluation of individual categories of lectures

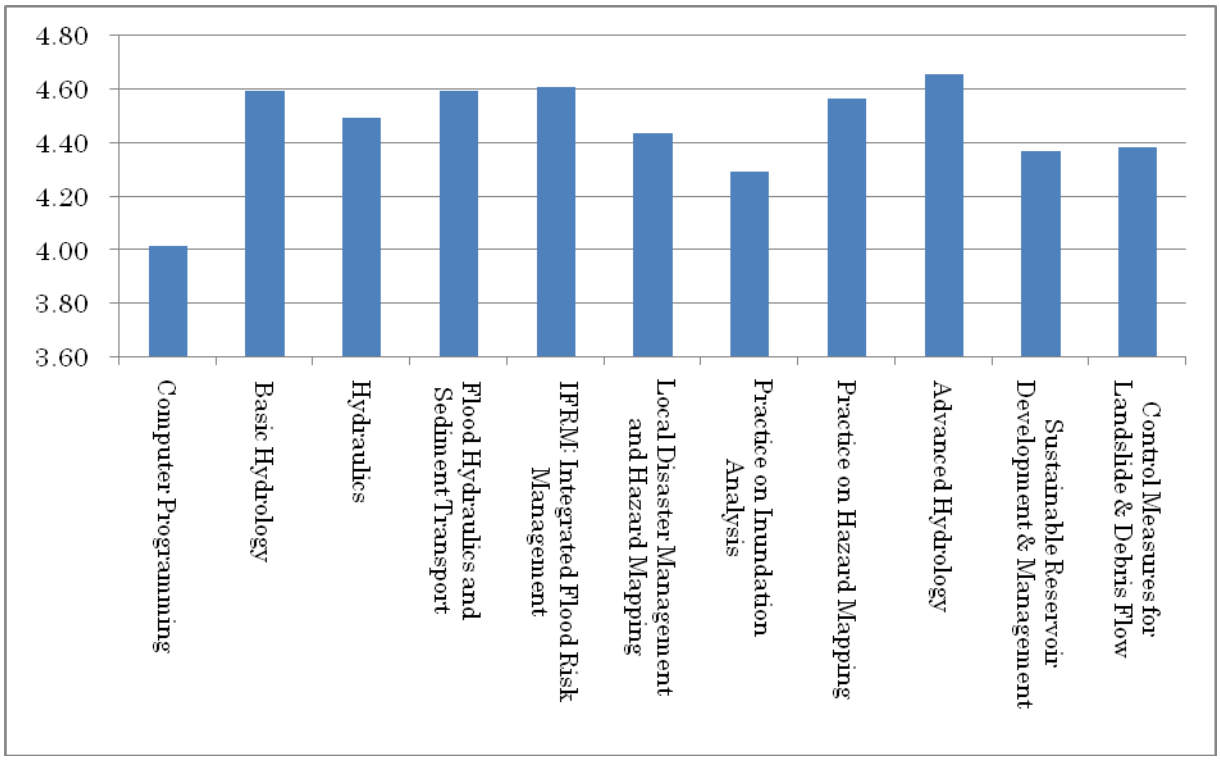


Figure 6-2 Average scores of individual lectures

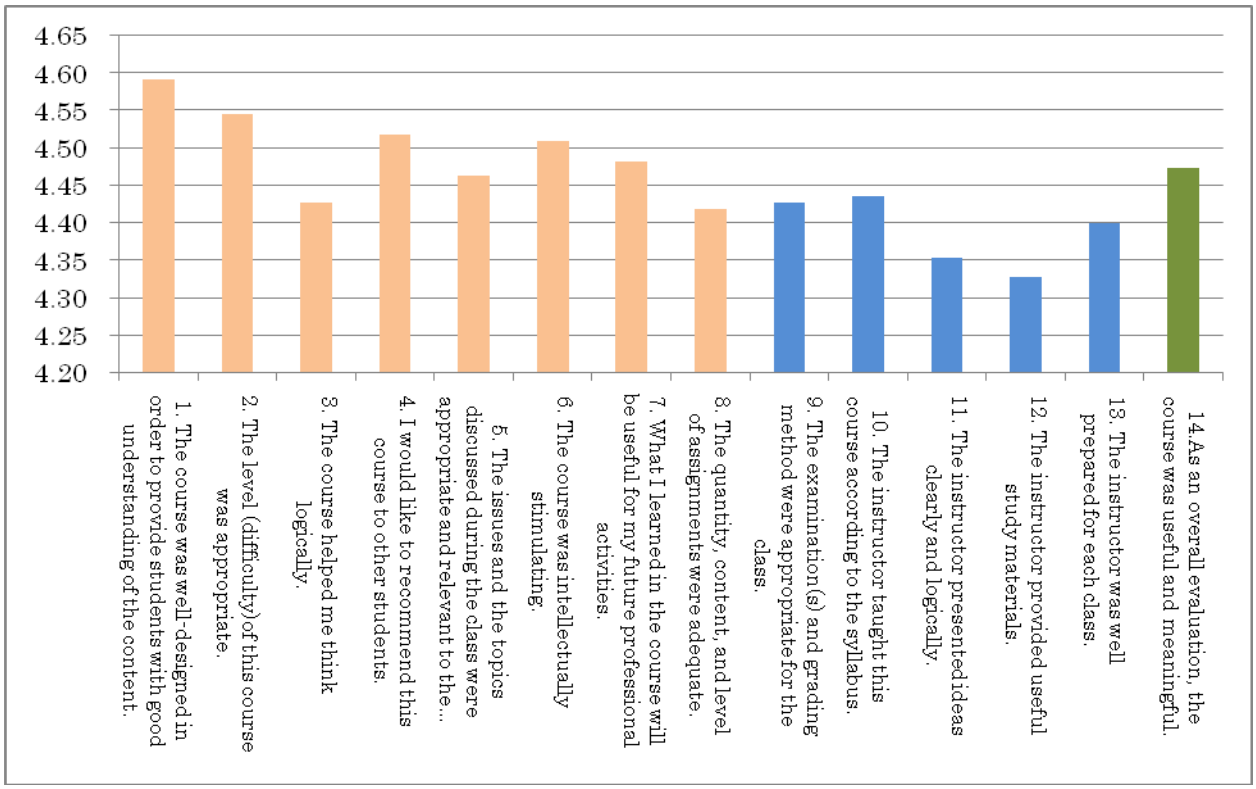


Figure 6-3 Average scores of individual categories

The ICHARM survey contained the following questions.

Q-1	Please describe the good/bad points regarding to the subjects. (including practice).
Q-2	Please fill in the name and the reason of **the best 5 useful lectures** for the water-related disaster mitigation in your country.
Q-3	If you think there are **any subjects of lectures to be added or deleted** to the course, please describe.
Q-4	Please fill in the name and the reason of **the best 3 lecturers** ***(Except for ICHARM Staff).***
Q-5	If you have any requests and comments for the course, please give us your opinions freely.

Individual lectures were evaluated based on five levels in the GRIPS survey and free responses in the ICHARM survey. The outcomes of the surveys are analyzed by generally examining both of them. Reference 6-1 lists the free responses of the students.

Although the free responses mostly contained favorable evaluations of each lecture, they also contained suggestions for improvement for the next year.

As shown in Figures 6-1 and 6-2, Computer Programming received relatively low evaluations. The free responses identified that suggestions for improvement in the free answers were mostly based on insufficient time for exercise rather than dissatisfaction toward the contents. Examples include, “Exercises to deal with actual problems would be more helpful,” “I need more exercises,” “The course should include Visual Basic other than Fortran and other languages,” and “I want to learn more practical applications.” The surveys indicated that the program needed to include more practical exercises while maintaining relevance with other lecture contents.

In terms of Practice on Inundation Analysis, many students responded that it was a useful lecture. However, suggestions included many responses such as, “I want more detailed explanations and discussions on logical backgrounds and governing equations of the models covered in the class,” and “I want more time.” Thus, the course should have included more detailed explanations of content in addition to explanations of how to use the models.

Sustainable Reservoir Development & Management and Control Measures for Landslide & Debris Flow covered a wide variety of content and was taught by various instructors. Thus, these courses tended to be repetitive and incoherent between classes. Free responses included opinions such as, “The class only covered explanation of overviews without going into details,” and “I couldn’t get a clear picture of the concept.” Next year, Sustainable Reservoir Development & Management in particular will be structured so that students will learn from one textbook from cover to cover over the entire course.

Many students answered that Hydraulics did not have enough exercises. The hours of exercise were reduced to half of last year’s course because many students from last year’s program answered that the amount was too much. Since it is difficult to increase hours of exercise due to the curriculum structure, it is necessary to enrich the homework assignments so that students can study on their own.

Students pointed out that the exercise in Practice on Hazard Mapping was difficult because available data to create terrain maps was limited in some countries. Improvements such as conducting exercises using data from Japan will be necessary.

Based on Figure 6-3, categories with low evaluations included **11. The instructor presented ideas clearly and logically**, and **12. Instructor provided useful study materials**. The common factor seen in both categories is that instructors tend to focus on explanations using a large amount of PowerPoint slides and end up not providing detailed explanations of graphs and figures.

6.1.2 Instructor evaluation

The ICHARM survey asked students to list the three best instructors and the five most useful lectures. Tables 6-3 and 6-4 show the outcomes thereof. Although the students were instructed not to include ICHARM staff in the three best instructors, some students did so anyways. Some students were confused lecturers with instructors.

Table 6-3 The three best instructors

(Valid responses: 8 students)

No.	Best1	Best2	Best3
1	Prof. Fukuoka (Chuo Unvi.)	Dr. Osti Rabindra (ICHARM)	Prof. Takeuchi (ICHARM)
2	Prof. Fukuoka (Chuo Unvi.)	Dr. Fujisawa (PWRI)	Prof. Ishikawa (Tokyo Institute of Technology)
3	Prof.Jayawardena (ICHARM)	Prof. Fukuoka (Chuo Unvi.)	Prof. Ishikawa (Tokyo Institute of Technology)
4	Prof.Jayawardena (ICHARM)	Prof. Takeuchi (ICHARM)	Prof. Ishikawa (Tokyo Institute of Technology)
5	Prof. Ishikawa (Tokyo Institute of Technology)	Prof. Watanabe (Kitami Institute of Technology)	Prof. Fukuoka (Chuo Univ.)
6	Prof.Jayawardena (ICHARM)	Prof. Ishikawa (Tokyo Institute of Technology)	Prof. Takeuchi (ICHARM)
7	Prof. Fukuoka (Chuo Univ.)	Prof. Ishikawa (Tokyo Institute of Technology)	Prof. Watanabe (Kitami Institute of Technology)
8	Prof. Ishikawa (Tokyo Institute of Technology)	Prof. Egashira (NEWJEC Inc.)	Prof. Fukuoka (Chuo Univ.)

Table 6-4 The five most useful lectures

(Valid responses: 8 students)

No.	Best1	Best2	Best3	Best4	Best5
1	Local Disaster Management and Hazard Mapping	Practice on inundation analysis	Local Disaster Management and Hazard Mapping	Flood Hydraulics and Sediment Transport	Sustainable Reservoir Development & Management
2	Basic concept of IFRM	Local Disaster Management and Hazard Mapping	Flood Hydraulics and Sediment Transport	Sustainable Reservoir Development & Management	Control measures for landslide and debris flow
3	Basic hydrology	Advanced hydrology	Hydraulics	Computer Programming	GIS
4	Prof. Amithirigala Widhanelage JAYAWARDENA	Prof. Kuniyoshi Takeuchi	Prof. Fukuoka, Chuo Univ	Prof. Oki, Tokyo Univ	Dr. Amano, PWRI
5	Basic concept of IFRM	Basic hydrology	Advanced hydrology	Flood hydraulics and sediment Transport	Practice on inundation analysis
6	Basic hydrology	Advanced hydrology	Hydraulics	Basic concept of IFRM	Practice on inundation analysis
7	Basic & advanced hydrology	Basic concept of IFRM	Practice on inundation analysis	Flood hydraulics& sediment transport	Hydraulics
8	Basic concept of IFRM	Basic hydrology	Advanced hydrology	Flood hydraulics and sediment Transport	Practice on inundation analysis

As shown in Table 6-3, of those instructors not from ICHARM, Prof. Ishikawa (Tokyo Institute of Technology) and Prof. Fukuoka (Chuo Univ.) were highly received by students. Especially, Prof. Fukuoka received high evaluations even when his lectures and the surveys were conducted six months apart. This indicates that his lectures left strong impressions on the students and were best matched their needs. Also, Prof Watanabe (Kitami Institute of Technology) and Prof. Egashira (NEWJEC, Inc. and former professor at Ritsumeikan Univ.) received high evaluations. They were in charge of the lectures on flood hydraulics and sediment transport, which indicate that students who work in actual projects found these lectures most useful. It is necessary to improve the contents of these lectures. Prof. Ishikawa often used a blackboard in his lectures, and the thorough teaching on hydraulics, a fundamental concept, was likely well-received among students.

As in the last year, it was notable that almost all instructors selected in this survey were university professors (or those with teaching experience in universities). This Master's course has about 50 instructors, all of whom provide excellent lectures. Still, the high evaluations for university professors indicate that they probably know how to keep students focused from their experiences of teaching on daily basis.

Table 6-4 indicates that highly evaluated lectures were those taught by the instructors selected in Table 6-3. Highly evaluated lectures include Flood Hydraulics and Sediment

Transport (Prof. Fukuoka), Hydraulics (Prof. Ishikawa), Basic Hydrology/Advanced Hydrology (Prof. Jayawardena, research & training advisor of ICHARM), Basic Concept of IFRM (Prof. Takeuchi, director of ICHARM), and Local Disaster Management and Hazard Mapping (Prof. Tanaka, group leader of ICHARM). These are almost identical to the outcome described in Figure 6-2. Although the Practice on Inundation Analysis received a relatively low evaluation on the GRIPS survey, it was well-received as shown in Table 6-4. It indicates that although many students recognized the importance of the exercise, they felt the need for logical explanations of analytical tools and other useful information.

6.1.3 General course evaluation

JICA conducted a student survey at the end of the course. The following section uses quotes to analyze the outcome.

1. Achievement level of unit goals

Students answered that they mostly achieved their objectives. Many of them responded that the units were important aspects in achieving their overall objectives.

2. Contents of individual units

Many of the lectures listed in "Most useful lectures" were the same as those listed in Table 6-4. Lectures that should be added in the future included "methods to promote disaster prevention" and "local activities toward disaster prevention." These aspects are already covered in this course such as the informational interview session with the residents of Ise City. However, it is necessary to improve them through means such as incorporating stories from municipal officials on-site difficulties.

3. Program design

Three students answered that the length of the program was "appropriate" and five answered "too short." Every year, many students answer that the length is short. Since this is a one-year course to grant Master's degree to students, the schedule makes the students complete all lectures and exercises in the first half of the year and work on Master's theses in the second half. Thus, many students seem to feel that the time allocated to write theses is too short. It is necessary to implement some measures next year, such as making students decide their theses themes earlier than they did this year.

4. Will the knowledge and experiences gained through this training be useful? How will students utilize them?

Two students answered, "I can directly utilize them in my line of work." Six answered, "Although I cannot directly utilize it, I can apply it to my line of work." Nonetheless, the majority of students answered that it would be difficult to utilize the achievements of this training after they returned to their home countries. The reasons included, "Because I am not authorized to make decisions (five students)," and "It is difficult to secure a budget to put them into practice (five students)."

This Master's thesis course is a problem solving-oriented course that aims to improve an organization's ability to respond to various situations. In order to achieve this objective, the deep understanding and support of the students' home organizations are essential. Thus, the program needs to implement inclusive efforts that involve the leaders of the home organizations rather than simply improving the capabilities of the trainees.

6.2 Course evaluation by ICHARM

6.2.1 Evaluation of the students' achievement of the course content

Although no student failed to complete the requirements for the degree, it was unfortunate that one student had to return home for health issues.

Although this is common to any training program, since the capabilities of students vary, there were some impediments to the progress of lectures and exercises. Although the program encouraged students to select theses themes to help the problems that they faced, one student was unfortuantely unable to receive a Master's degree.

Table 6-5 shows the evaluation of the achievement levels of individual course contents.

The following training objective was achieved as described below.

To develop the trainee's capacity to practically manage the problems and issues concerning water-related disasters in local levels and to contribute for socio-economic and environmental improvements in regional and national levels in developing countries.

Students seemed to be able to improve their practical capabilities to deal with community-level water-related disasters and essential knowledge and skills to make socioeconomic and environmental improvements at various levels from the national to the community level, through lectures and exercises such as Basic Concepts of Integrated Flood Risk Management (IFRM) and Local Disaster Management and Hazard Mapping.

The following training objective was achieved as described below.

Students are expected to become an independent investigator in the areas of integrated flood disaster management, who is equipped with the most advance technical and legal know-how to enhance the basic understand of the challenges of flood risks and to translate this knowledge back to a practical water-related disaster reduction strategies including poverty reduction and the promotion of sustainable development at local, national and regional level.

Students successfully acquired the latest fundamental and application knowledge essential in flood management through lectures and exercises such as Hydraulics, Flood Hydraulics and Sediment Transport, and Sustainable Reservoir Development & Management, as well as field trips to various parts of Japan. They turned themselves into experts in the field of general flood management.

Individual students need to put further efforts to implement the contents they learned in this program in water hazard mitigation strategy planning in their home countries in the future. The program is also expected to establish a system to follow-up on their efforts.

Table 6-5 Evaluation of the students' achievement of the course content

Unit goal	Indicator	Achievement level
1) To learn recent approaches employed across the world in integrated flood risk management	Class contribution, written exam	All students demonstrated a general understanding of integrated flood risk management through the lectures and class discussions.
2) To become able to clarify what is necessary to effectively reduce flood risk at the local and national levels, including public policies. Additionally, to become able to plan a risk management system at the local and national levels as well as develop a management system which includes various stakeholders and cooperation among organizations.	Contribution to the Town Watching exercise, written exam	All students came to understand the importance of risk reduction by means of flood hazard maps through the Town Watching exercise and interviews with residents in Ise City. They also learned the administrative and legal systems in Japan for risk management through the lectures.
3) To become able to develop indices at the local and national levels to detect and monitor changes in emergency response and disaster risk reduction as well as to become able to monitor the status and impacts of policies using such indices.	Reports, written exam	All students understood the importance of fundamentals necessary for flood control, such as basic knowledge in hydrology and hydraulics, major flood control structures (e.g. dams and levees), and sabo projects, through the lectures, exercises, and field trips. This understanding will help the students develop indices to detect and monitor changes in emergency response and disaster risk reduction.
4) To become able to contribute to the implementation of plans developed based on integrated risk management policies which are formulated in clearly-defined financial, institutional, and legal frameworks.	Write Master's thesis	All students identified flood-related problems in their home countries, studied possible strategies to solve them, and completed their Master's theses.
5) To become able to develop a risk management strategy which incorporates major critical management factors, such as emergency response, restoration, mitigation and preparedness. The strategy should also pay due consideration to issues in risk detection and information dissemination, as well as emerging threats such as global warming and climate change.	General evaluation based on attitudes in class, results of exercises, attitudes of working on Master's theses etc.	Students acquired various knowledge and skills as well as abilities to develop risk management strategies through various lectures, exercises, and field trips conducted over six months.

6.2.2 Evaluation of the entire course and improvements for the future

1) Improvements made from last year and the effects thereof

As discussed in 3.2, the course curriculum was reorganized and the number of lectures was increased based on student requests and other considerations.

For example, the lecture on Hydrology only had 15 units last year. Starting this year, however, the lecture was divided into Basic Hydrology (15 units) and Advanced Hydrology (15 units) to cover more content in response to student opinions stating that the Hydrology lecture covered a lot of content and progressed too quickly. As a result, as shown in Table 6-4, the students recognized both lectures as useful lectures. That was great progress, considering last year that Hydrology was not well received by the students as a lecture that will be useful in their home countries.

Computer Programming was added as a new lecture this year. As discussed in 6.1.1, although students' superficial evaluation was not very high, it could become higher depending on how the lecture is improved, judging from the free responses of the students. More practically applicable content will be added to this lecture while balancing it with the content of other lectures next year.

Last year's well-received lectures included River Channel Planning, Concept of IFRM, and Outline of IFRM. These lectures were offered as lectures in IFRM (1) – (3). Since students expressed that reorganization into IFRM (1) - (3) would be somewhat inefficient because of overlapping contents, however, the lectures were reorganized into two lectures, IFRM and Flood Hydraulics & Sediment Transport. Further improvements have been made as a result; almost all students ranked all these lectures as the five most useful lectures.

2) General evaluation

This program is in its second year. This year's program was implemented based lessons learned from last year's experience. All students achieved the unit objectives in the general evaluation and successfully completed the program.

Nonetheless, there was a wider variety in students' capabilities than the first year. The abilities of capable students and struggling students were notably different. Two top students, Mr. Biswas and Mr. Jin, presented their studies at the Japan Society of Hydrology and Water Resources (August) and the International Summer Symposium of Japan Society of Civil Engineers (September), respectively. In particular, Mr. Jin received a Certificate of Excellence in his session in the International Summer Symposium of Japan Society of Civil Engineers. These two students successfully represented the effects of the training. On the contrary, some students still struggled to conduct sufficient research on their theses topics one month before the deadline, and one student failed to submit the thesis before the deadline and could not receive the Master's degree. Urgent measures to deal with such issues are needed for the next year's program.

The course orientation makes an effort to enforce basic rules such as the requirement that students be on time for lectures and assignment deadlines. However, more students than last year failed to be on time and keep deadlines. Last year's program had three Japanese students from whom international students could learn the attitudes of studying and contents of lectures. Such environment seemed to assist students to realize the importance of being punctual. Fortunately, the 2009-2010 program has one Japanese student, and similar benefits are expected.

3) Coordination with other training courses

The JICA training course, Flood Hazard Mapping, was simultaneously implemented in

November, the mid-term period of this Master's course, and almost all lectures, exercises, and field trips were jointly conducted.

The joint implementation of the Flood Hazard Mapping training course enabled training to be provided to a total of 19 students from Bangladesh, Cambodia, China, Ethiopia, Malaysia, Indonesia, Nepal, Laos, the Philippines, Thailand, and Vietnam, covering 11 countries that are especially associated with heavy flood damage in Asia.

This wide variety of the students provided global perspectives to the training and contributed to active discussions and exercises. Also, it facilitated more interaction among the students. For the training course next year, collaboration with other training courses will be further promoted.

4) Improvements to be made in the future

The issues identified through this year's course are as follows.

Improvement for better thesis writing

JICA is currently offering Japanese language training, but intensive English training is necessary to write Master's theses in English. It is also necessary to continuously provide English language advice when writing theses. In addition, guidance is necessary on how to use basic computer software that is necessary to write theses, such as MS Word and Excel.

Procedures for thesis writing

Based on the lessons learned last year, the program had students select Master's theses topics earlier than last year. ICHARM research specialists were also assigned as individual tutors, and supposedly sufficient time and guidance systems were provided for writing theses. Still, there were students with less experience in analyzing problems of water-related disasters in their home countries, and the program did not necessarily progress as initially intended.

In the process of thesis writing, some of the students had trouble collecting necessary data from their organizations due to lack of cooperation and communication. One important issue is how to promote a sense of ownership not only in the students but also in their organization.

Field trips

Field trips are valuable learning experiences for students to actually observe the flood control strategies of other countries. Thus, reports were assigned before and after the trips so that the trips would not end up as just fun excursions. It is necessary to continue this exercise also in order to improve the students' basic English writing skills.

Action plans

There was not enough time to spend developing action plans because the students started working on them after submitting their Master's theses with not many days left before departing for their home countries. More time should be allocated for the development of action plans by setting the due date for Master's theses earlier.

In order to make action plans more feasible, the program should require students to communicate with their home organizations in the process of creating their action plans and provide follow-up at six months and/or one year after they return home.

Follow-up activities after completing the training

The purpose of this Master's course is to train experts with the essential latest social technologies so that they can exhibit the importance of disaster management in national planning to policy makers. Still, as this cannot be achieved instantaneously;

there is a necessity to provide continuous follow-up after the students return to their home countries.

Chapter 7: Overall Conclusion

7.1 Achievements in the Master's training course

ICHARM regards training activities as one of the three main activities along with research activities and information networking activities.

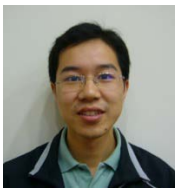
Based on that, ICHARM has implemented a five-year JICA Flood Hazard Mapping training course program. Starting fiscal 2009, it is planning to start the JICA Local Emergency Operation Plan with Flood Hazard Map, which aims to improve organizational abilities of disaster prevention institutions to deal with disasters as a new three-year project.

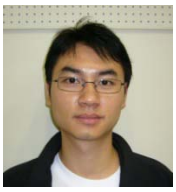
The second term of this Master's course was successfully implemented, and the planning and management of this course further strengthened the organization's capabilities. The opportunity also allowed ICHARM to contribute to solving water issues in the target countries of this course through assisting students in writing their Master's theses. This is one of ICHARM's successful projects, which is an embodiment of "Localism," one of the keywords for ICHARM activities.

This course also contributes considerably to information networking activities. That is, the connections with the students' home organizations are becoming stronger each year, which has provided better visibility of local situations in many ways. This worldwide information networking through students will definitely help ICHARM with its future activities, and close contact should be kept with them even after their graduation.

7.2 Messages from the graduates

Below are messages from six of the eight graduates of this course.

Name	Message
 Biswas Robin Kumar	Technology is always advancing for the betterment of mankind. Being a citizen of a developing country like Bangladesh, I was not well up to date regarding the modern technological development all around the world in the field of disaster countermeasures. I am extremely elated to pick the opportunity to study about the disaster in ICHARM. The designed course of this organization is practical oriented and will be helpful for me in coming days to serve my country effectively and efficiently. I am thankful to all the members of ICHARM for providing a pleasant environment of knowledge accumulation.
 Jin Ke	I am so proud to participate in this Master Program. China is a developing country which is suffering from frequent natural disasters. Huge amount of losses are caused by natural disasters each year. Japan is a developed country which has abundant experiences of disaster management and mitigation. Learning advanced technologies and experiences from Japan would surely contribute to the sustainable development of China. During my stay, ICHARM invited professors from different research institutes. They taught me lots of related theories, together with the causes, phenomena and prevention methods of different natural disasters. Theoretically discussing and practically application combined perfectly. This is my first chance to study abroad. I learned plenty of specialized theories and advanced disaster mitigation methods, and have formed a scientific way of thinking. Thanks to JICA, thanks to ICHARM, thanks to GRIPS, for giving me such a great learning opportunity. I would go on devoting myself to hard studying and striving for more progress. I believe in that the learning experiences here would momentously impact on my working ability after my returning to China.

Name	Message
 Xiao Fei	Time goes so quickly that this one-year master course of Water Related Risk Management will soon come to the end in September. I can still remember the time when I arrived in Japan, the most developed countries in Asia. Upon my arrival, I had a wonderful time and also I could build a better understanding of Japanese people, culture and the society. During this course, I achieved so much from the advanced lectures and reports of different topics, especially the lectures of Flood Risk management, Basic and Advanced Hydrology and Hydraulics, it would really help me a lot in my future works. One year is tough for me to learn so much knowledge and to complete the master thesis within six months. However, I could concentrate myself totally on the study since I had joined work, and it gave me a valuable experience and unforgettable memory. I am so grateful to GRIPS, ICHARM and JICA. And I really appreciate the comfortable studying and living environment that had been provided. I sincerely extend my great thanks to professors of GRIPS and ICHARM, with the knowledge I acquired from them I can do a better job.
 Alemu Yonas Tadesse	ICHARM after officially established as an institute, has actively involved on research and training. ICHARM aims at contributing to the prevention and mitigation of water related disasters in the world. In the training sector ICHARM has did a lot to train students in a one year masters program. ICHARM has strong commitment and qualified staffs to equip students to be water related problem solvers and bring a difference in the water sector after completing their study. During the one year training program it is found that the curriculum for the program is well prepared, course contents are well selected and instructors are high standard. Moreover, the theoretical class lectures are supported by field excursion which gives good opportunity to students to realize how the theoretical knowledge could be implemented in the real environment in the field. This is one of the best practices which I observed in ICHARM during one year stay for training. The training program including the course delivered is quite important to produce qualified students and students who had the opportunity to study in ICHARM are confidential to involve and contribute their parts in the water related problems of their countries. Therefore, the master's program is very important in producing competent and responsible students in solving water related disasters. Moreover, staying in ICHARM not only helpful to study the subject matter of water related disasters rather it has the opportunity to learn how to collaborate and help each other and learn the importance of efficient utilization of time.
 Simatupang Maruli Tua Gregorius	"To be one of the participants in this "Flood-related Disaster Mitigation Master Program" is a great promising opportunity. I can learn a lot about flood and its mitigation and also special knowledge about mitigation policy. It is an interesting experience to study in Japan especially in ICHARM. Change information, experience and knowledge between all participants from other countries are one of the valuable things. Study in ICHARM is a big challenge because I can learn about flood from the experts. I hope all the knowledge which I acquire here can be implemented in my works specially to reduce the flood hazard in my country. Study in Japan is a thrilling and excited, because everything are organized well by ICHARM and JICA. The hospitality of Japan makes my stay become more pleasant. Last but not least, I would like to say sincerely thanks to all of lecturer and staff in ICHARM for great support during my study and to JICA by giving me a challenge to study in Japan. And also for all my friends, participants, for the great time that we spent together, helping and support each other, this is an unforgettable moment in my life."
 KHORSUK Banluesak	Living and studying in ICHARM are extremely far away from my normal life. We have to do everything in the short time which is tough for me. However, among the experts here, it is a very good opportunity to gain knowledge from them then apply that to our individual study and our work. This course is aiming to countermeasure for flood-related disaster. So far, we have learned a lot of things in various subjects, some are fundamental and some are applications. To be successful in disaster mitigation, we need both of them.

Acknowledgements

This Master's course is in its second year. Based on our experiences in the first year, we made various improvements, including reorganizing the overall schedule and curriculum. However, there is still more room for improvement, and we appreciate your opinions and suggestions.

The gratitude should also go to those in local public offices and the regional offices of the MLIT, as well as local residents. They were all willing to arrange their schedules around the students' field trips and spent time for informative talks with them.