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ICHARM

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

Contents

United Nations Educational, Scientific and Cultural Organization

Message from Director

A huge typhoon, Muroto, hit the Kinki region of Japan in September 21, 1934. Two months later, Torahiko Terada, a well-known Japanese physicist and essayist, published a short essay in the Keizai Orai magazine. Reading this, I am amazed that his writing covers almost all important concepts and perspectives in today's disaster management. Here I would like to share some of his thoughts with you.

A natural disaster strikes when people lose their memory of the previous one. This is a common saying that many believe was coined by Torahiko. He writes "... the basic cause of these misfortunes is that people ... had forgotten about the possibility of such violent storms."

Anticipating "... the further civilization progresses, the more severe is the damage caused by the violence of nature," Torahiko says, "When single-celled animals are cut into two, each part can continue to live on its own without any problems," but the "higher animals ... can be killed if merely pierced in a certain way by a thorn." The "nerves and blood vessels," which underpin the biological integration of the higher animals, "are carefully protected by ingenious mechanisms." Contrastingly, he points out, the power lines and pipes "that are the nerves and blood vessels of our country ... are exposed to the elements." In this way, more severe damage will await in the future, he concludes.

Torahiko also mentions what seems like human errors that may lead to a disaster. "The old villages had been the fittest to survive the time-long tests of natural selection." But with population increase, more people have been settled in other places, where they end up suffering from disasters. In those new settlements, the building codes must be complied, but some houses are built with "shoddy construction" by cheating.

He says that natural hazards are enemies that "issue no ultimatums before their surprise attacks," and the country needs to prepare science-based national defense equipped with observational networks. He concludes the essay stressing the importance of "long-lasting cooperation among all of our people to establish appropriate, science-based measures against the natural enemies."

It seems to me that the all points Torahiko made in his essay are just like the ones we face today. I wonder what he would say about recent profound increase of disaster events and impacts.

(Citations from *Enjoying Torahiko in English* by Tom Gally and Mitsugu Matsushita, 2013)

31 July 2013
Kuniyoshi Takeuchi
Director of ICHARM

At Bled, Slovenia, where the LAM4 for IPCC AR5 was held on July 15-18, 2013

昭和９年９月 21 日強大な室戸台風が近畿を襲いました。その２か月後、寺田寅彦は「天災と国防」という小文を雑誌「経済往来」に発表しました。ここには現在の防災の基本的考え方、見方がほとんどすべて網羅されていて驚きます。一部を紹介したいと思います。

「天災は忘れたころにやってくる」は寺田寅彦の言と言われていますが、ここには「今度のような烈風の可能性を……忘れていたことがすべての災厄の根本原因」とあります。

「文明が進めば進むほど天然の暴威による災害がその激烈の度を増す。」その原因は複雑に発達し「有機的結合」をもった社会では、「一小部分の傷害が全系統に致命的となりうる恐れがあるようになったということである。」「単細胞動物のようなものでは個体を切断しても、各片が平気で生命を維持することができる」が、高等動物では「針一本でも打ち所次第では生命を失うようになる。」高等動物ではその有機的結合を支える「神経や血管」が、「実に巧妙な仕掛けで注意深く保護されている」が、社会の電線やパイプは「野天に吹きさらし」になっています。これでは被害の甚大化は避けられません。

「旧村落は「自然淘汰」という時の試練に堪えた「適者」として「生存」しているのに反して」、人口の増加でそれ以外のところに住む人が増え、そこが災害に遭っています。そこには建築基準が重要ですが、これを手抜きした「不正な施工」もあります。

自然の猛威は、「最後通牒もなしに突然襲来する」敵であり、観測網を整備した科学的国防が欠かせません。「天然の強敵に対して平生から国民一致協力して適当な科学的対策を講ずる」必要があります。

原因も課題も科学の重要性も現在と同じに見えます。昨今の災害の多発を、寺田寅彦はどう見るでしょうか。

Special Topics

UNESCO and Japan Renew Partnership for ICHARM

7 月 23 日、木曽功ユネスコ日本国特命全権大使とイリーナ・ボコバユネスコ事務局長が、パリのユネスコ本部において、ICHARM の更新に関する協定に署名しました。両氏の署名により発効した協定により、ICHARM は今後 6 年間、引き続きユネスコ後援世界機関（カテゴリー 2）として活動することになりました。詳細はユネスコのホームページ * をご覧ください。

**http://www.unesco.org/new/en/media-services/single-view/news/unesco_and_japan_renew_partnership_for_the_international_centre_for_water_hazard_and_risk_management/back/18256/*

On 23 July, 2013, the Ambassador of Japan to UNESCO, H.E. Mr Isao Kiso and the Director-General of UNESCO, Irina Bokova, signed an agreement for the renewal of ICHARM at the UNESCO Headquarters in Paris. The agreement, which entered into force upon its signature, grants ICHARM the status of an international centre under the auspices of UNESCO (Category 2) for a second six-year term. For more information, please visit the UNESCO website*.

Japanese Ambassador to UNESCO Isao Kiso (left) and UNESCO Director-General Irina Bokova at the signing ceremony (Photo: Courtesy of the Permanent Delegation of Japan to UNESCO)

**http://www.unesco.org/new/en/media-services/single-view/news/unesco_and_japan_renew_partnership_for_the_international_centre_for_water_hazard_and_risk_management/back/18256/*

Research

RRI Model Receives the 15th Infrastructure Technology Development Award 2013

ICHARM で開発を進めてきた「降雨流出氾濫モデル (RRI モデル)」が第 15 回国土技術開発賞 (優秀賞) を受賞しました。この賞は、住宅・社会資本整備もしくは国土管理に関わる、計画・設計手法、施工方法、維持管理手法、材料・製品、機械、電気・通信、伝統技術の応用などの広範に亘る技術で、近年に開発し、かつ実用に供された新技術が受賞の対象となります。今回、RRI モデルの新規性と、JICA チャオプラヤ川流域洪水対策プロジェクト（洪水管理システム構築支援）等への適用実績が認められて受賞にいたりました。

授賞式には、応募者である土木研究所を代表して竹内センター長と技術開発者の佐山主任研究員が出席し、太田昭宏国土交通大臣から直接表彰状と盾が授与されました。

PWRI was awarded on July 5, 2013, with the 15th Infrastructure Technology Development Award for the recent development of the Rainfall-Runoff-Inundation (RRI) Model. ICHARM Director Kuniyoshi Takeuchi, representing PWRI, and Senior Researcher Takahiro Sayama, who has developed the technology, participated in the awarding ceremony, and were presented with an award certificate and a crystal plaque by Minister of Land, Infrastructure, Transport and Tourism Akihiro Ota.

The award is established to recognize excellent technologies that have recently developed and put into practice in relation to housing and social infrastructure or land management including a wide range of categories such as planning and design, construction, maintenance and management, materials and products, machinery, electronics and communications, and applications of traditional techniques. The RRI Model has been recognized for its novelty and practical application to a JICA project called “Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin (flood management system development assistance).”

From left: Researcher Takahiro Sayama, MLIT Minister Akihiro Ohta, and Director Kuniyoshi Takeuchi

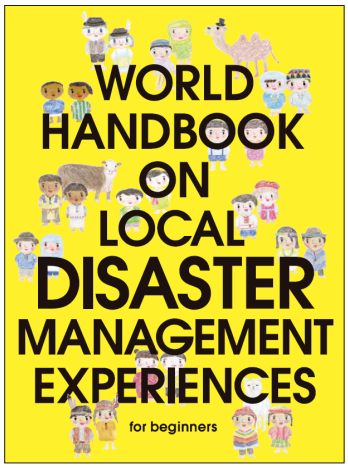
World handbook on local disaster management experiences
Disaster Management Handbook Published

ICHARM は 2013 年 3 月に英語の災害ハンドブックを出版しました。これは津波、地震、洪水、竜巻など 14 の災害を、世界中の研究者の協力で集めた教訓や写真を織り交ぜながら、図解しています。基盤研究「地域に根差したローカルな防災経験の

ICHARM published a booklet entitled “World Handbook on Local Disaster Management Experiences” in March 2013. The handbook illustrates 14 natural hazards, such as tsunami, earthquake, flood and tornado, with many pieces of advice and photos collected from cooperative re-

ICHARM Researcher Megumi Sugimoto (third from left) with teachers of Shibuya Junior & High School

searchers all over the world. This is a result of the basic research project conducted in fiscal 2010-2012 on active use of local disaster management experiences.



The handbook has been getting a lot of public attention. It was introduced in three major newspapers in Japan. After these newspaper reports, there have been inquiries about the handbook from schools, local public offices, hospitals and other organizations. In June 19, Megumi Sugimoto, the author and an ICHARM researcher, was invited by Shibuya Junior & Senior High School, a Tokyo-based UNESCO school with approximately 1,500 students, and instructed on how it can be used in a school setting to English teachers and librarians (see photo). They are planning to add some copies to the library books and use them as English learning material.

The handbook is getting worldwide attention, too. In March 2013, it was used for science teachers in Indonesia to learn disaster management. A total of 400 copies were given out to conference participants of the European Geoscience Unions held at Vienna in April and those of the UN Global Platform for Disaster Risk Reduction held at Geneva in May. To make it available for people in other countries, foreign researchers at ICHARM are now translating it into Spanish, Russian, and some other languages. The handbok is also downloadable in pdf form; just click the yellow banner on the top page of the ICHARM website (http://www.icharm.pwri.go.jp/publication/pdf/handbook_on_local_disaster_management_experiences.pdf). It has been downloaded 635 times in the last one month. In addition, we are discussing more useful ways to use the handbook with UNESCO and the UN Human Settlements Programme. We will appreciate your support and contribution for this handbook to help developing countries mitigate disaster damage. *(Written by Megumi Sugimoto)*

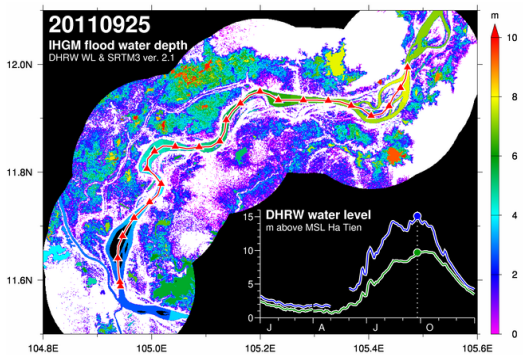
積極的活用に関する研究」（2010-2012 年度）の成果の一部です。

ハンドブックは、2013 年 2 月 18 日産經新聞、3 月 18 日毎日新聞、6 月 14 日読売新聞で紹介されました。新聞を見た学校や自治体や病院の他に、寒地土研や国総研からも問い合わせがありました。6 月 19 日にはユネスコスクールの渋谷教育学園渋谷中学高等学校（在校生約 1500 人）で英語や司書の教諭にこの教材を使って教えるポイントを指導しました（写真参照）。今後は、英語教材や図書室で使う予定とのことです。

海外では、2013 年 3 月にインドネシアの理科教員の防災教材として使用しました。さらに、4 月にヨーロッパ地球物理学会（ウィーン）や 5 月に国連防災グローバルプラットフォーム（ジュネーブ）で 400 部を配布しました。所内の外国人研究員の支援を受けてスペイン語、ロシア語等多言語に翻訳中です。1 ヶ月で 635 件ダウンロードされた PDF は、ICHARM のホームページトップの黄色のバナーから誰でも入手できます。さらなる普及のため、ユネスコや国連居住計画と協議中です。今後途上国の減災のために使われるよう皆様のご支援を賜りたく思っております。

Development of a Method for Estimating Flood Damage in the Lower Mekong Basin

In every rainy season when the southwest Asian monsoon is dominant, a large-scale flood occurs over the Cambodian Plain in the Lower Mekong Basin. In this region, people have been living with floods; in other words, they have been conforming to a rhythm in nature, because flood occurs rhythmically or cyclically within a one-year period. The annual rhythm of flood is, however, not constant but modulated (amplified and/or phase-shifted) in some years. If people cannot conform to a modulated rhythm, flood damage may become serious. We at ICHARM have been developing a method for estimating flood damage to houses and rice production in the Lower Mekong Basin as a function of floodwater depth. Applying this method, fluctuation in flood damage can be quantitatively estimated as the annual rhythm of flood changes, for example, in a projected future climate. To estimate flood damage more accurately, we also have been developing methods for observing and/or simulating flood inundation to understand floodwater depth distribution, a method for mapping geographical distribution of houses with their properties, and a method for identifying rice cropping patterns in space and time, by using satellite, census, field survey and other data sources.



(Written by Hideyuki Kamimera, Project led by Toshio Okazumi)

メコン川の下流域に広がるカンボジア平原では、南西モンスーンに伴う雨季の到来とともに大規模な洪水が毎年のように発生します。この地域では一年周期でリズミカルに洪水が発生しますので、人々は自然のリズムに合わせて工夫しながら生活しています。しかし年によっては洪水のリズムが乱れる（振幅が増したり位相がずれる）ことがあります。このリズムの乱れに十分に対応できなければ洪水被害が生じてしまいます。私たち ICHARM は現地調査で得られた情報をもとに家屋や米生産がこうむる洪水被害額を氾濫水深から推定する手法の開発・改良に取り組んでいます。この手法を応用すれば、例えば将来気候条件下で洪水のリズムが変化したときに洪水被害額がどのくらい変化するかを定量的に見積もることができます。ただし、被害額をより正確に推定するためには、洪水のリズム、家屋の地理分布や米の作付け状況も正確に把握する必要がありますので、多角的に手法の開発・改良に取り組んでいます。

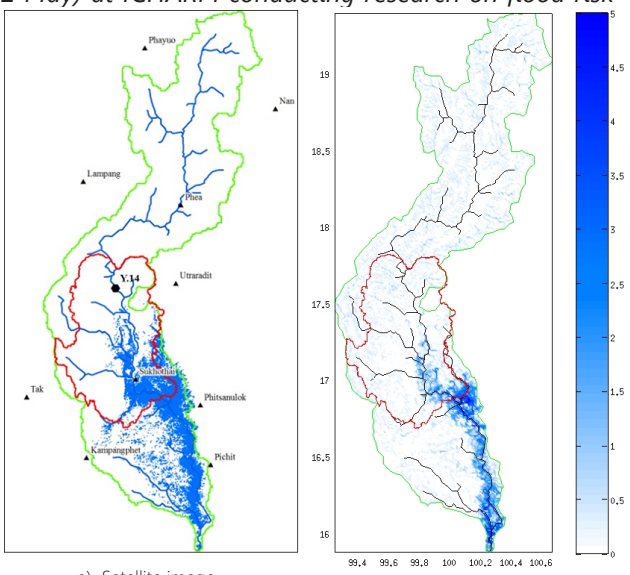
Collaborative Study between Thai Researchers and ICHARM

タイ国・Chulalongkorn 大学の Anurak Sriariyawat 博士と Kwanchai Pakoksung 研究員が、5月9日から22日までの2週間、ICHARM に滞在し、ヨム川流域の洪水リスク評価に関する研究を行いました。この研究は ICHARM と協力して実施され、Journal of Disaster Research 誌に投稿されました。以下は Sriariyawat 博士による論文の要約です。

タイ国北部の Sukhothai 州はヨム川流域に位置しています。この流域には大規模ダムがないため、洪水や渇水が頻繁に発生します。2011 年の洪水もそのひとつです。研究では、衛星雨量情報（TRMM）および RRI モデルを使って、流域の洪水状況に関するシミュレーションを実施し、観測の水位・流量や浸水範囲と比較しました。またシミュレーション結果をもとに、洪水による経済被害の推定を試みました。

その後、シミュレーションから得た浸水範囲をもとに回帰分析を行い、洪水による経済被害を計算しました。この計算結果を政府発表の数値と比較すると、27% 程度の過剰評価がみられました。この研究から、数値にある程度の差異はあるものの、RRI モデルを使った手法が流域規模の洪水リスク評価に有効であることがわかりました。

Dr. Anurak Sriariyawat and Mr. Kwanchai Pakoksung from Chulalongkorn University, Thailand, spent two weeks (9-22 May) at ICHARM conducting research on flood risk assessment in the Yom River Basin. The collaborative study with ICHARM researchers has been published in the Journal of Disaster Research, Vol. 8(3), 2013. The following is a summary of the journal article reported by Dr. Sriariyawat.



a) Satellite image on Sep. 21, 2011

b) Simulated inundation depth [m]

Sukhothai is a province in the northern part of Thailand, and is located in the Yom River Basin, where no large-scale dams have been constructed, resulting in frequent floods and droughts including the 2011 flood. The flooding situation in the basin was simulated by using a Rainfall-Runoff-Inundation (RRI) model with satellite-based rainfall (TRMM) to assess economic damage due to flooding. The simulation results were compared with the observed stream-flow water level, discharge and inundation extent.

Then, the simulated inundation area was used for regression analysis to estimate economic flood damage. The estimated damage for the 2011 case based on past records was overestimated by 27% compared to the damage reported by the government. Regardless of some discrepancy, this study demonstrated the potential of the approach with the RRI model for useful flood risk assessment at a basin scale.

(Written by Anurak Sriariyawat, led by Takahiro Sayama)

Capacity Development

Pakistani Officials Participate in a Capacity Development Workshop

ICHARM では、2013 年 5 月 28 日から 6 月 6 日まで、パキスタンの中級～高級行政官を対象に、ワークショップ「2013 パキスタンにおける統合的な洪水リスク管理能力向上」を実施しました。このワークショップは、2010 年にパキスタンで起こった大水害を契機に、日本政府からユネスコへの資金拠出によって開始した洪水対策プロジェクトの一環として実施したもので、昨年度 6 名を対象として実施した同内容のワークショップの 2 回目になります。

ワークショップには、パキスタン気象局首席気象官をはじめとする 5 名が参加し、日本の洪水対策や洪水予警報システムに関する各種講義や、荒川におけるスーパー堤防や鬼怒川水系におけるダム施設、砂防施設、渡良瀬遊水地の視察を行いました。

From May 28 to June 6, 2013, ICHARM conducted a workshop, "Capacity Development for Integrated Flood Risk Management in Pakistan," specifically designed for middle- to high-ranking officials of the Pakistani government. This is the second installment of the workshop, following the one held last year. The workshop has started as part of a flood management project that is organized by UNESCO in response to the mega flood that hit the country in 2010 and is funded by the Japanese government.

Panistani officials (front row) at the opening ceremony

This year, the chief meteorologist of the Pakistani Meteorological Department and four other officials participated in the workshop. They attended lectures on flood management and flood forecasting

and warning systems in Japan, and took a study tour to see the Arakawa super levee, dams in the Kinugawa river system, sabo dams, and the Watarase retarding basin. They also paid a courtesy visit to ministries and agencies of the Japanese government.


At the Watarase retarding basin

On the final day, the closing ceremony was held, where ICHARM Director Kuniyoshi Takeuchi awarded the participants with a workshop certificate, and the workshop ended successfully.

The participating officials praised the workshop for its excellent contents and organization. They were particularly impressed with river management in Japan including how steadily plans are put into action. They also commented that retarding basins like the one they saw at Watarase should be effective for flood control in the Indus River basin. Furthermore, they seemed inspired by the fact that the Arakawa diversion channel has been playing a very important part for Tokyo's development. Back home, they will discuss and plan how to cope with floods and what measures to take.


At the closing ceremony:
A participant is awarded with a certificate by ICHARM Director Kuniyoshi Takeuchi

For further information, a detailed report will be posted on the ICHARM website.

Finally, we would like to thank all offices and agencies that cooperated for this successful installation of the workshop.

(Written by Daisuke Kuribayashi)

また、日本政府関係省庁への表敬訪問も実施しました。

最終日に行った修了式では、竹内センター長から参加者に修了証が手渡され、無事にワークショップは終了しました。

参加者の多くからは、このワークショップの内容は大変良く考えられており、素晴らしいものだったとの評価を頂きました。特に、日本の河川管理とその着実な実施状況、渡良瀬遊水地のような遊水地はインダス川でも有効と思われること、荒川放水路があったために東京が発展してきたことに、強い感銘を受けて帰られました。帰国後、今回のワークショップから得られた知見をもとに、パキスタンで考えられる将来の方向性や対策をまとめることとなりました。

なお、本ワークショップの詳細は別途 ICHARM ホームページにも掲載される予定です。

最後になりましたが、本ワークショップの遂行に当たり、お忙しい所ご協力いただいた（独）水資源機構、国土交通省利根川上流河川事務所・鬼怒川ダム統合管理事務所・日光砂防事務所・荒川下流河川事務所、気象庁の皆様には、この場をお借りして厚く御礼申し上げます。

Visit to Chikusei City Flood Fighting Drill

Sixteen foreign students, currently enrolled at the ICHARM graduate programs, went on a study trip to a flood fighting drill at the Hakojima retarding basin, which was organized by Chikusei City, a neighboring city west of Tsukuba, on May 26, 2013. Flood fighting methods have been in use from ancient times by generations of people living on the riverside in the efforts to protect houses and farmland from flooding. These methods are ingeniously designed to use materials traditionally available for farmers such as bamboo and other trees and rice straws. The visit was a great opportunity for foreign students to take a close look at different methods because many techniques used in the methods are applicable to other places even in developing countries. In the drill, Chikusei City fire fighters and the MLIT branch office staff demonstrated different types of methods using sandbags, trees, and waterproof sheets. A Sri Lankan student was impressed with the demonstration and commented, "I've never seen these methods, but they seem to be effective in flood damage reduction and easily put to use in my country, too."


A demonstration of a flood fighting method using a water-proof sheet

(Written by Daisuke Kuribayashi)

2013 年 5 月 26 日、茨城県筑西市の母子島遊水地内にて、筑西市主催の水防訓練が行われ、ICHARM の修士課程・博士課程の外国人学生計 16 名が視察しました。水防工法は、川の近くに住む人たちが自分たちの家や農地を守るために古来から培われてきた技術であり、現地農家でも入手しやすい竹やわら、立木などの材料で行えるよう工夫されています。水防工法には、途上国においても実施可能な技術が多く含まれており、様々な工法について間近に見学できる機会でした。

訓練においては、筑西市消防団や国土交通省事務所の方々による積み土嚢工から始まり、木流し工・シート張り工・五徳縫い工・月の輪工などが実演されました。スリランカの学生からは、「このような工法は初めて見たが、自国にも適用が容易で洪水被害軽減にとても効果的なアイデアである。」とのコメントがありました。

Message by Andrea Juarez, ICHARM Internship Student

オランダの Wageningen 大学からインターンシップ生として、Andrea Juarez さんが 4 月から 7 月まで 3 か月 ICHARM に滞在し、研究活動や日本の洪水対策施設の視察を行いました。以下は、彼女からの寄稿文です。

ICHARM でインターンシップができるとわかったとき、新しい環境、新しい文化の中で勉強することになり、自分の持てるものを最大限に発揮する必要があると思いました。実際に ICHARM に来ると、環境や文化の違いにかかわらず、簡単に馴染めました。インターンシップ開始当初から、私の指導担当を含めたスタッフや学生たちもとてもよく気遣ってくれて、異なる環境にいるとは思えないほどでした。

ICHARM では、様々な能力開発や研究に関する活動に直に触れる機会に加え、日本の洪水リスク管理や、パキスタン、バングラデシュなど他国の洪水管理について知る機会も得ました。統合的管理手法の理論だけではなく、日本でいかにして実際に活かされているかを学べました。多くの継続的なプロジェクトの確実な実施には、発展途上国が自らの社会経済体制を考慮することが重要であることも学びました。自分の考えを伝え、それに対し常にフィードバックを得られたことは素晴らしいことでした。おかげで、モチベーションも上がり、人間そして研究者として成長できました。国際的な研究機関で、様々な文化を知る機会を得、こうした環境では、それぞれの文化的価値観の差異を理解し、共通点を見出そうとする雰囲気があることも実感しました。ICHARM での経験は非常に充実したもので、視野を広げてくれました。

Ms. Andea Juarez, a student of Wageningen University in the Netherlands, stayed at ICHARM on an internship from April to July. During the three months, she studied for her research while taking advice from ICHARM researchers and visited several places around Japan to see flood control structures. The following is her contribution to this issue of the ICHARM newsletter.

When I learned my internship at ICHARM was a possibility I knew it was going to be a challenge. Partly because it was going to be a new environment and culture for me, but also because I had set myself up to deliver my best. To my surprise regardless of my different background it became very easy to blend in. Right from the start my supervisors, colleagues and fellow students were very supportive and made it possible to feel just like home.

Interning at ICHARM gave me the opportunity to engage in different capacity building and research activities, as well as get introduced to Japanese flood risk management. The international ambience made it also possible to comprehend about flood management in other countries such as Pakistan and Bangladesh. My most valuable lesson was to understand beyond just the rationale of an integrated management approach, in particular by getting to know Japanese experiences and how it has translated into real life and successful projects. Moreover, in order to ensure more sustainable projects, I learned about the importance for developing countries to consider their own socio-ecological systems, when implementing or adopting such successful experiences.

Ms. Juarez (rightmost) with Pakistani tour participants

I was privileged and honored to have shared my opinions and receive constant feedback. This nourished my motivation and contributed to my personal and professional growth. I also appreciated getting to know and share cultures in a professional setting. This offered me a special atmosphere to understand differences between cultural values, while at the same time identify the common grounds we share.

My time spent at ICHARM broadened my scope and left me with a rewarding experience. Knowing and engaging with their work plus sharing the expertise and dedication of researchers and fellow students have profoundly inspired me. I was fortunate to meet great mentors and build treasure friendships. Overall I couldn't ask for a better internship and I am looking forward to continuing strengthening our relation in the near future.

(Written by Andrea Juarez)

Study Tour to 2011 Tsunami-affected Areas along Miyagi Coast

2013 年 6 月 10 日から 12 日にかけて、ICHARM が主催する修士コースの現地視察を引率し、宮城県沿岸津波被災地における復興の現状を視察する機会を得たので、ここにその一部分を紹介します。なお、追って報告の詳細版をホームページに掲載する予定です。

On June 10-12, 2013, ICHARM Senior Researcher Daisuke Kuribayashi accompanied a group of ICHARM master course students on a study tour to 2011 tsunami-affected areas along the coast of Miyagi Prefecture in the Tohoku Region of Japan. The following is his report on the progress of the restoration projects two years after the devastation. A detailed version of the report will be posted on the ICHARM website later.

1. Yuriage, Natori City

Huge tsunamis in March 2011 swept away wooden houses in this district, and about 750 residents were killed during the event. In the area is higher ground where a shrine stands. We took a view from there and found that disaster rubble had been all cleared; just all kinds of construction vehicles were busy working here and there. According to the restoration plan, levees will be constructed as the primary defense line (T.P. 7.2m), roads will be built as the secondary defense line (T.P. 6.0m), and heightened housing areas will be developed on the land side of the secondary defense line (T.P. 5.0m). A sample levee has been built near the higher ground to show local residents how high the new levee will be.

View from the higher ground towards the Natori River (Machines for seawall construction are visible in the upper right corner of the photo.)

Sample levee to show local residents how high the new levee will be.

During the March 2011 earthquake, the ground on the land side of the old levee built along the Natori River got liquefied. Because of that, the old levee will be removed first for foundation improvement, and then a new levee will be built on the better foundation.

Completed part of the seawall near the Sendai Airport (left: land side)

Along the coastline of the district, a seawall with better tsunami-resistance is being built based on a new building standard set out after the tsunami disaster. Part of the seawall has been completed with enhanced land-side and crown revetments with air vent ports applied for more resistance.

2. Ishinomaki City

In Ishinomaki, we looked down from Mt. Hiyori upon the Pacific Ocean and the Old Kitakami River. During the Edo era, the city was one of the largest rice-shipping ports (in fact, one third of the rice consumed in Edo (now Tokyo) was shipped from Ishinomaki). The river was the major shipping route from inland areas to the port, so for the convenience of loading and unloading the shipment, no levees were built along the river, and the tradition remains until today. However, the city suffered serious damage from the tsunami and has decided to construct levees along the river (T.P. 7.2-4.5m). Meetings for local residents about the levee construction plan have been held 140 times with about 1,800 participants in total. The restoration process has been slow but is steadily progressing.

View from Mt. Hiyori upon the Old Kitakami River and a river sand bar

3. Kesennuma City

Kesennuma shares the same problem of land subsidence with Ishinomaki. Roads there have been heightened about 50 cm to 1 m. Along the road in front of the city hall are signs showing a tsunami inundation depth at the location. The local aquarium near the sea has been closed since the disaster, but the fish market next to it was busy with a landing of bonito fish. Despite the liveliness we saw at the market, a city official explained to us that the overall catch in Kesennuma is still about 60% of what it was before the disaster, and that the restoration of the fisheries and related industries has been slower than other sectors.

Heightened road near the Kesennuma Fish Market

Finally, we would like to thank everyone who provided support for this study tour. This event cannot have been made possible without the support of MLIT regional and branch offices and the Kesennuma City Hall.

(Written by Daisuke Kuribayashi)

1. 名取市閖上（ゆりあげ）地区

本地区は、木造家屋がほとんど流出し、約 750 名が犠牲となった地区です。地区には、神社が設けられている高台があり、そこから付近を一望すると、がれきはすべて撤去されており、各種工事用車がひっきりなしに走っていました。復興計画としては、第一次防御ライン（T.P.7.2m）として堤防を、第二防御ライン（T.P.6.0m）として道路をそれぞれ整備し、その陸側にかさ上げをして宅地整備（T.P.5.0m）を行う予定です。高台の近くには、住民がわかりやすいように、建設予定の堤防のモデルが設置されていました。

名取川沿いでは、堤防陸側の地盤が液状化したため、現在の堤防をいったん撤去して地盤改良を施したのち、新たに堤防を建設するとのことです。

また海岸沿いでは、津波後の新たな設計基準を用いた「粘り強い海岸堤防」工事が行われており、完成した堤防では陸側法面ブロックや天端の空気孔を確認することが出来ました。

2. 石巻市

日和山から海側と旧北上川側を俯瞰しました。石巻は、江戸時代にコメの一大出港地でした（江戸で消費されるコメの 3 分の 1 は石巻から運ばれました）ので、舟運での荷捌きを邪魔しないよう、旧北上川にはこれまで堤防が設けられていませんでした。今回の津波被害を受け、河川にも堤防が設けられる計画となりました（T.P.7.2m~4.5m）。計画については、既に延べ 1800 名・140 回の地区説明会が開催されており、徐々にではありますが復興は進んでいる印象です。

3. 気仙沼市

石巻市と同じく地盤沈下に悩まされていますが、道路部分は 50cm~1m 程度かさ上げされています。市役所前の道路沿いには津波浸水深が表示されています。海沿いのリアスシャークミュージアムは休館中ですが、隣の魚市場はカツオの水揚げなどで活況を呈しています。しかし、市役所担当者の説明によれば、震災前と比較すると水揚げ高はまだ 6 割程度で、水産業を中心とする産業面での回復がまだ遅れているとのことでした。

最後になりましたが、今回の現地視察実施にあたり、お忙しいなかご協力頂いた国土交通省東北地方整備局河川部、仙台河川国道事務所、東北技術事務所、北上川下流河川事務所および気仙沼市役所の皆様には厚く御礼申し上げます。

Networking Activity

The 2nd Asia-Pacific Water Summit held in Chiang Mai

第2回アジア・太平洋水サミットが、去る5月19・20日に、タイ・チェンマイで開催されました。これに先立って14日から18日まで技術関連ワークショップも催されました。サミットは、分野別セッション（FAS）とリーダーズ・フォーラムが行われ、FASには、「水安全保障と水関連災害の問題：リーダーシップとコミットメント」という共通テーマの下、7つのセッションが設定されました。各FASでは、各国代表とアジア・太平洋水フォーラム運営組織の担当者が、それぞれの分野での課題を議論し、提言を作成、20日に行われたリーダーズ・フォーラムに提出し、それをもとにチェンマイ宣言が作成されました。

ICHARMは、FAS5の主催者として水関連リスクとレジリアンスに関するセッションを主催し、世界の水関連災害に対して現在取られている対策に関する問題を提起しました。議論は閣僚レベル3名、国際機関からの2名を含む7カ国からのパネリスト9名によって行われ、以下の点で意見の一致をみました。

1. 国際社会は、より包括的な方法で水関連リスクを低減すべく協力する。
2. 効果的な措置を講じ、経過観察を行うために、対策の対象となるリスクや脆弱性を明確に定める。
3. このようにして定められた対象は、ポスト兵庫行動枠組（HFA）およびポストミレニアム開発目標（MDGs）においても明確に記述する。

さらに、本セッションの提言には、「FAS5は、水と災害に関する議論を定期的に行うべきであるという国連水と災害に関する特別会合による提案に賛成する」という一文も盛り込まれました。

災害リスク低減の重要性はリーダーズ・フォーラムでも再確認され、チェンマイ宣言の第2項として採択されました。

The second Asia-Pacific Water Summit took place in Chiang Mai, Thailand, on May 19-20, 2013. Preceded by a technical workshop on May 14-18, the summit was divided into two main events; seven Focus Area Sessions (FAS) and the Leaders forum. FAS were held around key themes under the common theme "Water Security and Water-related Disaster Challenges: Leadership and Commitment." During these FAS, representatives and members of Asia-Pacific Water Forum Lead Organizations discussed the respective issues under their specific focus, came out with specific recommendations, and then presented to the Leaders forum on May 20, which led to the Chiang Mai Declaration.

ICHARM, as the organizer of FAS5 on water risks and resilience, seriously raised problems about current strategies to overcome global water disasters. Then, those problems were discussed with 9 eminent panelists who were invited as representatives of 7 countries, among whom were 3 at the ministerial level and 2 from international institutions. All panelists came to firm agreements: (i) the global community should collaborate in reducing water-related disaster risks in a more comprehensive manner; (ii) for effective implementation and monitoring, clear-cut targets on risk and vulnerability should be established; and (iii) such targets need to be stressed in the post- Hyogo Framework for Action (HFA) and post- Millennium Development Goals (MDGs). Moreover, the FAS5 recommendation states, "FAS5 supports the proposal made at the UN Special Thematic Session on Water and Disasters to establish regular discussion process on water and disasters."

The importance of disaster risk reduction was reaffirmed and enclosed in the Chiang Mai Declaration as paragraph 2 :

"2. Encourage the inclusion of disaster risk reduction in the United Nations development agenda beyond 2015 to address the common challenges to reduce deaths and economic losses from floods, droughts and other natural disasters; "

(The whole declaration can be downloaded at:
http://apws2013.files.wordpress.com/2013/05/chiang-mai-declaration.pdf)

(Written by Ai Sugiura and Sangeun Lee, Project led by Kenzo Hiroki)

Lower House Members Visit ICHARM

2013年6月19日、金子恭之委員長（自民党）をはじめとする衆議院国土交通委員会の議員11名の方々が、土木研究所を来訪されました。遠心力載荷実験施設や構造力学実験施設などを視察された後、世界の水問題の解決を対象として国際的に活動しているICHARMを訪問されました。

Eleven lower house members of the Committee on Land, Infrastructure, Transport and Tourism led by committee leader Yasuyuki Kaneko of the Liberal Democratic Party visited the Public Works Research Institute on June 19, 2013. After a brief tour to lab facilities such as the centrifugal loading experiment laboratory and the structural dynamics experiment laboratory, the party also paid a visit to ICHARM as a research institute that is internationally active in addressing water issues.

The meeting with the committee members started with a presentation on ICHARM by Deputy Director Shigenobu Tanaka, followed by another presentation by TIN

Myint Aung of Myanmar about his master's thesis on which he is currently working. After that, four doctoral students and twelve master's students lined up in front of the lower house members and introduced themselves.

Committee leader Mr. Kaneko gave an encouragement to the students, saying that he hopes they learn advanced knowledge and technologies, both hard and soft, from ICHARM educational programs and use them in their country to maintain a safer living environment.

The visit ended after taking photos with all participants including the visitors, PWRI and ICHARM staff and students.

ICHARM will make the most of these opportunities to publicize our activities.

(Written by Daisuke Kuribayashi)

冒頭、田中グループ長から ICHARM の活動概要の紹介が行われ、続いて修士課程の学生である TIN Myint Aung 氏（ミャンマー）が、彼が現在執筆している修士論文の紹介を行いました。その後、ICHARM が実施している博士課程 4 名、修士課程 12 名が壇上に整列し、自己紹介を行いました。

金子委員長からは、ICHARM での研修から、日本の最先端の防災・減災のためのハード・ソフトの知識を学びとって、母国で活かし、安全な生活環境で過ごすために頑張っていただきたいとの激励の言葉がありました。

最後に議員の方々と一緒に、土木研究所幹部、外国人学生と集合写真を撮影し、訪問は終了しました。ICHARM では今後もこのような機会を捉えて、さらなる活動の紹介に努める所存です。

ICHARM Signs an MOU with IWPC

On April 12, 2013, ICHARM and the Iran Water and Power Company (IWPC) signed an MOU on research exchange and technical cooperation to provide mutual assistance in promoting research. IWPC is a governmental agency under Iran's Energy Ministry and highly interested in hydrological models and flood forecasting, which are necessary for water resource development. They are particularly interested in IFAS, for it can be applied to river discharge analysis and dam storage analysis. After several meetings, both parties finally agreed to sign the MOU to help each other promote research and strengthen their networks. The two institutes are also planning research on other water-related disasters besides floods, such as droughts in dry and semi-dry areas of the Middle-Eastern Region.

Iran, semi-arid country

(Written by Daisuke Kuribayashi)

2013 年 4 月 12 日、ICHARM とイラン水・電力資源開発公社（Iran Water and Power Company：IWPC）は、相互の研究活動を推進するべく、研究交流と技術協力に関する覚書を締結しました。

IWPC は、イランエネルギー省が所管する政府機関で、もともと水資源開発のために必要となる水文モデルや洪水予報に関心を高く持っている機関です。 特に、河川流量解析やダム貯留地解析ツールにも活用できる、統合洪水解析モデル（IFAS）に対する興味を強く持っており、ICHARM との数回の意見交換の後、相互の研究活動推進とネットワークを強化するため、今回の協定締結に至ったものです。今後、中東地域などの乾燥および半乾燥地域における渇水などの、洪水以外の水関連災害に関する研究活動を検討しています。

ICHARM Special Session at the Sri Lanka-Japan Collaborative Research 2013 Conference

The Conference on Sri Lanka-Japan Collaborative Research was held from March 29 to 31, 2013, at the University of Peradeniya in Sri Lanka. The event was organized by the International Research Centre of the University of Peradeniya in collaboration with the Japanese Embassy in Sri Lanka along with the Japan Foundation, the

2013 年 3 月 29 ～ 31 日、スリランカ・日本共同研究に関する会議が、スリランカの Peradeniya 大学で開催されました。Peradeniya 大学国際研究センターが、在スリランカ日本大使館、国

Networking Activity

際交流基金、スリランカ国立研究委員会、日本スリランカ学識経験者協会、日本スリランカ学生協会の協力を得て開催したものです。ICHARM 主催の特別セッションは 31 日に、「水資源・水災害管理分野の研究と実践の隔たりを埋める」というテーマで、水資源・水災害管理分野の研究、と有用な研究結果、スリランカで実践する際の問題などが話し合われました。

参加者は、水資源・水災害管理分野の研究、教育、実践、管理など各分野からなり、最適な実践を行う上での障害の分析と、国内外で得た知識をよりよく利用する方法を考えました。セッションでは基調講演の他、特別講演 2 件、発表 9 件も行われました。ICHARM からは竹内センター長とペレラ専門研究員が参加し、元 ICHARM 研究・研修指導監で現在香港大学教授である Jayawardena 先生も参加されました。

National Research Council of Sri Lanka, the Sri Lankan Academics Association in Japan, and the Sri Lankan Students Association in Japan.

A special session organized by ICHARM was held on March 31. The session theme was "Closing Gap Between Research and Practice in Water Resources and Disaster Management." The session was intended to expose research work carried out in water resources and disaster risk management, their beneficial outcomes, and obstacles in establishing those outcomes in Sri Lanka. They first created a platform to discuss and find ways to fill the gaps between objectives of training, teaching and research programs and actual practice at home. Presenters involved in research, teaching, practicing and management sectors of water resources and disaster management took part in the session. The final goal was to analyze actual obstacles for best practices and find better ways to utilize the knowledge acquired in Japan in their offices and departments at home. The session was consolidated with a keynote lecture, two special talks and nine presentations and attended by ICHARM Director Kuniyoshi Takeuchi, Hong Kong University Professor A.W. Jayawardena, who was the former ICHARM research and training advisor, and ICHARM Researcher Duminda Perera.

(Written by Duminda Perera)

Local High School Students Enjoy ICHARM Open Day 2013

4 月のつくば科学技術週間に開催された土木研究所の一般公開に合わせ、ICHARM は今年も「ICHARM Open Day」を 4 月 19 日に開催しました。

今回は、博士課程の外国人学生と ICHARM 外国人研究員が一丸となり、つくば市の茨城県立竹園高等学校・茨城県立並木中等教育学校から前年度とほぼ変わらず計 59 名（竹園 39 名、並木 17 名、先生方各校よりあわせて 5 名）の生徒の皆さん、そして国総研から 10 名の合計 71 名の皆さんを招待しました。

まず ICHARM 講堂において、田中グループ長挨拶の後、博士課程学生 2 名（カリーナ（オランダ）、ロドリゴ（グアテマラ））による母国の文化、水災害、自然災害、歴史に関する幅広い講演を行い生徒の皆さんの興味を引きつけました。

続いて ICHARM 2 階に移動し、アメリカ・ウクライナ・オランダ・韓国・グアテマラ・ネパール・バングラデッシュからの 7 カ国の各国研究員制作によるポスターセッションを行いました。

質疑のために設けた時間を利用し、生徒の皆さんはそれぞれ英語を駆使しとても熱心に研究員達に質問されていました。参加者にお願いしたアンケート結果にも充実していたという意見が多く生徒の皆さん、そして研究員の双方にとってとても有意義なイベントになったと思います。

次世代の水文学研究者を輩出すべく「ICHARM Open Day」は来年も行う予定です。

ICHARM held the annual event, "ICHARM Open Day," on April 19, 2013. This is part of the open house event organized by the Public Works Research Institute during the Tsukuba Science & Technology Week.

ICHARM doctoral students and researchers did a great job to hold an enjoyable and informative event. A total of 71 people participated in the Open Day; 39 students from Takezono High School, 17 from Namiki Secondary School and 10 from the National Institute of Land and Infrastructure Management.

The participants were first led to the ICHARM auditorium. There, following the welcome speech by Deputy Director Shigenobu Tanaka, they listened to two doctoral students, Karina Vink of the Netherlands and Fernandez Reynosa Rodrigo of Guatemala, making interesting presentations on their home countries including brief history and water-related and other natural disasters.

After the presentations, they moved to the second floor of the ICHARM building, in which researchers from seven countries (US, Ukraine, the Netherlands, Korea, Guatemala, Nepal and Bangladesh) were waiting to make a small presentation on their countries. The participants were divided into small groups for better interaction with each presenter and visited one researcher after another who prepared a poster to explain about their home countries.

All students were very active asking the researchers many questions in English. Their comments in the post-event questionnaire were very positive about the event, suggesting that they enjoyed themselves very much. It was highly rewarding for both the participants and the ICHARM staff.

We are planning to hold the ICHARM Open Day next year, too, for future hydrologists.

(Written by Seiko Tanaka)

Other Topics

New ICHARM Members

Five new members joined ICHARM. They would like to say brief hellos to the readers around the world.

Nario Yasuda

Deputy Director

I have been appointed to serve as the deputy director of ICHARM effective July 1. Previously, I was with the Disaster Prevention Research Institute Kyoto University and helping Tokushima City develop a tsunami evacuation plan to prepare for a Nankai Trough earthquake. I am still involved in a restoration project for Karafune of Ishinomaki City, an area badly damaged by the Great East Japan Earthquake. This is actually my second appointment to ICHARM in 9 years since the last one around its official establishment. I'll be working hard to promote research, local practice and training for disaster risk reduction both at home and abroad from a fresh perspective. I would be grateful for your support.

Shinji Egashira

Training & Research Advisor

I am very happy to have a chance for studying again with students as well as with staff members at ICHARM. Previously, I was a faculty member at Kyoto University for 21 years and Ritsumeikan University for 13 years, and a technology advisor of NEWJEC Inc. for 6 years. My special concerns are still sediment transportation and associated channel changes in relation to flood/sediment disasters.

Yoichi Iwami

Chief Researcher

I joined the ICHARM members this past mid-May from the River Environment Research Division of NILIM (National Institute of Land Infrastructure and Management), MLIT. I am in charge of hydraulic and hydrological issues. I am sure that ICHARM can play a great role for flood-prone countries by mitigating damage with Japanese technology. I would like to do my best to contribute to the mission.

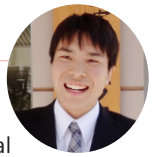
Wataru Kobayashi

Chief Researcher

I have started working for ICHARM and Construction Technology Research Department (CTRD) since July. Before joining ICHARM, I designed and operated ICT systems for river management or disaster prevention at MLIT, Cabinet Office and FRICS (Foundation of River & basin Integrated Communications). My recent research interest is machine learning, and at the CTRD, I am responsible for the effective utilization of software. I'll be happy to help ICHARM in these fields.

Shun Kudo

Researcher



I just joined ICHARM this April. I studied water level forecasting using statistical methods as a master's student. At ICHARM, I am in charge of educational and training programs. I hope to contribute to the mitigation of water-related disasters around the world by improving the programs to be more rewarding.

Leaving ICHARM

Shigenobu Tanaka *(Deputy Director)*

While working at ICHARM, I was very lucky to get to know a lot of people around the world and be able to work together to mitigate water-related disaster risks. I am most grateful for all warm support I was given during my career at the center. I retired from ICHARM in the end of June and have started a new career in August as a professor at the Water Resources Research Center of the Disaster Prevention Research Institute Kyoto University. I hope to continue working together with friends and partners around the world for our common goals.

Pat Yeh *(Chief Researcher)*

It has been a nice experience of working for ICHARM. I thank you for all the supports that ICHARM members had given me during my one year stay here. I wish ICHARM huge success in research in the future.

Publication List

*April - June 2013.

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- Karina Vink, Kuniyoshi TAKEUCHI, *International comparison of measures taken for vulnerable people in disaster risk management laws*, International Journal of Disaster Risk Reduction, Elsevier, 4, 63-70, Jun. 2013
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- 藤岡 奨, 佐山敬洋, 三浦祐司, 越田智喜, 深見和彦, *レーダ雨量の不確実性を反映した降雨場の生成に関する研究*, 土木学会論文集B1(水工学), 土木学会, Vol. 69, No. 4, I_319-I_324, Mar. 2013
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- 上米良 秀行, 杉浦 愛, 岡積 敏雄, 萬矢 敦啓,*メコン川下流域を対象にした家屋洪水被害推定手法の検証*, 河川技術論文集,第19巻, pp351-356, 2013年6月
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- Yoshikazu SHIMIZU, 岡積敏雄, バドリ・シュレスタ, *衛星観測降雨の土砂災害への適用に関する基礎的検討*,平成25年度砂防学会研究発表会概要集B,公益社団法人 砂防学会, B-210 - B-211, May. 2013
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