



United Nations  
Educational, Scientific and  
Cultural Organization

# **ICHARM Strategies and Action Plan for 2006-2008**

**October 2006**

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

# ICHARM Strategies and the Action Plan for 2006-2008

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## **PREFACE**

Water disaster in the world is increasing more than ever before with the exponential expansion of human activities. The climate change is accelerating its severity. The concern is repeatedly highlighted and confirmed by various national and international meetings and initiatives. The latest ones are the United Nations World Conference on Disaster Reduction in Kobe 2005 and the International Flood Initiative launched in this occasion. It is along this line of global commitment that ICHARM was established in Tsukuba, Japan on 6 March 2006, supported by 191 UNESCO member countries and many other national and international organizations. I was appointed as the founding director of the Centre and feel honoured and obliged. I thank all the people and nations who supported the establishment of ICHARM. Without your enthusiastic support, it would have never been realized.

This document “ICHARM Strategies and the Action Plan for 2006-2008” was developed as the master guide of ICHARM, an evolving guide rather than a fixed rule. We held various workshops and symposia ever since the conception of ICHARM in 2003 to gather the wide spectrum of opinions on the needs of and the expectation to ICHARM. There were many experts, overseas and in Japan, who kindly contributed to the formulation of these strategies. The action plan was developed by ICHARM based on those strategies and the resource availability for their implementation. The draft was submitted for review to the first ICHARM Advisory Board held in Tsukuba on 15 September 2006. Many valuable comments by the advisors were reflected in this final version. I thank all the experts who contributed to enrich the document.

ICHARM aims to serve as the Centre of Excellence for water disaster risk management. Its main service is prescribing strategies and assisting their implementation. The main implementation assistance will be capacity building and connecting localities with relevant implementation organizations. The initial focus of ICHARM is flood-related disasters including flash flood, continental flood, landslide, debris flow, storm surge and tsunami. ICHARM will implement this task with the three pillars of activities: research, training and information networking.

ICHARM would like to utilize and integrate the advance technologies, indigenous knowledge and all the available means what-so-ever to reduce the disaster risk. In doing so, ICHARM will pay a strong attention to the diversity of society, taking an approach of *Localism* that tries to meet the real needs of the people in diverse society including poverty eradication and governance. Such challenges necessarily involve

many aspects beyond the scope of ICHARM. ICHARM likes to overcome this difficulty by alliance, an alliance with individuals, organizations and programs that can complement each other and make synergy.

Now we have well defined strategy and work plan with many ideas to lead this challenge to success. It is time to implement. We have a great enthusiasm and a commitment to carry it out. I sincerely ask your cooperation by sharing your knowledge and capacity with ICHARM. ICHARM calls for an alliance with you. Let us start working together.



Kuniyoshi Takeuchi  
Director of ICHARM

## 1. INTRODUCTION: POINT OF DEPARTURE

### *Increasing water-related disasters*

Humanity is now entering a new era of living with nature. Global warming and modification to natural landscape are intensifying the meteorological and hydrological hazards. On the other hand, population growth and economic development are increasing the societal vulnerability. As a consequence, human being is forced to live with increasing disaster risk and to change the lifestyle towards a more disaster conscious and prepared society.

The world has experienced unprecedented disasters in the past three years (2004-2006), such as the Indian Ocean Tsunami, the Hurricane Katrina and the Leyte Island Landslides. Many other water related disasters of various scales are also occurring one after another all over the world. Disaster statistics reveal that similar hazards can result in different consequences under different societal conditions and always more tragic to the poor and the weak such as the elderly, women, children, sick and handicapped.

The disaster database of the Belgian Université Catholique de Louvain's Centre for Research on the Epidemiology of Disasters (CRED) analysed by ICHARM (Merabtene & Yoshitani, 2005) shows the following increase in water disasters during the period from 1970 to 2004 (For an event to be entered in CRED Database, one of the following four criteria must apply: more than 10 people died, more than 100 people were affected, call for international assistance, or the government declares a state of emergency)

- The number of excess-water disasters (i.e. floods, cyclone, storms, landslides and storm surges) has increased on average from nearly 50 to 250 disasters per year (the number of disasters in 2002 was as high as 300 events).
- The number of affected people has increased on average from 50 to 300 million. More than 5,000 people are killed almost every year.

More specifically:

- The number of people affected as well as the number of fatalities due to too much water disasters has increased significantly especially since 1990, and particularly since 1998. The China floods in 1998 killed more than 3,000 people, affected a total of 250 million people, destroyed 2.9 million houses and ruined more than 9 million hectares of crops (Yoshitani et al., 2003). The Cambodia and Vietnam floods in 2000 killed 350 people in Cambodia and 450 in Vietnam. The economic damages were US\$80 million and US\$350 million in Cambodia and Vietnam,

respectively (International Federation of Red Cross and Red Crescent Societies, 2005). In 2002, devastating and costly floods occurred in European rivers especially in the Elbe and the Danube rivers. This flood is one among many devastating floods occurred in Europe during last two decades, such as the Rhine/Meuse floods of 1993 and 1995, the Oder flood of 1997, the UK floods in 2000 and in 2005, Hurricane Katrina took more than 1,330 lives and more than 2,096 people were reported missing (as of February 2006) and a total of about US\$96 billion worth of damages (White House, 2006).

- The areas affected are expanding in all continents and regions including areas that were historically seldom affected by floods such as arid countries like Iran, Egypt, Morocco and Yemen, as well as East and Central Europe. Nevertheless, Asian countries are by far more affected. Although the number of flood-related disaster events in Asia accounts for about 40%, the number of affected people is over 90% and fatalities are close to 90% of the global number. In terms of economic losses, the proportions are Asia 43%, Americas 35%, Europe 19%, Oceania 2% and Africa 1% (Merabtene & Yoshitani, 2005).

Thus the flood-related disasters occur all over the world and heavy human losses are concentrated in developing countries, whereas the economic losses are high in developed countries. The human casualties are closely related to poverty.

#### *International response to the increasing water-related disasters*

Responding to such devastating reality, the United Nations has taken a series of actions since the 1990s. The United Nations International Decade for Natural Disaster Reduction (IDNDR) took place in 1990–1999 followed by the United Nations International Strategy for Disaster Reduction (UN/ISDR). The World Conference on Natural Disaster Reduction convened by IDNDR in Yokohama, Japan, in May 1994 adopted the Yokohama Resolution “*Yokohama Strategy and Plan of Action for a Safer World*” emphasizing the importance of prevention and preparedness as an integral part of national development. The United Nations World Conference on Disaster Reduction (WCDR) organized by UN/ISDR in Kobe, Japan, in January 2005 adopted “*The Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*”. It was adopted by 168 countries and emphasizes, among others, the importance of assisting the poor and weak people with public–private partnerships to reduce their vulnerability to hazards.

The International Flood Initiative (IFI) was initiated by UNESCO-IHP in 2002 and

formally established by UNESCO, WMO, UN/ISDR and the United Nations University in 2005 at the WCDR. It is an initiative to specifically focus on reducing the risk of flood disasters. The mission statement of IFI reads: *“The International Flood Initiative promotes an integrated approach to flood management, at the same time reducing social, environmental and economic risks that result in and from floods and increasing the benefits from floods and the use of flood plains”* (UNESCO-WMO Joint-task Team, 2005). Here, development is considered an important aspect of disaster reduction, while it clearly states the needs to increase the benefits of floods.

Under such circumstances, the preparatory activity for the establishment of ICHARM was started, following the announcement of ICHARM’s establishment plan at the Ministerial Conference of the 3rd World Water Forum in March 2003. The official proposal of ICHARM as a UNESCO Category II Centre was presented at the UNESCO-IHP 16th Inter-Governmental Council (IGC) in September 2004. A large number of government representatives as well as many international organizations voiced their support, reflecting their concern of the spread and intensification of water related disasters all over the world and the need for a global centre to serve the emerging needs the risk management of water-hazard. ICHARM is a realization of these expectations.

Disasters are a threat to the life of people and the major setback to development. It is a threat to societal stability and sustainability. To follow is the ICHARM strategies and action plan for the period of 2006-2008 responding to the request of the people in the world to meet the needs of raising political and public awareness and promote societal commitment to reduce the risk of water-related disasters.

## 2. OBJECTIVE AND GOVERNING PRINCIPLES OF ICHARM

In order to meet the global necessity of reducing the risk of water-related disasters, ICHARM sets out the following objective.

### **Objective**

ICHARM serves as the Centre of Excellence to provide and assist implementation of the best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters including flood, drought, landslide, debris flow, storm surge, tsunami and water contamination.

ICHARM serves as the centre of excellence to deliver the best practicable strategies for managing water-related risk addressed to local communities of any scale under different conditions as well as to the globe. Its main objective is to formulate strategy and assisting implementation. The strategies will be prescribed reflecting the differences in targeted societies. The main implementation assistance of ICHARM would be centred on capacity building as human resource is the basis of any practical activities against disaster risks including political awareness raising, fund raising as well as guiding people. The other implementation assistance would be by bridging the necessary local actions with the relevant implementation organizations.

ICHARM is a global centre to serve all the regions in the world including humid tropics, temperate humid regions and arid and semi-arid regions. The centre will cover all types of water-related disasters caused by too much, too little and too dirty water. The initial focus will be on flood-related disasters including flash flood and continental flood, landslide, debris flow, storm surge and tsunami.

### *Localism and Alliance for Localism*

ICHARM considers the real needs of local disaster risk management, which are different in different communities depending on their geographical and societal conditions. The difference is especially large between developed and developing countries. Responding to such diverse needs, ICHARM takes the approach of *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 or regional experiences and trends. The first priority agenda in disaster management for developing countries would be the reduction of fatalities. The basic strategy to achieve this goal cannot neglect the problems of poverty and governance. Without facing such basic problems, no actions would be either effective or sustainable. ICHARM commits on localism to cope with the real problems of localities.

In order to implement activities based on these principles, it is obvious that ICHARM needs a strong alliance of individuals, institutions, programs and any other organizations throughout the world that are working for the common objective. Special emphasis is on those institutions that are working at the forefront with localities and their problems. ICHARM will strive to nurture synergy among these individuals and groups by building a network of experts working for localities around the world. ICHARM calls for *an Alliance for Localism* for developing this synergy to meet the real needs of the diverse global community in reducing the risk of water-related disasters.

Based on such understanding, ICHARM sets forth the following guiding principles:

### **Guiding Principles**

- To be needs driven rather than supply driven, responsive to respective local realities
- To prescribe tailored strategies to realize integrated risk management including avoidance, reduction, transference and acceptance under the multifaceted social, economic, institutional and cultural conditions as well as technological availability.
- To produce policy effective information and raise public awareness to promote societal action.
- To promote Research Development and Capacity Building jointly to bring science to where it is most needed.
- To work in alliance with all the related organizations of the world to mutually complement resources and expertise, and to create synergy in implementation.
- To serve as the centre of excellence for water hazards and risk management of the world and play a central role of its strategic promotion.

ICHARM recognizes that there is a high international expectation to the Japanese technology which has made Japanese industrialization, urbanization and economic development possible in the hazardous Asian monsoon region. ICHARM is ready to supply whatever ICHARM or PWRI has in its inventory. However, it recognizes that the supply of readily available technology in Japan is not nearly enough to meet the needs of a diverse community in the world.

As natural and socio-economic conditions differ in different regions and localities, ICHARM has to be needs driven and able to deliver the strategies that are needed in any locality, which requires an international inventory. Thus, ICHARM has to be a facilitator of all the managerial means and technologies available in the world. This is the necessary function of ICHARM to realize the localism approach.

To be *needs driven* for any locality, the strategies should inevitably follow the principles of integrated risk management where all possible means, social to technical, should be utilized to meet its natural and social constraints. Disaster mitigation is practical only if it is developed as an integral part of economic and social development.

ICHARM's overall mission is to lead societies to be more conscious in disaster risk. The political commitment is especially important. To this end, ICHARM aims to produce *policy effective* information that can be used by politicians to persuade parliaments and administrative sectors and increase the priority of disaster management in their national agenda. This is a challenge but absolutely necessary if ICHARM wishes to alter societal attitudes towards disaster risk. ICHARM will not repeat the effort of collecting large quantities of disaster information such as those undertaken by the Université Catholique de Louvain (Belgium), Munic Re (Germany) and Dartmouth University (USA), but will focus on reading and interpreting them, in combination with a wider range of statistics and documents, to derive policy effective information. The information should be universal for the global agenda but should be local and site specific for helping local communities. The challenge of studying the local realities in close cooperation with local experts and managers will be one of the main activities of ICHARM.

Another main guiding principle of ICHARM is to ensure that research development programmes are integrated with capacity building programmes. Science should be developed and owned by the people of the nation that needs it and will benefit from it. Otherwise, the advancement of science will always enlarge the science-divide between nations and between people. Science should not become an engine for

pumping up resources from developing countries to developed countries but one for sharing them. ICHARM wishes to develop, for example, an advanced technology for satellite-based hydro-meteorological forecasts and to be disseminated worldwide. It considers that such development should be made jointly with the people who need it most. This is only possible by promoting research development programmes jointly with capacity building programmes.

### **Management Strategy**

- To be the information clearinghouse and the facilitator of knowledge and technology transfer for the world and so to deliver whatever is available to wherever it is needed in the world.
- To make the Japanese experience to cope with water related disasters and human network available worldwide.
- To promote joint work with researchers and engineers in developing countries in alliance with universities and related institutes worldwide.
- To function, in substance, as a UNESCO Centre with internationally recruited staff and English as an operating language.
- To promote external fundraising jointly with the researchers and administrators of various nations and international institutes.

In order to achieve the objectives of the Guiding Principles, ICHARM will manage itself closely as possible with many people and institutions in the world, mobilizing people, information, technology and funds. The resources available anywhere should be delivered wherever they are needed. The Research results accumulated in ICHARM/PWRI is an important basis for the activities. Collaboration with universities and other research institutes will be the central core of alliance, bringing the engineers and researchers in developing countries into the top science team. To assure this function, ICHARM will be operated as an international centre in personnel, language and office management.

### **3. OUTLINE OF ICHARM: HISTORY AND THE FRAMEWORK**

#### **3.1. Establishment of ICHARM**

The plan for the establishment of the Centre was commenced by an agreement between Mr. Matsuura, the Director General of UNESCO and Mr. Chuma, the Japanese vice Minister of Land, Infrastructure and Transport during a meeting held on the occasion of the Third World Water Forum in March 2003. They basically agreed to establish an International Centre in Japan under the auspices of UNESCO with respect to risk management of water related disasters. In later years, it was decided that the centre will be established and operated as an internal organ of the Public Works Research Institute. Then arrangements have been made with UNESCO on draft agreements that needed to be executed among the UNESCO, Japanese Government, and the Public Works Research Institute via the Ministry of Foreign Affairs of Japan.

In September 2004, the IHP Intergovernmental Council (with the participation of 36 council countries and related organizations of the United Nations) adopted a resolution to support the plan to establish the Centre. Through this resolution, the establishment of the centre gained a widespread international interest and recognition. At the opening ceremony of the World Conference on Disaster Reduction sponsored by the United Nations and convened in Kobe in January 2005, Japanese Prime Minister Koizumi introduced the plan to establish the centre as a part of the measures taken by Japan in global cooperation regarding disaster prevention. In addition, the Finance and Administrative Commission (FA) and the Programme and External Relations Commission (PX) of the UNESCO Executive Committee adopted to consider the proposal made by the Japanese government to establish the centre in the UNESCO General Conference in autumn 2005.

In October 2005, at the 33<sup>rd</sup> UNESCO General Conference in Paris, a resolution was adopted to approve the proposal of the Japanese government to set up ICHARM. After in two years from the assertion of the concept in the preceding (32<sup>nd</sup>) General Conference, the approval of 191 member countries of UNESCO was given for the establishment of ICHARM.

With this approval and with the Cabinet decision of the Japanese government on 3 March 2006, agreements between the Japanese government and UNESCO, and the Public Works Research Institute and UNESCO were executed. Three days after, the

ICHARM was officially established on 6 March 2006. Prof. Kuniyoshi Takeuchi (Professor of the Graduate School of the University of Yamanashi and the chairperson of Japan National Committee of UNESCO-IHP) was appointed as the founding Director of the Centre.

During the preparatory stage of establishing ICHARM, various activities such as symposia and conferences were held to gather information from the world renowned experts on preparing the future action plan. The Public Works Research Institute convened a workshop from 20-22 January 2004 in Tsukuba, Japan, to elicit information from global specialists on the Centre's plan of activities. On the following day, 23 January 2004, an international symposium on risk management regarding water related disasters was held in Tokyo under the joint sponsorship of the Ministry of Land, Infrastructure and Transport, and UNESCO. The Public Works Research Institute organized another workshop on 24-26 January 2006, in Tsukuba on management of flood risk, where the participants representing related organizations provided proposals and advice on the planned activities of ICHARM. Opinions provided at these conferences have been reflected in this document. Table 1 summarizes the past activities.

At the occasion of the 4th World Water Forum held in Mexico on 16-22 March 2006, the Public Works Research Institute planned and organized a session on March 16 entitled "Collaborative Approach among International Agencies for Effective Flood Management- International Flood Initiative (IFI)" in cooperation with UNESCO and WMO. During this session, the establishment of ICHARM was also announced.

Table 1: Conferences and meetings as a part of preparatory activities of ICHARM<sup>1</sup>

January 20-22, 2004	Technical Workshop on Water Hazards and Risk Management (Tsukuba)
January 23, 2004	International Symposium on Water Hazards and Risk Management (Tokyo)
June 12-14, 2004	Preparatory Meeting of IFI (Tsukuba)
February 28-March 4, 2005	International Workshop on Flash Flood Disaster Mitigation in Asia (Tsukuba)
January 24-26, 2006	International Workshop on Flood Risk Management (Tsukuba)
March 21, 2006	IFI Session in the 4th World Water Forum (Mexico City)

<sup>1</sup> Reports of these meetings are available online at ICHARM website, <http://www.icharm.pwri.go.jp>.

May 10, 2006	Domestic Inaugural Symposium (Tokyo)
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### **3.2. Organization of ICHARM**

#### *Outline of the Public Works Research Institute (Host organization of ICHARM)*

The Public Works Research Institute was established as a national research institute in 1922 and is responsible for investigation, inspection, research and development regarding civil engineering works, which include multifaceted research activities towards preventing and mitigating water related disasters such as floods, droughts, land slides, and tsunami and high tides. In April 2001, with the overall organizational review of governmental agencies, the institute was reorganized as an Independent Administrative Agency. In April 2006, it was integrated with the former Civil Engineering Research Institute, Hokkaido Development Bureau. In March 2006 ICHARM was established and became a part of the organizations of the Public Works Research Institute together with the Central Research Institute (Tsukuba) and the Civil Engineering Research Institute for Cold Region (Sapporo).

#### *Organization of ICHARM*

ICHARM has one research group (Water-related Hazard Research Group) and three research teams (International Technical Exchange Team, Disaster Prevention Research Team, and Hydrologic Engineering Research Team). The International Technical Exchange Team is primarily responsible for planning and implementing training programs and following up of such programs. In addition it is responsible for the overall adjustment for the information networking activities of the centre. The Disaster Prevention Research Team is responsible for research activities related to risk assessment and risk management of water related disasters. The Hydrologic Engineering Research Team is responsible for research activities in the field of hydrological observation, hydrological forecasting, and hydrological analysis.

Staff of the Centre is made up of officers of the Public Works Research Institute supported by the Japanese government and the members who are employed within a specific research budget in order to promote individual projects. Moreover, an external research employee system with the objective of obtaining the advice and instructions of field specialists on specific research themes is also in place.

### 3.3. ICHARM Advisory Board

According to the agreement between Japanese government and UNESCO (following the Japanese cabinet decision on 3 March, 2006) an Advisory Board is set up for giving advice to the activities of ICHARM. The Advisory Board is made up of up to 13 members commissioned by the Chief Executive of the Public Works Research Institute, which should include six regional members elected by the Intergovernmental Council of UNESCO-IHP and a representative of the Director General of UNESCO.

The Advisory Board provides advice on the work plan for the activities of ICHARM submitted by the Director of the Centre and also reviews the reports on activities of the Centre. In principle, the Board meets once in every two years. Based on the advice from the advisory board, the Chief Executive of the Public Works Research Institute makes the final decision on the work plan and budget of ICHARM.

The members of the ICHARM Advisory Board for the first term (2006-2008) are as follows;

- Director General of UNESCO (representative)
- Members elected by IHP Intergovernmental Council:
  - Group 1 (Western Europe and North America): Mr. Eugene Z. Stakhiv (USA)
  - Group 2 (Central and Eastern Europe and Russia): Mr. Maciej Zalewski (Poland)
  - Group 3 (Latin America and Caribbean): Mr. Carlos Eduardo Tucci (Brazil)
  - Group 4 (Asia and Oceania): Mr. Muhammad Akram Kahlowan (Pakistan)
  - Group 5a (Africa): Mr. Abou Amani (Niger)
  - Group 5b (Arab States): Mr. Anwar George Hanne Jiries (Jordan)
- Members appointed by the Chief Executive of PWRI:
  - Secretary General (representative), World Meteorological Organization (WMO)
  - Director, International Strategy for Disaster Reduction (UN-ISDR)
  - Rector, United Nations University (UNU)
  - Rector, UNESCO Institute for Water Education (UNESCO-IHE)
  - Vice President, Japan International Cooperation Agency (JICA)
  - Vice Minister for Technical Affairs, Minister of Land, Infrastructure and Transport

## **4. ACTION PLAN FOR 2006-2008 (1) RESEARCH, TRAINING AND INFORMATION NETWORKING**

### **4.1. Introduction**

ICHARM will initially place its priority on risk management in relation to *flood-related disasters* including flash flood, continental flood, landslide, debris flow, storm surge and tsunami. Specifically, research, training and information networking are the three pillars of ICHARM activities to produce the best practicable strategies to diverse localities and the globe and assist their implementation. ICHARM integrates and carries out these activities in alliance with a large number of relevant organizations in the world.

#### **4.1.1. Research**

The initial focus of ICHARM research will be on three subjects: local studies to identify the real needs in flood risk management in diverse localities, satellite-based flood forecasting and early warning, and hazard mapping for community preparedness.

Advanced technologies in observation, modelling, forecasting and hazard mapping are promising areas of ICHARM research activities. They have great potential to improve the current flood management in all levels of operation. However, these technologies are only useful and effective if they are built-in parts of the daily life of society in a sustainable manner. It is of no use to push the technology into a society which is not ready to accept or respond to it. Local study is therefore extremely important to make any efforts of ICHARM to be practically useful. Also the research must be combined with training programs, for examples by letting the trainees be involved in ICHARM research activities.

##### *(1) Local studies*

ICHARM will serve the world based on the findings of local studies. Local studies will influence the direction where ICHARM ought to evolve. Even though the real needs may be beyond the current scope of ICHARM such as poverty eradication and governance enhancement, ICHARM still wishes to face the reality and serve for coping with the real problems. Disaster mitigation, especially in developing countries,

is practical only if it is developed as an integral part of national economic and social development. ICHARM will act, to its fullest extent, as a facilitator to meet the needs and seeds wherever and whatever they are. There are many activities that can be assembled to meet the real needs if a proper alliance is formed.

Local studies will be conducted by a multiple mode. There will be in-house research, joint research with collaborative organizations and the research by designated ICHARM affiliates all over the world. ICHARM will activate and utilize all the possible channels as a UNESCO Category II global centre and the Secretariat of International Flood Initiative. Local information will be collected through UNESCO-IHP National Committees, WMO CHy National Committees, JICA offices, NGOs and many other supporting organizations, programmes, and individuals. The outcome will be compiled into:

- (i) ICHARM Local Study Series, and
- (ii) ICHARM Flood Year Book.

The former is a publication of research investigation and analyses. The latter is a collection of major flood events information and their cause-impact analyses.

## *(2) Flood forecasting and Early Warning*

The second research subject of ICHARM is to develop advanced technologies aimed to make early warning and preparedness more effective to local flood defence. One area is the satellite-based precipitation for flood forecasting and warning. There are many regions in the world where hydro-meteorological observations are missing or inadequate for flood forecasting purposes. Satellite observations coupled with physically based distributed hydrological models are especially useful in these vast regions of ungauged or poorly gauged basins.

In collaboration with JAXA, JMA, NASA and many other institutes, ICHARM aims to develop observation and prediction methods which would form the base to deliver the best available forecasts and warning anywhere in the world regardless of geographical location and climate. It will supplement the ground observations, especially in regions with scarce data. The International Flood Network (IFNet) has already started the Global Flood Alert System (GFAS) initiative for issuing alert of heavy rainfall through internet. ICHARM will support this line of technology development, not only providing rainfall estimates but also translating them to discharge and distributing the flood forecasts.

### *(3) Flood hazard mapping*

The third research subject is flood hazard mapping. The research will focus on developing methodologies that make hazard maps readily available to remote localities and above all applicable under different local conditions. Flood hazard mapping are proved to be a valuable basis for flood management planning, institutional regulation, preparedness, evacuation, recovery management, etc. The necessary information and technology for flood hazard mapping can be obtained through advanced observation and forecasting technology developed within the aforementioned research projects. Other required information and technology include fine mesh digital elevation maps, GIS technology, historical flood-formed topography, past flood levels and inundation records, flood inundation simulation under different dike breakage points, demographical distribution and composition, traffic roads and other structural information, the local evacuation planning etc. The Flood Hazard Mapping technology developed in this research will form the basis of the training course and will be used in practical application in local communities.

#### **4.1.2. Training**

The training courses will be part of the wider ICHARM interests in increasing local capacity to reduce societal vulnerability through comprehensive flood risk management. The undergoing training activities of ICHARM are on:

- (i) Flood hazard mapping course started in 2004, and
- (ii) River and Dam engineering course started in 1969.

These training courses are implemented as JICA's technical cooperation projects.

ICHARM training programme will eventually expand to cover various other topics in collaboration with relevant universities and institutes. For instance, the theme "Governance and societal transformation for productive and disaster resilient society" is an example of new training programme to be formulated to targeted decision makers and senior public officers.

As a post-training programme of the hazard mapping course, a follow-up consultation on early warning and preparedness and the effective use of hazard maps in trainees' local communities is planned in collaboration with related professional training programmes conducted by international aid agencies like JICA.

ICHARM is also looking into the possibility of offering a training programme

leading to a university degree, such as a Masters degree in the field of flood disaster mitigation, in collaboration with national and international universities and institutes. The discussion on the possibilities to launch such programme has started with the National Graduate Institute for Policy Studies in Japan.

#### **4.1.3. Information Networking**

As a flood-related information clearinghouse, ICHARM is working to create and expand its human network to collect and assemble site-specific (i.e. local) information. The ICHARM information archives will comprise the broad and diverse information surrounding flood events including statistics, related governmental and non-governmental actions, political and institutional commitments, budgetary changes, resulting judicial and policy developments, relevant research and technological developments, and information on the related humans networks, etc.

One of the important areas to focus on is the maintaining of up to date local disaster events catalogue for ICHARM to take proper emergency actions. ICHARM will not attempt to duplicate already existing resources for collecting disaster information, but it will strive to provide a knowledge base in the form of policy effective information, which is part of ICHARM management strategy.

The ICHARM will form a network of relevant UN Organizations, Inter-governmental organizations, governmental and non-governmental organizations, communities, universities, institutes, private sectors and their programs. This network will serve for ICHARM's emergency response activities, local studies, contribution to World Water Assessment Program, organizing meetings, to promote exchange of ideas and information with localities and among researchers and practitioners, etc.

#### **4.1.4. Emergency Response**

ICHARM will help in crisis management utilizing its personnel, human networks and knowledge base during the aftermath of catastrophic disasters. ICHARM will join the various emergency initiatives by sending competent personnel and by networking information and necessary resources. But the main activities of ICHARM in this regard would not be organizing or participating in emergency rescue teams but rather providing a useful resource-base for such teams as the necessary local information.

#### **4.1.5. Organizing meetings**

ICHARM will actively organize or sponsor workshops, symposia, conferences to promote communication and capacity building. At a biannual basis, ICHARM will hold, possibly in collaboration with other organizations, the *ICHARM Integrated Flood Management Symposia*, preceding each ICHARM Advisory Board Meeting.

## **4.2. Research**

### **4.2.1. Local Studies**

#### *Research Title*

#### **Case Studies on Strengthening of Flood Disaster Management Cycle**

#### *Outline*

The effective approaches in reducing the flood damage in a given region depends very much on what is lacking in that particular area in terms of responding to flood hazard. In some regions installing a flood forecasting and warning system may be essential measures to mitigate flood damage, while in others, awareness raising of local people may be effective. Lessons from disaster prone countries indicate that effective management of disasters works only when all four components of the disaster management cycle, namely, preparedness, response, recovery, and mitigation are in place. The blind introduction of a particular measure does not necessarily contribute to damage mitigation, whereas the strengthening of the components identified as vulnerable does.

This research project focuses on several selected regions where there is a high degree of flood damage potential and a combination of appropriate measures are warranted. In-depth analyses of past flood damage and identification of vulnerable areas will be studied in order to strengthen the flood damage mitigation cycle as a whole at the community level. These investigations for a number of locations will be synthesised for a future drafting a set of guidelines in flood disaster risk management.

#### *Budget*

20 Million JPY/yr (170 Thousand USD) for the fiscal years 2006-2008

#### *Plan*

##### - Target locations

Approximately 10 locations will be selected for general study mainly by literature survey, and out of that about 2 regions will be considered for detailed study. The Mekong River Basin, Bangladesh, Caribbean, Mozambique, Philippines, among others, are being considered for the first stage.

- In-depth studies to provide hitherto missing information related to floods, to identify bottlenecks in the overall flood disaster management systems.
  - o Entrust research to local specialists and institutions and formulation of joint research programmes
  - o Enlisting the professionals involved in local disaster management to study teams
  - o Conducting workshops and symposia on relevant themes and research findings.
- Review the Disaster Management Cycle (See figure) with emphasis on floods against the findings and propose modifications. Identify in each locality, those parts of the disaster management cycle, which lack adequate information and those which are especially vulnerable. To come up with a “Report card of flood management system” for each locality.

For instance, in Bangladesh, during the flood of 1970 and also the flood of 1991, 97% of deaths associated with the floods are due to drowning including women and children. There is very limited information on the casualties among the homeless and seasonally migrated workers. Shelters were packed during the floods.

#### *Outcome*

- Publication of a series of local studies including detailed analyses and recommendations.
- Drafting flood damage mitigation improvement proposals for several localities

#### *Future Directions*

- Encouraging local affiliates to conduct continuing studies on the subject and building the necessary capacity. Providing a mechanism of continuing the information exchange between such groups and ICHARM.

#### *Alliance to promote the study*

- Establishment and use of a network of flood specialists
- Coordination with JICA and other relevant programs
- International Flood Initiative’s framework

#### *Outreach of the study results*

- Contribution to IHP VII (2008-2013) Focal Theme 1.3: Hydro-hazards, hydrological extremes and water-related disasters, and IFI.
- Contribution to UN WWDR III and to Asia-Pacific Water Forum

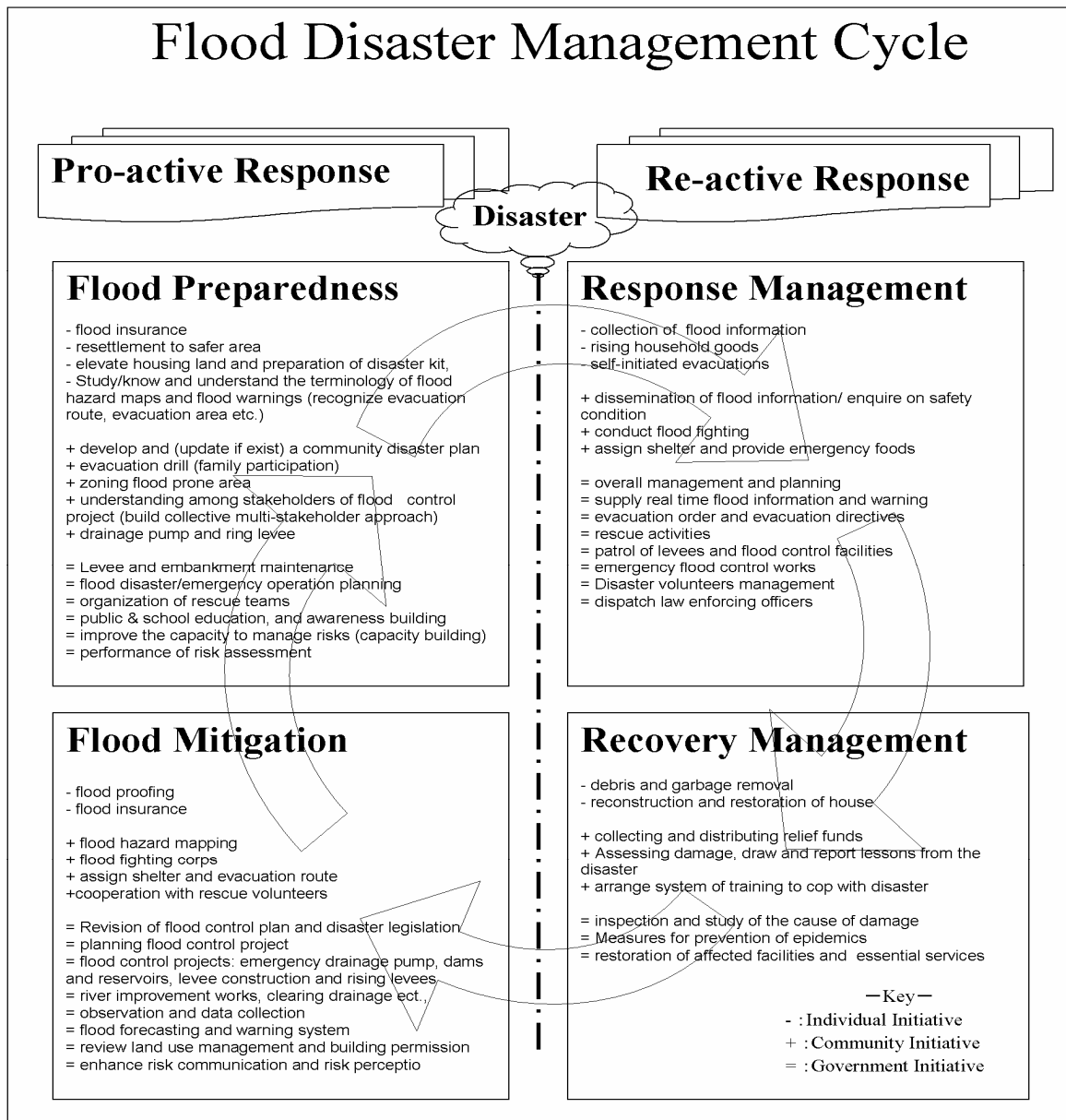


Figure: Flood Disaster Management Cycle

## *Research Title*

### **Large Floods Report Project**

#### *Outline*

Usually the policy landscape of a disaster becomes clear only after a considerable time from the occurrence of disaster. Unlike disasters, the policy machinery to mitigate them often moves slowly. Moreover, given that the technical knowledge on hydrological processes, disaster science and other relevant fields like environmental technology, structural engineering, etc., are continuously developing, the policy-related lessons would not be outdated within a few years.

This project focuses on policy related lessons of past floods in the world. The events that will be considered in the project are generally from the last decade.

#### *Budget*

6 Million JPY/yr (50 Thousand USD) for fiscal years 2006-2008

#### *Plan*

Briefly, the project plan is as follows:

1. First, a wide group of experts on flood disaster issues will be invited to submit short articles describing (a) flood event(s) , with the special emphasis on developing a larger document (book chapter) on the policy-related lessons from that event.
2. The initial submissions will be subjected to peer-review and selected articles will be published in a technical report.
3. After further selection, a small number of authors will be invited to participate in projects funded by PWRI to produce comprehensive reports on the event(s) they proposed.
4. After an interactive peer review, the resulting articles will make a monograph on lessons on global floods policy.

#### *Outcome*

- Publication of a PWRI report on World Floods
- Detailed reports on the selected case studies

*Future Direction*

Publication of a monograph of World Floods: facts and lessons learned

*Alliance to promote the study*

Contributors (individuals/organizations) from around the world

*Outreach of the study results*

- Contribution to IHP VII (2008-2013) Focal Theme 2: strengthening water governance for sustainability, and IFI
- Contribution to UN WWDR and particularly to develop the risk chapter of WWDR with WMO and UN-ISDR

#### **4.2.2. Flood forecasting and early warning**

##### *Research Title*

##### **Development of a satellite-based rainfall monitoring technology for flood forecasting on a river basin scale**

##### *Outline*

The International Flood Network (IFNet) has started a series of test operation of the Global Flood Alert System (GFAS) in June 2006. GFAS provides end users with information on extreme heavy rainfall events detected by earth observation satellites with an easy-to-use data format. However, the spatial and temporal resolutions of satellite data are still inadequate for forecasting floods on ordinary rivers.

ICHARM will develop a technology of generating near-real-time global rainfall product with satellite-based data on the basis of a joint study with Japan Aerospace Exploration Agency (JAXA). The research aims at improving flood forecasting and warning systems in areas prone to flood hazards, especially in developing countries, where insufficient rainfall monitoring networks, poor cross-boarder exchange of real-time hydrologic data in trans-boundary watersheds, etc. often hamper the process of effective flood forecasting.

The output of the research is a technology of generating near-real-time global rainfall products based on satellite data which can be used for flood forecasting and warning in river basins of more than a few thousands square kilometres, with the following specifications:

Spatial resolution: 10 km

Temporal resolution: less than 3 hours

Delay of data delivery: less than 4 hours

##### *Budget*

8 Million JPY/yr (68 Thousand USD) for fiscal year 2006-2008

##### *Plan*

- 1) To develop a technology of producing a near-real-time global rainfall product based on a global climatic rainfall mapping technology mainly using microwave remote-sensing data. It is planned to use the GSMaP method, developed by the

research group led by Prof. Ken'ichi OKAMOTO of the Osaka Prefecture University; and

- b) To validate the near-real-time satellite-based rainfall products using ground-based observations and to improve its accuracy. The tests would be carried out in the Chao Phraya Basin in Thailand and the Mekong River Basin along few other basins in Japan.

#### *Future Direction*

ICHARM and JAXA plan to widely distribute the near-real-time global rainfall product with the firm expectation to contribute in enhancing flood damage mitigation activities in the world.

In order to promote the applications of the rainfall products, ICHARM hopes to conduct the following activities:

- i) To participate in the Sentinel Asia Project promoted by the Asia-Pacific Regional Space Agency Forum (APRSAF) and to provide support to use the products in that framework;
- ii) To promote the use of the products for the GFAS developed by IFNet;
- iii) To promote case studies applications of the satellite-based products to flood forecasting in a variety of climatic and watershed conditions; and
- iv) To support a future plan of the Global Precipitation Measurement Mission (GPM) aiming to estimate the global rainfall every three hour based only on microwave sensors.

#### *Alliance to promote the study*

- Cooperative research with JAXA, and JMA.
- Coordination with JICA, IFNet, NASA and other programs for case studies and operational uses.
- Use of IFNet and APRSAF networks.

#### *Outreach of the study results*

- Contribution to the Hyogo Framework of Action 2005-2015
- Contribution to the quick and efficient implementation of flood forecasting and warning system in the areas prone to flood hazards, especially in developing countries

### *Research Title*

## **Development of a basic framework for flood forecasting and warning using satellite-based and GIS data**

### *Outline*

Major reasons for the lack of effective flood forecasting and warning systems in developing countries include the lack of real-time hydrologic data (such as rainfall observation, water-level and river discharge measurement) and the high cost involved in setting up flood forecasting systems for a basin. To contribute in improving this situation, ICHARM is conducting a joint research with the Infrastructure Development Institute (IDI), Japan, and nine major civil-engineering consulting companies to develop a flood runoff analysis system utilizing satellite data and global GIS data. This user-friendly interfaces system is named IFAS (Integrated Flood Analysis System).

The output of this research is a basic framework for efficient implementation of flood forecasting and warning systems which make use of not only ground-based rainfall data but also satellite data and GIS technology. ICHARM will assist the efficient implementation of the developed flood forecasting and warning systems in the world, particularly in developing countries.

### *Budget*

14 Million JPY/yr (120 Thousand USD) for fiscal year 2006-2008

### *Plan*

- 1) To develop the IFAS software framework with the aim to enable more consistent and more convenient setting up and calibration of runoff models in any river basin.
- 2) To investigate the advantages of using not only ground-based rainfall data but also satellite-data for flood forecasting with IFAS in river basins mainly around the South-eastern Asia region.
- 3) Continuous improvement of the user-interface of IFAS, based on user-experience.
- 4) Implement more flood runoff analyzing models as IFAS libraries.

### *Future Direction*

With the present-day computing resources it may be possible to conduct flood runoff calculations for the globe by using satellite-estimated rainfall together with IFAS. ICHARM hopes to launch a study on the feasibility of extending GFAS from a

system detecting extreme rainfall to a direct flood hazard detection system. This future project will be named GFAS2 (GFAS phase 2) developed by IFNet. When it will be implemented, ICHARM will promote GFAS2 and the utilization of the product through the Phase 2 activities of the Sentinel Asia Project (after 2008).

*Alliance to promote the study*

- Cooperative research with IDI and the major nine civil-engineering consulting companies.
- Coordination with WMO-RA II, JICA, IFNet, JMA, MRC and other programs for case studies and operational uses.
- Use of WMO-RA II, IFNet and APRSAF networks.

*Outreach of the study results*

- Contribution to the Hyogo Framework of Action 2005-2015
- Contribution to the quick and efficient implementation of flood forecasting and warning system in areas prone to flood hazards, especially in developing countries

### **4.2.3. Flood hazard mapping**

#### *Research Title*

#### **Research on Flood Hazard Maps for Developing Countries**

#### *Outline*

With the global increasing trend of flood damage, Flood Hazard Maps (FHM), which contribute to smoother evacuation and mitigation of damage, are useful management tools. Particularly in situations where necessary structural measures are not fully implemented due to issues such as lack of financial resources or other concerns like adverse environmental impacts, non-structural measures like FHM become extremely important. Japan, among other countries, has a long tradition of preparing flood hazard maps. However, from a global perspective there are numerous site-specific conditions that have to be taken into account for applying this technology where needed. To assist the implementation of flood hazard maps ICHARM is conducting a comprehensive research program to meet the specific local needs.

The research scope includes:

- 1) Development of methodologies to produce FHM in locations where high-resolution topographic charts are not available. This includes identifying potential inundation areas using coarse-scale maps and satellite data.
- 2) Development of guidelines and mechanisms for the dissemination of FHM in developing countries.
- 3) Development of promotional material for FHM, using multimedia and information technology tools.

In addition to this, the results of the research will be reflected in Flood Hazard Mapping training programs and FHM Seminars in concerned countries.

#### *Budget*

14 Million JPY/yr (120 Thousand USD) for fiscal year 2005-2008

#### *Plan*

Target area: Southeast Asia

- Survey of the current flood situation in developing countries (2005-2007)

- Development of techniques to estimate inundation area and depth, in regions of limited data (2005-2007)
- Development of innovative uses of FHM to suit different situations (2006-2008)
- Produce guidelines, conduct case studies and prepare courseware as well as educational material (2006-2008)
- Convening seminars and symposia (2006-2008)

*Alliance to promote the study*

1. Typhoon Committee
2. Government organization in-charge of flood management of each country, local universities and research institutes

*Methods for conveying the results*

- Seminars and symposia.
- Community awareness-raising using the produced educational material.

*Outreach of the study results*

- Contribution to IHP VII (2008-2013) Focal Theme 2: strengthening water governance for sustainability
- Contribution to IHP VII (2008-2013) Focal Theme 5: water education for sustainable development



People catching fish despite the flood warning that has been issued, in a river where water level changes are usually slow. If a sudden change in the water level were to occur, many people would be victimized (2005, Hat Yai, Thailand. Photograph by S. Tanaka, ICHARM)

## **4.3. Training**

### **4.3.1. Introduction: Target and Follow Up after the Training Program**

ICHARM is conducting two training programs: "Flood Hazard Mapping Training Course" and "River and Dam Engineering Course III". The two training programmes are intended for practitioners (i.e., with a certain level of field experience after graduation) involved in river management and water resource development and who are recognized as having the capability to disseminate the results of the training in their home countries.

In order to sustain the training and to ensure practical outcomes that extend beyond the span of the training period, the trainees are requested to formulate specific local action-plans for hazard map implementation activities after returning to their home countries. ICHARM will follow-up the implementation of the action-plan.

The lectures are conducted by internationally renowned experts. Recent collaborations include many Japanese organizations and international agencies like Kyoto University, the Mekong River Commission (MRC) and IWHR. Future collaboration is also planned with UNESCO-IHE and WMO.

ICHARM will continuously improve its training programs by listening to the voices of localities during the training and follow up of the training course as well as outcomes of local studies described in Section 4.2.

ICHARM will use the suggestions and feedback it receives during the training courses, follow-up activities and seminars as well as the results of the local-studies (section 4.2) to continuously improve the training programs.

### **4.3.2. Flood Hazard Mapping Training Course**

#### *Background and Outline of the Course*

The Asian Monsoon region is afflicted by many floods every year causing loss of human life and severe property damages. In addition to structural measures like embankments and reservoirs, non-structural approaches such as "Flood Hazard Maps (FHM)" can be very useful in reducing these damages. Particularly in developing countries where necessary structural measures are not fully implemented, it can be immediately useful.

To respond to these local needs for disaster preparedness, ICHARM is implementing the “Flood Hazard Mapping” training course every year for 16 trainees from eight countries in East and Southeast Asia since FY 2004. The course is specifically designed for officials and practitioners in the public sector who are involved in flood or river management. The training extends for a period of five weeks covering lectures, assignments and field trips.

The ultimate goal of the course is to create flood hazard map tailored for each locality, in order to contribute to the flood damage mitigation.

#### *Course objective/outcome*

Participants gain the following capacities by the end of the training programme:

- (1) Understanding the effectiveness of flood hazard maps and acquiring the methods to disseminate and utilize them.
- (2) Acquiring methods of enhancing risk-perception of communities and raising public awareness to flood risk.
- (3) Acquiring the professional knowledge of hydrology and inundation analysis necessary to produce flood hazard maps.
- (4) Acquiring the general knowledge on flood hazard maps in Europe, Japan, Asia, and other parts of the world.
- (5) Ability to produce and apply flood hazard maps in their own countries, and to draft local action-plans for promoting Flood Hazard Maps.

The participants are expected to share the knowledge, technology and experience acquired during the training with respective governmental engineers and officials engaged in flood and river management in their home countries.

#### *Follow Up*

Based on the fact that an organized effort is important in the production of a flood hazard map, trainees are requested to review the ongoing activities of former-trainees and report on the problems they are facing, prior to the training program in Japan. Moreover, at the end of the training program, the trainees are asked to provide a presentation on the planned actions to be implemented in their home country, so that they may return home with a sense of purpose. Progress of the action plan is shared

among trainees and the trainers using a mailing list and other media means. Furthermore, the trainees are requested to complete the training program by holding mini-workshops to share knowledge gained through the training program within their organizations.

Starting from the fiscal year 2006, ICHARM will hold follow-up seminars in order to share information on the promotion of Flood Hazard Maps such as practical problems faced by trainees in their home country and how they have or are attempting to resolve them. The seminars will also involve experts and specialists from universities, research institutes and related organizations. The first follow-up seminar is planned to be held in Malaysia in February 2007.

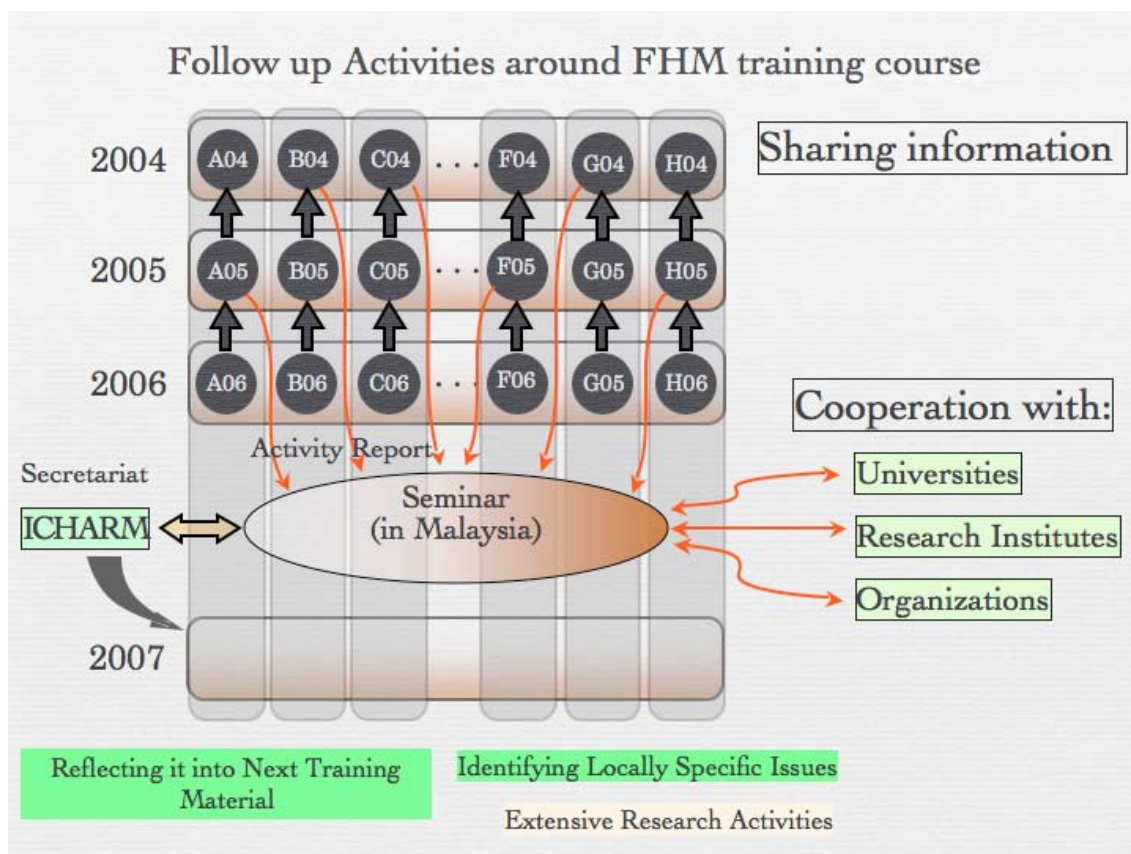


Figure: Follow-up activities around FHM training course

The outputs of this seminar will be reflected into the training program for the following fiscal year and the important issues related to producing and utilizing FHM may be taken up as research themes of ICHARM. Moreover, the participants will also acquire advanced knowledge and useful information related to the production and utilization of FHM from the invited experts. Through this event, the production of

FHM that takes into account the local conditions in developing countries will be promoted.

#### *Mailing List*

ICHARM manages a mailing list of all the participants of the training course and the involved experts. This is a platform used for purposes like exchanging views on diverse matters related to Flood Hazard Mapping, discussing progress and issues of action-plans and to ask questions. ICHARM newsletters (Section 5.3) are also distributed to the members of the mailing list.

### **4.3.3. River and Dam Engineering Course III**

#### *Background*

Integrated water resources management, including water resources development, flood control, dam construction planning and conservation of water environment, is an effective approach for sustainable use of rivers. Japan has been grappling with the issue of balancing various priorities of river water management for many years and has successfully been supplying water to urban and remote areas from the river basins throughout the year, and reduced water-related disasters – problems that still are major challenges for many developing countries. This course is organized based on the belief that the water management techniques that Japan has developed over the years could be useful for other countries.

The objective of this program is to train engineers on areas such as plans for flood control, development of water resources and river environment through exposing them to the knowledge and technology on river and dam engineering in Japan. The course has a history of 34 years and covers a wide spectrum of subjects ranging from the history of river and dam administration in Japan to advanced technical trends in river and dam engineering.

Every year around ten trainees representing developing countries from around the world undergo a three months training that includes lectures, assignments and field trips related to rivers and dams. After completion of the coursework, research in specific themes is carried out at the research laboratories of ICHARM, Public Works Research Institute and the National Institute for Land and Infrastructure Management.

### *Course Objectives/Outcome*

- (1) Understanding Japan's river works history, the present legal systems and organizations including environmental assessment, and recognizing water problems in the participants' countries.
- (2) Acquiring the skills of planning and design related to the River Improvement and water use.
- (3) Acquiring the skills of design, construction and management of dams.
- (4) Producing a technical report including an action-plan tackling water problems in the participants' country, taking advantage of the knowledge and experience gained from the training.

### *Follow-up*

At the end of the training program the trainees are requested to present their action plan. The trainees are requested to report on their activities based on the implementation of the proposed action plan.

### *Mailing List*

ICHARM will maintain a mailing list of the trainees who participated in the training program. Newsletters that report on the activities of ICHARM are also distributed.

#### **4.3.4. Flood Disaster Mitigation Masters Degree Program**

The occurrence of flood disasters have been increasing during the past decade, and it is reasonable to expect that the disaster risk will keep on increasing at a significantly fast rate in the future. Therefore, in order to respond to the global increase in flood vulnerability, the world is in need of a community of experts and professionals with a profound understanding of the emerging risks and a sound theoretical and practical background of water-related disaster risk management to take effective action. With this requirement in mind ICHARM plans to start a Masters Degree program in flood disaster mitigation.

This program is being designed to provide trainees from developing countries with the mastery of knowledge and technology on flood related disasters through one year programme. It is planned that the Masters Degree in flood disaster mitigation will be

granted through collaboration with the National Graduate Institute for Policy Studies of Japan.

#### *Outline of the Course*

The program will consist of lectures and practical assignments in the first semester and a completion of a research project in the second.

#### *Course Objectives/ Outcome*

- 1) Basics on meteorology, hydrological processes and accessing meteorological data for hydrological analyses.
- 2) Knowledge on hydrological observations, forecasting methods, and techniques for modelling of flow, inundation, etc.
- 3) Knowledge on river engineering and river ecology.
- 4) Knowledge and technology related to flood risk evaluation and risk mitigation.
- 5) Research on themes closely related to the professional background of the students leading to the Masters Thesis.

#### **4.3.5. Other Training Activities**

In addition to the core activities described above in detail, ICHARM will be involved in many other training activities as a contributing partner, among which are:

- Masters course on Tsunami Disaster Prevention Training conducted by the International Institute of Seismology and Earthquake Engineering of the Building Research Institute of Japan.
- The JICA Group Training: Disaster Mitigation, Preparedness and Restoration of Infrastructure implemented by the Japan Construction Training Centre. (ICHARM contributes with a four-day course on Flood Hazard Maps.)

Further, ICHARM is planning to organize a comprehensive Tsunami Disaster Management and Mitigation Training program that covers overall tsunami prevention, in order that early warning to be effective. This will be a contribution to the Tsunami Disaster Management Programme promoted by UNISDR.

On an irregular basis, short-term trainings are also planned on areas like, flood

management, river and water management, information systems, hydrological observation and water resources management for trainees of JICA, World Bank and other programs/projects.

## **4.4. Information Networking**

### **4.4.1. Currently Available Networks**

PWRI has already built a number of international networks as by-products of different initiatives. It is important for the information networking function to have a coherent mechanism to maintain, update and expand the network during its operation.

Examples of such networks are:

- (i) UNESCO-IHP national committees, regional offices, UNESCO Category I and II Centres, Regional Committees;
- (ii) WMO CHy national members, experts;
- (iii) ISDR National Platforms for Disaster Risk Reduction
- (vi) UN Organizations, international IGOs, GOs, NGOs and their programs including professional associations and donors agencies;
- (v) Universities and other national and international institutes;
- (vi) Private companies in the related fields;
- (vii) Other collaborative organizations and individuals; and
- (viii) ICHARM training course alumni and after care program participants.

And the network will serve for:

- (i) ICHARM's emergency response activities by assembling and providing effective emergency information necessary for the emergency groups to coordinate and organize their actions:
- (ii) Planning Local Studies,
- (iii) Preparing Flood Year Books,
- (iv) Contributing to future WWDR,
- (v) Prompt dissemination on the web site on a daily basis,
- (vi) Responding to daily questions arising from any frontline local activities regarding their flood-related risk management, and
- (vii) To support the participant selection process in ICHARM training programs and other activities, so that they will make effective contributions to disaster risk reduction.

#### **4.4.2. Affiliate Program**

##### *General Objective*

Affiliate program is a new ICHARM program to collect obscure facts, needs and assessment on water-related disasters in various regions of the world and to disseminate policy effective information as associate members of ICHARM.

##### *Assignment*

Affiliates are expected to help in either of the below-mentioned ICHARM's projects as associate members of ICHARM.

- To lead a local flood defence study;
- To send a prompt report of a big water-related disaster in the region of the affiliate;
- To routinely contribute to the publication of large floods report; or
- To routinely report national statistics of water-related disaster damage, expenditure and other statistics on water-related disaster to ICHARM.

##### *Expected Activities*

- Conduct the technical investigation and risk assessment work in accordance to ICHARM directives and guidelines.
- Provide the affiliate's view point of the disaster and prospected solutions for future remediation.
- Provide timely and original coverage of the water disaster issue, tracking action from national agency appropriations to comprehensive disaster management, legislation and public land/water policy.
- Ensure the accuracy and appropriateness of water-related disaster statistics in database and literature.
- Build their own national and regional networks.
- Participate in annual workshop of ICHARM affiliates.

##### *Eligibility and Qualification*

- Any individual working in the field of water disasters and/or risk management.
- Knowledgeable of local hazards and issues related to the water disaster in the target region and locality.
- Demonstrated professional reporting ability on disasters issue (e.g. national/regional report on disasters).

#### **4.4.3. Organizing and Sponsoring Conference/Workshop**

- A session at the 5th World Water Forum in Turkey in March, 2009
- The Fourth International Conference on Flood Defence in 2011
- WWAP Managing Risk Workshop in 2007
- Second Biannual Symposium on Flood Risk Management in 2008
- First Annual Workshop of ICHARM affiliates in 2008
- IFI meetings upon request
- Conference of IHP Water Centres

## **5. ACTION PLAN FOR 2006-2008 (2) CONNECTIVITY, FUNDRAISING AND PUBLICATIONS**

### **5.1. Collaboration with Related Organizations and Programs**

#### **5.1.1. Introduction**

In order to achieve the primary objective of ICHARM, especially to respond to the needs of diverse localities, it is indispensable for ICHARM to collaborate and cooperate with all relevant organizations and programs having activities in the related scope. Such collaboration should bring about mutual benefits by exchanging information and experiences, complementing and increasing efficiency of the use of limited resources and creating synergy for the common objectives.

The following will be the main categories of collaborative activities:

1) ICHARM will participate as a proactive player in the activities of water and disaster related international organizations, such as UNESCO, WMO, ISDR, UNU, IAHS, IAHR, EC, GWP, WWC and Asia Pacific Water Forum and their programs such as International Flood Initiative (IFI), World Water Assessment Programme (WWAP), UN-Water, United Nations Advisory Board on Water and Sanitation. The mode of collaboration would be planning and working together, sharing necessary resources, resource persons, ideas, information, communication networks, etc. For IFI, ICHARM will play the role of its Secretariat.

2) ICHARM will promote the linkage with 11 other existing UNESCO Water Centres and the other eight centres under preparation to make their function effective. ICHARM requests the linkage to help for local case studies by finding the proper ICHARM affiliates. In particular, mutual cooperation will be promoted with UNESCO-IHE for effective bilateral exchange of lecturers and textbooks as well as seeking the possibility to organize jointly planned courses.

3) ICHARM and/or PWRI have signed the MOU with some professional organizations for close collaboration such as the China Institute for Water Resources and Hydro Electric Power, Korean Institute of Construction Technology, Mekong River Commission, University of California at Davis, the Institute of Water Resources of US Army Corps of Engineers. The main mode of collaboration will be personnel

exchange, joint research and joint organizing of conferences. ICHARM will establish new cooperative research partnerships with many other domestic and international organizations.

4) On the occasion of the 3<sup>rd</sup> World Water Forum in Japan in 2003, various international programmes supported by the River Bureau of the Ministry of Land, Infrastructure and Transport such as IFNet, JWF and NARBO were initiated, and are being promoted. ICHARM will seek a close collaboration and appropriate sharing of responsibilities with such programmes to achieve synergy among the respective activities.

5) Through collaboration with the Japan International Cooperation Agency (JICA), Asia Development Bank (ADB), World Bank and other funding organizations, various research and training projects will be planned and implemented.

## 5.1.2. Collaboration with Respective Organization and Programme

### **International Flood Initiative (IFI)**

#### *Background*

The preparatory meeting of the International Flood Initiative (IFI) was held on 12-14 July 2004 in Tsukuba, Japan with the purpose of drafting a concept paper (the Tsukuba paper). A parallel concept paper was drafted (known as the Geneva paper) by a WMO task team on 28-30 July 2004 in Geneva, Switzerland. WMO and UNESCO then combined the products of both these meetings and the revised concept paper (the Joint UNESCO/WMO Flood Initiative, also called the JUWFI paper (documents IHP/IC-XVI/Inf.14 and Inf.14.) was adopted at the 16th session of the IHP Intergovernmental Council (September 2004) and the 12th session of WMO CHy (October 2004), respectively. To incorporate comments and suggested amendments made at the IHP Council and WMO CHy, as well as from the UNU, ISDR and IAHS, another preparatory meeting was held on 10-11 December 2004 in London (Ontario), Canada.

The International Flood Initiative (IFI) was formally launched during the UN World Conference on Disaster Reduction (WCDR) held on 18-22 January 2005 in Kobe, Hyogo, Japan by the Director- General of UNESCO in the presence of the Executive Heads of partner agencies WMO, UNU, ISDR, IAHS UNU, IAHR, IISA, ICHARM, and PWRI. The concept paper was further revised at the inaugural UNESCO/ WMO joint IFI meeting held in Geneva, Switzerland, 21-22 March 2005.

#### *Programme Vision and Objective*

*The Vision of IFI:* The Vision of the IFI is to create well-informed and adequately prepared communities toward a flood-proof society living consciously and harmoniously with floods.

*The Mission of IFI:* The IFI aims at implementing recommendations of the WSSD taking into consideration the physical parameters of flooding, its socio-economic conditions and the risk a society is prepared to take in order to achieve its development objectives.

*Mission Statement:* The International Flood Initiative promotes an integrated approach to flood management, at the same time, reducing social, environmental and economic risks that result in and from floods and

increasing the benefits from floods and the use of flood plains.

*Overall Objective:* The overall objective of IFI is to build capacities in countries in order to gain and advocate better understanding and handling of hazards, vulnerabilities and benefits involved with floods by promoting all measures leading to that end by applying the following guiding principles:

- Living with Floods;
- Equity;
- Empowered participation;
- Inter-disciplinarity and trans-sectorality; and
- International and regional cooperation.

#### *Programme Secretariat and ICHARM Position*

The International Centre for Water Hazard and Risk Management (ICHARM) was chosen to act as Secretariat of IFI. Accordingly, in April 2005, the ICHARM Secretariat was strengthened. Extensive preparatory activities for the establishment of the Centre have been undertaken and its formal launching on March 2006 fits in well with the first year of the International Decade for Action 'Water for Life'. (2005-2014) as well as the United Nations Decade of Education for Sustainable Development (UNDESD) (2005-2014).

At the 4th World Water Forum, the 'Collaborative Approach among International Agencies for Effective Flood Risk Management: International Flood Initiative (IFI)' session was held on 20 March 2006. The session was convened by the Public Works Research Institute (PWRI), ICHARM, UNESCO and the WMO.

Current partners of IFI are as follows:

UNESCO IHP <http://www.unesco.org/water/ihp/index.shtml>

ICHARM [http://www.icharm.pwri.go.jp/centre/index\\_e.htm](http://www.icharm.pwri.go.jp/centre/index_e.htm)

WMO <http://www.wmo.ch/index-en.html>

IAHS <http://www.cig.ensmp.fr/~iahs/>

UNU <http://www.unu.edu/>

UNISDR <http://www.unisdr.org/>

IIASA <http://www.iiasa.ac.at/>

IAHR <http://www.iahr.net/site/index.html>

PWRI <http://www.pwri.go.jp/eindex.htm>

This interagency initiative with a wide range of intellectual and professional partners will continue during the IHP-VII period.

## **World Water Assessment Programme (WWAP)**

### *Background*

Acceptance of the need for a more people oriented and integrated approach to water management and development has gradually evolved as a result of a number of major conferences and fora. The Mar del Plata Action Plan of the 1977 UN Conference on Water, the Dublin Conference on Water and the Environment and the Rio Earth Summit, with its highly important Agenda 21 document, in 1992 and the World Water Vision exercises have successively reinforced the need for comprehensive assessment of the world's freshwater as the basis for more integrated water management. At the urging of the Commission on Sustainable Development and with the strong endorsement by the Ministerial Conference at The Hague in March 2000, UN Water has undertaken a collective UN system-wide continuing assessment process, the World Water Assessment Programme (WWAP).

### *Scope of the programme*

The WWAP, building on the achievements of the many previous endeavours, focuses on assessing the developing situation as regards freshwater throughout the world. The primary output of the WWAP is the periodic World Water Development Report (WWDR). The Programme will evolve with the WWDR at its core. Thus there will be a need to include:

- data compilation (geo-referenced meta-databases);
- supporting information technologies;
- data interpretation;
- comparative trend analyses;
- data dissemination;
- methodology development and modelling.

The recommendations from the WWDR will include capacity building to improve country-level assessment, with emphasis on developing countries. The Programme will identify situations of water crisis and will thus provide guidance for donor agencies and will provide the knowledge and understanding necessary as the basis for further capacity building.

Partners of WWAP are as follows:

UNESCO IHP <http://www.unesco.org/water/ihp/index.shtml>

WMO <http://www.wmo.ch/index-en.html>

UNU <http://www.unu.edu/>

UNISDR <http://www.unisdr.org/>

PWRI, ICHARM [http://www.icharm.pwri.go.jp/centre/index\\_e.htm](http://www.icharm.pwri.go.jp/centre/index_e.htm)

Others UN Agencies and water institutes: UN-Water, UNEP, UNDP, WHO, ...

#### *PWRI/ICHARM Contribution to WWAP*

Contribution to the World Water Development Report 2: Water, a shared responsibility

- *Japan Case Study*: PWRI/ICHARM wrote the Japan Case Study report for the Japanese Ministry of Land, Transport and Infrastructure (see WWDR 2, pp. 481-483. The full report of Japan case study will be also made available online by the WWAP Secretariat.)
- *Managing Risk Chapter*: PWRI/ICHARM was solicited by UN-Water to work with UN agencies as technical and scientific advisor to produce the Risk Chapter and indicators development. ICHARM contributed with WMO and UNISDR to the authoring and editing of Chapter 10: Managing Risks: Securing the Gain of Development.
- *Indicators Development*: PWRI/ICHARM proposed the development of indicator on flood policy effectiveness for risk reduction and to explore other policy options, referred to as PWRI Risk Index. ICHARM contributions appeared in WWDR 2 under the name of Public Work Research Institute (PWRI), Tsukuba Japan (see WWDR 2, pp. 337-369).
- *Box of Best Practices*: Sixteen boxes were submitted to WWAP secretariat in different issues that are directly related to the different chapters of WWDR 2. The good practice examples from Japan were provided aiming to share knowledge and experience with all WWAP partners.

#### *ICHARM Action Plan:*

- To participate as a full partner along with WMO and UNISDR in producing the related Managing Risk Chapter of oncoming WWDR products;
- To continue giving technical and scientific support to UN Water for developing scientifically-sound and feasibly measurable indicators to assess progress on global goals and targets (such as MDGs);
- To continue updating the “PWRI Risk Index” also referred to as “Risk and Policy Assessment Index” introduced in WWDR 2. In the first phase the index will be applied to some selected WWAP Case Studies (Outreach: Indicators applicable to as

many situations as possible so that cross-country and inter-regional comparison can be made.)

- To strength alliance and data sharing to extend the PWRI Risk Index toward building and developing a global flood risk map (outreach: to encourage countries prioritize investment for water disaster management);
- To join existing expert groups working on vulnerability and risk assessment such as UNU-EHS vulnerability assessment panel;
- To undertake joint scientific and technical programmes with WWAP partners in aim to define action plan to further strengthen the global risk management strategies. The aim of the Action Plan is to provide a high-level overview of priority areas and various actions the related agencies and institutions plan to undertake over the next few years in the field of risk management;
- To support investment in data collection, analysis and modelling capacities related to water risk management in aim to seek a sturdy framework from which implementation plan can be made; and
- To organize related workshops and expert group meetings with WWAP partners;

## **WMO**

### *Past Activities with PWRI*

Director General of the River Bureau, Ministry of Land, Infrastructure and Transport is appointed as the hydrological advisor to WMO. So, as a part of governmental contribution to promote the Hydrology and Water Resources Program of WMO, Public Works Research Institute has been dispatching personal to participate in Working Group of Commission of Hydrology (CHy) as experts and in Regional Area II (Asian Region) Working Group of Hydrology as rapporteurs. ICHARM also has cooperated with WMO and UNISDR to contribute to the authoring and editing of Managing Risk Chapter of the World Water Development Report 2 as an output of WWAP activities.

### *Future Plan*

ICHARM will continue to make contribution for promoting the activity of WMO in the field of operational hydrology such as flood forecasting/warning and hydrological observation by actively participating in CHy and regional activities.

## **Mekong River Commission**

### *Past Activities with PWRI*

On March 21, 2003, MRC, NIRE (National Institute for Rural Engineering of Japan) and PWRI agreed upon their mutual cooperative research, training and information exchange activities and signed a Memorandum of Understanding. On the basis of this agreement, PWRI has shared the MRC's hydrologic HYMOS database for research purposes of the RR2002 project led by the University of Yamanashi and participated in the Annual Flood Forums consecutively from the 1<sup>st</sup> one. At the 3<sup>rd</sup> and 4<sup>th</sup> Annual Flood Forum, ICHARM/PWRI made presentations on the integrated flood management in Japan and the recent studies on flood forecasting technology at ICHARM/PWRI, respectively. PWRI also invited a MRC expert to give a lecture in the flood hazard training course.

### *Future Plan*

ICHARM will enhance mutual cooperative activities with MRC, through research, training and information-networking activities, in order to the establishment of integrated flood and water-resource management in the Mekong River basin.

## **University of California at Davis (UCD)**

### *Past Activities with PWRI*

PWRI has conducted cooperative researches with UCD, especially with the research group led by Prof. M. Levent Kavvas since 1989. In 1990s, their cooperation resulted in the development of an Integrated Regional-Scale Hydrologic/Atmospheric Model (IRSHAM) to study the impact of climate change on hydrologic regime on river basin scale in Japan. In the later 1990s and 2000s, their cooperation resulted in the development of a Regional Hydrology and Climate Model (RegHCM) for downscaling the outputs of global-scale atmospheric forecasts and assimilations, and a macro-scale hydrologic simulation model, Watershed Environmental Hydrology (WEHY) Model.

### *Future Plan*

ICHARM will continue this long and fruitful cooperation with UCD. ICHARM looks forward for the cooperation in the improvement of RegHCM and WEHY models and apply their achievements to issues on flood disaster mitigation in the world together with UCD.

## **US Geological Survey (USGS)**

### *Past Activities with PWRI*

PWRI has conducted cooperative researches on hydrology and water resources planning and management with USGS since 1991. At the first stage of this cooperation, PWRI and USGS signed a Memorandum of Understanding and actively exchanged mutual researchers. Those activities resulted in many joint field experiments and publications. In addition, a new cooperation on watershed management between US Bureau of Reclamation and PWRI was initiated and promoted through the USGS-PWRI cooperation. Although the MOU expired recently, PWRI and USGS are keeping links through joint workshops in Japan or USA once in two years.

### *Future Plan*

ICHARM will take a role in this long and fruitful cooperation to enhance mutual research activities on a variety of hydrologic issues in the world.

## **US Bureau of Reclamation (USBR)**

### *Past Activities with PWRI*

PWRI and USBR have conducted cooperative research on watershed and river system management based on the Implementing Arrangement signed in 2002, especially in the field of issues on dam reservoir operations, rehabilitation and their optimal integrated management in river basin scale.

### *Future Plan*

ICHARM will take a role in the integrated water resources management in river basin scale in this joint study.

## **Korea Institute of Construction Technology (KICT)**

### *Past Activities with PWRI*

PWRI and KICT have conducted research cooperation in every field of Civil Engineering since 2002. ICHARM has taken a role in the cooperation on hydrologic observations, especially river discharge measurement, and on the application of PWRI's physically-based distributed model (WEP) to monitor and analyze

hydrological cycle of the Cheonggyecheon watershed in Seoul, Republic of Korea.

#### *Future Plan*

ICHARM will keep cooperation on hydrologic observations and modeling, especially on river discharge measurement, and the applications of WEP.

### **Korea Water Resources Corporation (K-Water or KOWACO)**

#### *Past Activities with PWRI*

PWRI and KOWACO agreed on the mutual cooperation in the field of water resources and dam technologies and signed a Memorandum of Understanding in 2003. Two personnel of KOWACO had worked at PWRI as visiting researchers. One of them, Dr. Hyosok Chae contributed to a study on monitoring flood inundation in the Lower Mekong River basin.

#### *Future Plan*

ICHARM will pursue any future cooperation with K-Water in the field of hydrology.

### **UNISDR**

#### *Past Activities with PWRI*

- PWRI contributed the chapter on "Managing Risks" of WWDR2 written by WMO and UNISDR, by providing information on flood risk characteristics.
- As a participant in IFI, PWRI exchanged opinions in the IFI session of WWF4 in Mexico.
- In June 2006, ICHARM participated in the regional workshop on "Mitigation, Preparedness, and Development for TEWS in the IO Region" in Bangkok, Thailand.

#### *Action Plans*

- Chapter on risks of WWDR will be written by three parties, WMO, UNISDR and ICHARM.
- ICHARM plans to implement a comprehensive tsunami disaster prevention training program in order to function the early warning system effectively.

## **Asia Disaster Reduction Center**

### *Past Activities with PWRI*

- A lecture was delivered at the training program on preparing the Flood Hazard Map in year 2004 by a lecturer from ADRC.
- Opinions were exchanged at the symposium “Domestic Inaugural Symposium” in Tokyo on May 10<sup>th</sup>, 2006.

### *Action Plan*

- A system for mutual cooperation on training programs and special lectures will be formed between Asia Disaster Reduction Centre and ICHARM.

## **Typhoon Committee**

### *Past Activities with PWRI*

- Flood Hazard Mapping program was initiated by the Typhoon Committee. The program is continued by PWRI since 2004. PWRI participated the workshop on Flood Hazard Mapping in September 2005 in Malaysia.
- PWRI participated a special session on Flood Hazard Maps at the IAHR in Seoul in September 2005.

### *Action Plan*

- A cooperation to promote preparing flood hazard maps will be formed after trainee’s return from the Flood Hazard Mapping training course and efforts will be made for early dissemination of Flood Hazard Maps in developing countries.

## **China Institute of Water Resources and Hydropower Research (IWHR)**

### *Past activities with PWRI*

- IWHR employed two former PWRI researchers (Dr.Wang Yicheng and Dr. Jia Yangwen)
- PWRI and IWHR signed a Memorandum of Understanding in February, 2003
- PWRI and IWHR started a policy study project of Yangze River Flood Management for the period 2003-2008 with focus on resettlement issues in flood retarding basins, funded by Japan Science and Technology Agency.
- PWRI invited IWHR professors to deliver lectures at Flood Hazard Mapping Training courses in 2004 and 2005.
- PWRI organized a one-week training program on flood management for the IWHR

staffs in 2005.

- PWRI and IWHR jointly organized special sessions on flood management policy at 2<sup>nd</sup> Asia and Pacific Hydrology and Water Resources Conference in 2003.

#### *Action Plans*

- Personnel exchange
- Initiation of a joint research project on sediment disaster with IWHR with the help of IRTCES (UNESCO IHP centre on erosion and sedimentation hosted by China Ministry of Water Resources).
- Invite promising young researchers from IWHR and related organizations to ICHARM as affiliates.

### **Network of Asian River Basin Organization (NARBO)**

#### *Past activities with PWRI*

- Joint local-need survey in 2004 and 2005 (Department of Water Resources of Thailand, Department of Irrigation and Drainage of Malaysia, Mahaweli Authority of Sri Lanka, and other organizations)

#### *Action Plan*

- Utilize NARBO's network to implement ICHARM's information networking activities
- Joint research in integrated water resources management in a selected river basin. ICHARM focuses on localized flood risk management, while NARBO focuses on water and reservoir management.
- Joint survey for local flood impact study.

### **Japan Water Forum (JWF)**

#### *Past activities with PWRI*

- Coordination of a flood risk session at an academic conference

#### *Action Plan*

- Theoretical support for JWF's Hangen Campaign (to halve the number of water-related fatalities) by publishing supporting document with historical data on disasters

- Technical and strategic supports to plan Asia Pacific Water Forum's Water Disaster Taskforce

### **United Nations University (UNU)**

#### *Past activities with PWRI*

- Coordinated drafting of International Flood Initiative concept report
- Signing of a MOU in 2006
- Personnel exchange

#### *Action Plan*

- Joint application for external funds (GEF in 2006, MEXT in 2007)

## **5.2. External Fundraising**

### **Global Environmental Facility (GEF)**

Project Development Facility (PDF) grant for incremental project development costs.

- In 2006, plan to bid for a medium level (PDF-B, maximum of \$350,000 for single country projects) project together with collaborating organizations. The tentative theme is Rainfall and flood forecasting for environmental vulnerability assessment in a changing climate: Cases of Nepal and Brazil.
- Hopefully in 2007, bid for a medium level (PDF-C, maximum of \$1 million). The tentative theme is full implementation of the above system in several countries.

### **Asian Development Bank**

- In 2006, proposed a local flood defence study together with JWF and other collaborators.

### **Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT)**

*On-going science projects funded by MEXT*

- Mekong Water Resources Modelling Project (2002-2006)
- Chao Phraya River Basin Hydrologic Modelling Project (2002-2006)
- Chanjian River Flood Management Policy Scenario Project (2004-2008)
- Support for ICHARM International Workshops (2004-2006)

*Plan*

- Promotion Plan on Earth Observation under the scheme of Group on Earth -- Observation plan: System Development of real-time satellite data driven flood forecasting and warning
- Post Mekong Water Resources Modelling Project (application of the earth simulator analyses for future disaster mitigation planning)
- Others

### **5.3. Communications and Public Relations**

In order to contribute to the prevention and mitigation of water related disasters from the global perspective as an international centre under the auspices of UNESCO, ICHARM combines many different approaches in an effort to collect and disseminate relevant information.

#### *Web Presence*

ICHARM will disseminate information through its WWW site both in English and Japanese. ICHARM web will play the dual roles of disseminating information and coordinating ICHARM activities (i.e. Research results, Networking functions, Training courses, etc.). Furthermore, the web presence will act on a more general plain as a portal site on water hazard risk management related information with the vision of being a one-stop shop on the subject.

ICHARM will provide multimedia-rich, visually effective and appealing information based on technologies like Web-GIS in order to attract attention of a wider international audience to the issues of water hazards.

#### *Newsletter*

ICHARM will continue its efforts to further improve the quarterly newsletter issued in English and Japanese simultaneously. Various promotional activities during domestic and international conferences as well as using the network of trainees from abroad in the training programs, continuous attempts will be made to increase the subscriber-base.

Opinions and requests from readers will be incorporated to the maximum extent possible in order to create a newsletter that is responsive to its subscribers. Further, the electronic and online nature of the distribution, main media of which are by electronic mail and via the ICHARM web, will be exploit to the fullest possible extent to deliver a rich reader experience, while giving due consideration to the problems faced by subscribers from the locations with inadequate Internet connectivity, at the same time.

#### *Dissemination of the Output of ICHARM activities*

The results of research will be presented at international meetings. In addition to publicizing ICHARM output, these participations will help in providing much needed

checks and balances by receiving feedback from diverse groups and also to identify potential future partners.

International journals, the formal reports of the Public Works Research Institute and other published media will be used for providing information in English.

## **6. MANAGEMENT OF ICHARM**

### **6.1. Active Recruitment of Foreign Staff**

ICHARM was established as a part of the Public Works Research Institute (PWRI). Therefore the general employment rules of PWRI will be applied to the management of the personnel of ICHARM. On the other hand, as an international centre under the auspices of UNECO, ICHARM has set the policy to actively recruit foreign researchers. On two occasions in the past, December 2005 and July 2006, fixed term researchers (including regular employment and temporary employment) were recruited through international recruitment procedure, which will be continued in the future.

### **6.2. Office of ICHARM**

The office of ICHARM is located inside the PWRI complex in Tsukuba, Japan. It was developed by renovating a former experimental laboratory. The entire second floor of the building is designated for business sections and the first floor is for training room and library space. The re-modelling begun in August 2004 and was completed in March 2006.

The training room on the first floor can be used for training activities for up to 30 participants and the space can also be used for invited lectures and seminars.

Moreover, the library on the first floor is to accommodate domestic and international document related to the activities of ICHARM that have been previously compiled by the Public Works Research Institute. It will also actively be used to display the house publications of international organizations such as UNESCO and WMO. The remaining space on the first floor is allocated for auditorium space (with booths for simultaneous interpretations that can be used for international lecture events, up to about 50 people) and is scheduled to be completed around autumn 2007.

## **7. CLOSURE**

The ideas and activity plans presented in this report were developed mainly based upon the discussions during a number of meetings on ICHARM before and after its establishment. The international workshop held in Tsukuba on January 2006 and a series of expert meetings held in Tsukuba and Tokyo from April to August 2006 were among the most important occasions for the development of the strategies and the action plan. We express our deep gratitude for those who brought their splendid insights and encouragements to ICHARM.

Nevertheless the report presented here addresses only the scope of the very early stage of ICHARM activities that is expected to expand further in the future. Thus this report is of a limited scope describing the activities planned for the next two years. The immediate area of focus is limited to flood-related disasters, but will be expanded to other water hazard risks in the future including droughts and water contamination. The research agenda on the socio-economical, psychological and judicial aspects of disaster management, which is not yet established, needs careful planning. The concrete partnerships with the implementation organizations are not yet fully in place. These are very much necessary ingredients for our solutions to be effective in mitigating water disasters, and are only a few samples of what needs to be done in the long-term. The long-term vision of ICHARM should be tailored based on changing world needs, and above all, the responses we receive.

With all those future expansion potentials in mind, ICHARM will commit itself to pursuit the actions described in this plan. We hope that the realization of this plan, especially the idea of localism, will result in a new era of flood-related disaster management in the world. However small it is at the beginning, this may bring about a clear change in the current approaches of global disaster mitigation by paying more attention to diversity of our world.

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