PWRI's New Organizations and Research Projects on Natural Disasters

by

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ABSTRACT

The second medium-term plans with the new 17 Priority Research Projects started in April 2006 at the Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI). In addition to the change of medium-term plans, the IAA-PWRI made two big changes in its organization. One is the foundation of the International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM), and the other is the unification with the Civil Engineering Research Institute of Hokkaido. It is hoped that the new Priority Research Projects and these changes in the organization will increase the IAA-PWRI's capacity for research on natural disasters.

KEYWORDS: International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM), Natural Disasters, Organization, Priority Research Projects

1. INTRODUCTION

In April 2001, the old Public Works Research Institute (PWRI) that had belonged to the Ministry of Land, Infrastructure and Transport (MLIT) was reorganized to the Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI). The IAA-PWRI should carry out research and development

* that must be surely performed to promote the public welfare,
* and that need not be carried out directly by the national government,
* but that might not be always carried out by the private sector.

The IAA-PWRI should achieve the medium- term goals that are given by the Minister in charge. To achieve the medium- term goals, the IAA-PWRI prepare the medium- term plans, and carry out research and development according to the plans. One of the most important parts of the medium-term plans are the Priority Research Projects, which deal greatly required research topics, which should be conducted quickly, and whose results will contribute greatly to advance in civil engineering technologies and public welfare.

The first medium-term plans were for the period from April 2001 to March 2006. The second medium-term plans should be formulated before the end of the first plans. In this paper described are the new Priority Research Projects, the most important parts of the plans.

In addition to the change of medium-term plans, we made two big changes in our organization. One was the foundation of the International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM) on the 6th of March 2006, and the other was the unification with the Civil Engineering Research Institute of Hokkaido on the first of April 2006. It is hoped that these changes in the organization will increase our capacity for research on natural disasters. The changes in our organization are described first, then follows the new Priority Research Projects.

2. INTERNATIONAL CENTRE FOR WATER HAZARD AND RISK MANAGEMENT UNDER THE AUSPICES OF UNESCO (ICHARM) [1]

2.1 Background

The UNESCO International Hydrology Programme (IHP) is contributing to solving global water-related problems through the foundation of UNESCO Centres in every corner of the earth. The Centres serve as an international base for every specific theme of water-related field and aim to promote exchange of international information, partnership and cooperation. On the other hand, the Public Works Research Institute

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has greatly contributed to solving diversified water management problems, including flood control, water resources, quality management of public waters and river ecology. Recently, international research projects, such as the flow prediction of the Mekong River basin are also done successfully.

In 2003 on the occasion of the Ministerial Conference of the Third World Water Forum, Mr. Koichiro Matsuura, the UNESCO Director-General, proposed the foundation of UNESCO Centre for Water Hazard and Risk Management, in agreement with the Japanese government. Recognizing the positive role of such international contribution and willing to make use of its accumulated technical knowledge in solving global water-related problems, the Public Works Research Institute founded an International Center for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM) inside the institute on March 6, 2006, following its recognition by the UNESCO general meeting on October 2005.

2.2 Objectives

The goal of the Center is to be the world Centre of Excellence to provide 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.

This centre aims to promote Research, Training and Information Networking activities, focusing on the issues and problems related to water hazard and risk management (Fig. 1). These three activities will be developed in integrated manner. For instance, the daily research results will be applied to the capacity building for researchers and professionals mainly from developing countries. The human network to be formed through the training activities will become a permanent core of the future information networking. The information networking will boost mutual flow of information, enabling the outcome to be reflected accurately in the research and capacity building

2.3 Principles and Strategies

The guiding principles of the ICHARM are:

- To be needs driven rather than supply driven, responsive to respective local realities.
- To prescribe tailored strategies to realize integrated risk management under the multifaceted social, economical, 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 where 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 a think-tank of water hazards and risk management of the world and play a central role of its strategic promotion.

The management strategies of the ICHARM are:

- To be the clearinghouse of information and the broker of knowledge and technology of the world to deliver whatever available to wherever needed in the world.
- To make the Japanese and PWRI's experiences 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 operation language.
- To promote external fundraising jointly with the researchers and administrators of various nations and international institutes.

2.4 Present Activities

Initially, ICHARM will place its priority on “risk management regarding flood-related disasters”. Specifically, the centre conducts activities of “research, training and information networking.”

Based on the Japanese and PWRI's experiences and technologies, the centre integrates and carries out those activities in collaboration with relevant organizations in Japan and abroad.

3. NEW PUBLIC WORKS RESEARCH INSTITUTE

3.1 Unification with the Civil Engineering Research Institute of Hokkaido

The Civil Engineering Research Institute of Hokkaido was originally established as the Laboratory of the Civil Engineering Department, Hokkaido Agency, Ministry of Internal Affairs in 1937. In 1947, it was reorganized as the Civil Engineering Laboratory of Hokkaido. It was renamed as the Civil Engineering Laboratory, Hokkaido Developing Bureau, Hokkaido Developing Agency in 1951. After changing its name several times, it was reorganized to the Incorporated Administrative Agency, Civil Engineering Research Institute (IAA-CERI) of Hokkaido in 2001.
The objective of the IAA-CERI was to contribute to the promotion of development of Hokkaido by improving civil engineering technologies. Hokkaido's climate is severe and cold. Soft peat covers considerable part of plains in Hokkaido. The IAA-CERI has developed civil engineering technologies suitable for the natural conditions of Hokkaido.
On the other hand, the objective of the IAA-PWRI was to contribute to the promotion of effective construction and maintenance of quality infrastructures by improving civil engineering technologies. The improvement of civil engineering technologies was common to the both institutes. Because of their common missions, it was recommended to unify the IAA-PWRI and IAA-CERI to the new IAA-PWRI. The new IAA-PWRI was established on the first of April 2006.

3.2 New Organization

The objective of the new IAA-PWRI is to contribute to the promotion of effective construction and maintenance of quality infrastructures and of development of Hokkaido by improving civil engineering technologies. The new organization chart is shown in Fig. 2. The new IAA-PWRI consists of three sub-institutes, namely the Tsukuba Central Research Institute, the Civil Engineering Research Institute for Cold Region and the ICHARM. Most of the research groups of the old IAA-PWRI belong to the Tsukuba Central Institute. Most of the research departments of the old IAA-CERI belong to the Civil Engineering Research Institute for Cold Region. For comparison, the old organization charts of the two old agencies are shown in Fig. 3.
It goes without saying that the unification with the IAA-CERI has increased the IAA-PWRI's capacity to make research on natural disasters in the cold region, and that the foundation of the ICHARM has increased the IAA-PWRI's capacity to disseminate its expertise and research results on natural disasters to the world.

4. PRIORITY RESEARCH PROJECTS IN THE NEW MEDIUM-TERM PLAN

4.1 Medium-term Goals, Medium-term Plans and Priority Research Projects

The medium-term goals are operating goals that should be achieved by an Incorporated Administrative Agency during a period ranging from 3 years to 5 years. The Minister in charge gives these goals. The Incorporated Administrative Agency must prepare the medium-term plans, which are plans for the Agency to achieve the medium-term goals.
In the medium-term plans, the research projects, which are greatly required, which should be conducted quickly, and whose results will contribute greatly to advance in civil engineering technologies and public welfare, are defined as Priority Research Projects. The Priority Research Projects in the previous medium-term plans of the IAA-PWRI are shown in the Table 1.

4.2 Development of the New Priority Research Projects

In the new medium-term goals, it was directed by the Ministers in charge to conduct research and development that will realize the following goals:
a) To prevent or mitigate damages caused by

earthquakes, tsunami, eruption, storm and flood-related disasters, sediment-related disasters, snow and ice-related disasters, and traffic accidents
b) To decrease risk of life environment remarkably and to improve quality of living space
c) To renew infrastructures safely and efficiently and to improve management of infrastructures
d) To utilize energy and natural resources efficiently, to reduce wastes, and to preserve sound water quality and ecological systems
e) To construct infrastructures suitable in the snowy and cold climate of Hokkaido
f) To construct stable agricultural infrastructures utilizing local resources and harmonizing with beautiful nature of Hokkaido
To realize these goals, 17 Priority Research Projects were formulated. The Priority Research Projects in the present medium-term plans are shown in the Table 2. Seven Priority Research Projects are dealing with natural disasters in the present medium-term plans, while there were only two Projects dealing with natural disasters in the previous medium-term plans.

5. CONCLUSIONS

The second medium-term plans with the new Priority Research Projects started in April 2006 at the Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI). In addition to the change of medium-term plans, the IAA-PWRI experienced two big changes in its organization. One is the foundation of the International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM), and the other is the unification with the Civil Engineering Research Institute of Hokkaido. It is hoped that the new Priority Research Projects and these changes in the organization will increase the IAA-PWRI's capacity for research on natural disasters.

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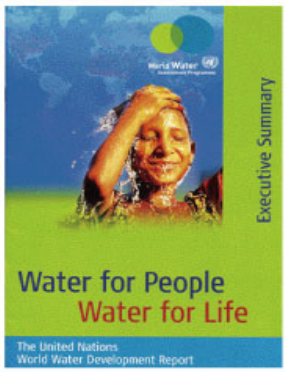

UN WWDR(2003)
Executive Summary

Our Web

- Contributing to the World Water Development Report (WWDR) compiled by the World Water Assessment Programme (WWAP) by developing various indicators and presenting case studies in the risk management domain
- Promoting the International Flood Initiative (IFI)
- Expanding the Global Flood Alert System (GFAS) in liaison with the International Flood Network (IFNet)
- Conducting interdisciplinary studies on water-related disaster reduction measures for foreign rivers such as the Mekong River, the Chao Phraya River and the Chang Jiang River
- Developing procedures for hydrological observations and data processing

Research

Data/ Information

Results/ Outcomes

Curriculum

Participation

Information Networking

Knowledge

Network

Training

- Developing database regarding water-related disasters worldwide in various areas such as meteorology, hydorology, damage statuses, and risk management systems
- Creating an international/interdisciplinary network of researchers, administrators and those who completed training courses through the Web and newsletters

- Planning and conducting training for administrators and researchers mainly in developing countries
  [Examples of the Training Courses]
  - Flood hazard mapping
  - River and dam engineering
  - Tsunami disaster prevention (in preparation)

Fig. 1 Three Activities of the International Center for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM)

Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI)

Chief Executive

Executive Members

General Affairs Department
Planning and Research Administration Department

Tsukuba Central Research Institute
- Construction Technology Research Department
- Material and Geotechnical Engineering Research Group
- Earthquake Disaster Prevention Research Group
- Water Environment Research Group
- Hydraulic Engineering Research Group
- Erosion and Sediment Control Research Group
- Road Technology Research Group
- Structures Research Group

Civil Engineering Research Institute for Cold Region
- Administration Department
- Cold Region Construction Engineering Research Group
- Cold Region Hydraulic and Aquatic Environment Engineering Research Group
- Cold Region Road Engineering Research Group
- Cold Region Agricultural Development Research Group

The International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM)
- Water-related Hazard Research Group

Fig. 2 The Organization Chart of the New Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI)

Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI)

Chief Executive
- Executive Members
- General Affairs Department
- Planning and Research Administration Department

- Construction Technology Research Department
- Material and Geotechnical Engineering Research Group
- Earthquake Disaster Prevention Research Group
- Water Environment Research Group
- Hydraulic Engineering Research Group
- Erosion and Sediment Control Research Group
- Road Technology Research Group
- Structures Research Group

- Secretariat for Preparatory Activities of UNESCO-PWRI Centre

Civil Engineering Research Institute of Hokkaido (IAA-CERI)

Chief Executive
- Executive Members
- General Affairs Department

- River and Port Department
- Structures Department
- Road Department
- Agricultural Engineering Department

Fig. 3 The Organization Chart of the Old Incorporated Administrative Agency, Public Works Research Institute (IAA-PWRI) and the Incorporated Administrative Agency, Civil Engineering Research Institute (IAA-CERI) of Hokkaido

Table 1 The Priority Research Projects of the Old PWRI for the Medium-Term Plans during 2001-2005

1. R&D for ensuring safety
   - 1.1 Research on economical seismic retrofit technologies for civil infrastructures.
   - 1.2 Research on enhancing techniques for mitigating damage caused by slope collapse and fluidization.
   - 1.3 Research on evaluating water quality risks.
   - 1.4 Research on techniques for conserving ground environment.

2. R&D for conserving and restoring the environment
   - 2.1 Research on comprehensive hydrologic models for river basins.
   - 2.2 Research on restoring the natural environments of lakes and rivers.
   - 2.3 Research on techniques for controlling water quality and soil at dam reservoirs and downstream sections of rivers.
   - 2.4 Research on techniques for treating bottom sediment at enclosed water areas.
   - 2.5 Research on evaluating heat island phenomena reduction alternatives.

3. R&D for efficiently preserving and improving infrastructure
   - 3.1 Research on improving the durability of structures and evaluating their performance.
   - 3.2 Research on evaluating the soundness of infrastructure stock and its remedial techniques.
   - 3.3 Research on improving infrastructure using new, untapped, and recycled materials.
   - 3.4 Research on efficient construction and redevelopment of dams considering surrounding environment.
   - 3.5 Research on reducing construction costs of super-long highway structures.

Table 2 The Priority Research Projects of the New PWRI for the Medium-Term Plans during 2006-2010

I. R&D for preventing or mitigating damages caused by earthquakes, tsunami, eruption, storm and flood-related disasters, sediment-related disasters, snow and ice-related disasters, and traffic accidents

1. Research on prevention and mitigation of flood-related disasters in the world by utilizing integrated risk management approaches
2. Development of technologies for strengthening river levees against floods
3. Development of seismic resistant technologies for existing highway and river infrastructures against strong earthquakes
4. Development of technologies for predicting or mitigating sediment-related risks posed by severe rainfalls or earthquakes
5. Research on efficient utilization of coastal areas in the cold region
6. Research on improvement of road safety against large-scale rock slope failure
7. Research on winter road safety and efficiency

II. R&D for decreasing risk of life environment remarkably and for improving quality of living space

8. Development of technologies for decreasing risk of life environment

III. R&D for renewing infrastructures safely and efficiently and for improving management of infrastructures

9. Research on improvement of design methods for efficient construction of highway infrastructures
10. Research on improvement of maintenance and management technologies of highway structures
11. Research on durability of infrastructures in the cold region

IV. R&D for utilizing energy and natural resources efficiently, reducing wastes, and preserving sound water quality and ecological systems

12. Development of recycling technologies in construction for efficiently utilizing natural resources and reducing wastes
13. Development of preservation and restoration techniques for aquatic ecosystems
14. Development of technologies on dams that reduce effects on the natural environments
15. Development of design technologies on rivers and basins in snowy climate

Table 2 The Priority Research Projects of the New PWRI for the Medium-Term Plans during 2006-2010 (contd.)

V. R&D for construction of infrastructures suitable in the snowy and cold climate of Hokkaido

5. Research on efficient utilization of coastal areas in the cold region
6. Research on improvement of road safety against large-scale rock slope failure
7. Research on winter road safety and efficiency
11. Research on durability of infrastructures in the cold region
15. Development of design technologies on rivers and basins in snowy climate

VI. R&D for construction of stable agricultural infrastructures utilizing local resources and harmonizing with beautiful nature of Hokkaido

16. Development of the cyclic utilization system of local biomass that has the centralized biogas plant in its core
17. Research on preservation of structural function and on improvement of water supply function of agricultural water use infrastructures in the cold region