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ICHARM

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

Message from Executive Director

An interface between science and decision making

Submission of a New Flood Management Policy to the Minister of Land, Infrastructure, Transport and Tourism on 9 July 2020.
新しい治水政策を国土交通大臣に答申
（2020 年 7 月 9 日）

Under critical situations caused by climate change, disasters, and infection diseases, how much control can science exercise over decision making? How much scientific knowledge, including uncertainty, can society incorporate in decision making?

The Intergovernmental Panel on Climate Change (IPCC) has published assessment reports since 1990 by integrating scientific knowledge produced by scientists worldwide. IPCC was awarded the Nobel Peace Prize in 2007 for its scientific support for the development of internationally coordinated policies for mitigating and adapting to global warming. The organization also contributed to adopting the Paris Agreement globally in 2015. However, Dr. A. Weinberg, who pioneered the boiling water reactor, has presented a concept of "trans-science," arguing that there are "questions which can be asked of science and yet which cannot be answered by science." He suggests that beyond the domain of science lies the one where politics and society are solely responsible for making decisions.

At the beginning of this century, the Integrated Research on Disaster Risk (IRDR) was launched in disaster science as an answer to a fundamental question: Why had science been failing to demonstrate concrete methodologies for disaster risk reduction, although it had increased scientific knowledge and technology? Similarly, in global environmental science, Future Earth began in 2015 in response to the criticism: No progress had been made in societal transformation even though scientific knowledge had been deepened and accumulated. In almost parallel to the discussions of these two international science programs, the Science Council of Japan met the same criticism over the reason for its existence and spent ten years restructuring the existing disciplines to create a new principle – "Science for Society."

While science was reaching out hard to accommodate the needs of society through long hours of discussions as mentioned above, all of sudden COVID-19 broke out, spreading widely. Responding to urgent questions posed by society to science, the two parties have been working together without any clear definition of each other's role and are now causing society dire confusion that can't be ignored. Society and science definitely need to engage in deep deliberation on an interface between science and decision-making, referring to the concept of "trans-science," while fostering trust of society in science, ensuring accountability of science to society, having faith in humility of scientists, and encouraging respect for diversity.

July 31, 2020
KOIKE Toshio
Executive Director of ICHARM

科学と意思決定の界面

気候変動、災害、感染症などの危機的状況下において、科学は不確実性を踏まえてどれだけ意思決定に影響を及ぼすことができるのでしょうか。また、意思決定においては、不確実性を有する科学の知見をどれだけ取り入れることができるのでしょうか。

気候変動に関する政府間パネル（IPCC）は、1990 年以来、地球温暖化に関する世界中の専門家の科学的知見を集約した「評価報告書」を取りまとめてきました。地球温暖化問題への国際協調的な対応策を科学的に裏付けてきた功績に対して 2007 年にはノーベル平和賞が授与され、2015 年の「パリ協定」の締結に大きく貢献しました。一方で、軽水炉の発明者である A. ワインバーグ博士は、「科学が問いとして受け止め、追究することはできるが、最終的に答えることはできない問題群」があることを示し、トランス・サイエンスの概念を提示しています。つまり、科学を超えて政治や社会が選択する責任の領域があることを示唆しているのです。

今世紀になって、災害科学の分野では、「科学技術の発達によっても災害による被害が減らないのはなぜか」という根本的な問いから、災害リスク統合研究（IRDR）が推進されました。地球環境科学分野でも同様に、「科学的知見は深められたものの社会の変革が進められていない」との批判に応え、フューチャーアースが開始されています。この 2 つの国際科学プログラムの議論とほぼ同時期に、日本学術会議では、「存在意義が国民の目に見えない」という批判に応えて、「社会のための科学」という新しい学術体系をほぼ 10 年の歳月をかけて取り纏めました。

このように時間をかけた議論を踏まえて科学側から社会への働きかけが進む中で、新型コロナウィルス感染症が突如拡大しました。社会から待ったなしの問いが科学側に投げかけられ、それぞれの役割を明確に認識できないまま協働が進み、その結果、見過ごすことのできない混乱が生じたのは事実でしょう。トランス・サイエンスの概念を踏まえ、社会による科学への信頼、社会に対する科学の説明責任、科学者の謙虚さ、多様性への敬意などに基づき、科学と意思決定の界面に関する社会と科学と間での熟議が期待されます。

Contents

Special Topics

Research

Training & Education

Others

Special Topics

4th ICHARM Governing Board Meeting was held
第 4 回 ICHARM 運営理事会を開催しました

On June 2, 2020, the fourth ICHARM Governing Board (GB) meeting was held using a WEB meeting system via the Internet as a precaution against COVID-19. The GB meeting, though held every two years before, is to be held every year from this year on in compliance with the agreement between the government of Japan and UNESCO, signed on February 13, 2020. In the meeting, the GB examines ICHARM activity report and examines and adopts its work plan for the next year based on the long- and mid-term programmes. The GB had met three times in the past: first on February 25, 2014, second on March 3, 2016, and third on February 14, 2018.

A scene of the Governing Board
運営理事会の様子

As defined in the agreement, the GB is chaired by the president of PWRI, currently NISHIKAWA Kazuhiro, and composed of nine members, including YAMADA Kunihiro, the vice-minister for Engineering Affairs of MLIT, representing the government of Japan, and Youssef FILALI-MEKNASSI, the director of the Division of Water Sciences and the secretary of IHP, representing UNESCO on behalf of the director-general.

At the meeting, Executive Director KOIKE Toshio reported and then the GB members examined the activities of ICHARM in the last two years from 2018 to 2019. He also explained the work plan for the next year, which was unanimously adopted after thorough discussions.

Participants
会議参加者

Overall, all the GB members highly appreciated the efforts of ICHARM. They also gave valuable advice for further improvement of the activities and the organization. Mr. YAMADA expressed MLIT's continuous support to ICHARM, in addition to praising ICHARM's cutting-edge research, human resource development, and information networking. Some members suggested that ICHARM should study disaster risk management in consideration of the prevention of infectious diseases such as COVID-19. Others expected ICHARM to build closer relationships with other UN organizations and UNESCO category 2 centres.

Following the work plan adopted at the meeting with the suggestions provided by the GB members, ICHARM will continue striving for disaster risk reduction on a global basis.

The meeting materials are available at the ICHARM website below.

http://www.icharm.pwri.go.jp/special_topic/20200609_GoverningBoard.html

2020 年 6 月 2 日に第 4 回 ICHARM 運営理事会を開催しました。この運営理事会は、2020 年 2 月 13 日に署名・締結された日本国政府とユネスコとの協定に基づき、ICHARM の活動に関する報告書の審査、ICHARM の長期・中期計画に基づく事業計画を審査・採択するために、年に一度開催することとされています。

これまで、2014 年 2 月 25 日に第 1 回会合、2016 年 3 月 3 日に第 2 回会合、2018 年 2 月 14 日に第 3 回会合がそれぞれ開催され、今回は第 4 回目の会合となりました。今回の会合は新型コロナウィルスの感染拡大防止のため、ICHARM 運営理事会として初めて WEB 会議での開催となりました。

運営理事会の委員は、本協定の規定により、土木研究所・西川和廣理事長が議長を務め、日本国政府の代表者として国土交通省・山田邦博技監、ユネスコ事務局長の代理としてヨーゼフ・フィラリ・メクナシィ水科学部長・IHP 事務局長等、計 9 名の委員が出席しました。

会合では、小池俊雄センター長から 2018 年から 2019 年の 2 年間にわたる活動報告がなされ、その審査が行われました。その後、今年度の事業計画について説明、その審査が行われ、満場一致で採択されました。山田委員からは、ICHARM が行っている最先端の研究、人材育成、そして情報ネットワーク活動に高い評価をいただくとともに、今後の活動に対し国土交通省として継続的な支援を行うことを述べられました。また、他の委員からも、ICHARM のこれまでの活動に対して大いに評価していただく一方で、新型コロナウィルス等の感染防止対策を考慮した防災の取り組み、他の国連機関やユネスコ・カテゴリー 2 センターなどとの連携強化を期待する意見などをいただきました。

ICHARM では、本会合で採択いただいた事業計画に基づき、また委員の皆様よりいただいたご助言などを踏まえ、今後とも精力的な活動に取り組んで参ります。

なお、本会合での配布資料および発表スライドは、ICHARM ホームページでご覧いただけます。

http://www.icharm.pwri.go.jp/special_topic/20200609_GoverningBoard_j.html

Summary of the 4th ICHARM Governing Board meeting

Date: 16:00-18:00, Tuesday, 2nd June 2020

Web meeting system: BlueJeans

Agenda:

- Introduction of the Agreement between UNESCO and the Government of Japan regarding the Continuation in Japan of ICHARM
- Confirmation of the rules and procedures for the ICHARM Governing Board meeting
- Examination of ICHARM Activity Report
- Examination and adoption of ICHARM Work Plan

Participants (listed in an alphabetical order of their organizations):

TANAKA Akihiko, President, National Graduate Institute for Policy Studies (GRIPS)

Fadi Georges COMAIR, Chairperson, International Hydrological Programme (IHP) Intergovernmental Council

IWASAKI Eiji, Director General of Global Environment Department, on behalf of Mr. Shinichi Kitaoka, President, Japan International Cooperation Agency (JICA)

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

NISHIKAWA Kazuhiro (Chairperson), President, Public Works Research Institute (PWRI)

MATSUOKA Yuki, Head of the United Nations Office for Disaster Risk Reduction (UNDRR) Office in Japan, on behalf of Ms. Paola ALBRITO, Chief of Branch, Intergovernmental Processes, Interagency Cooperation and Partnerships, UNDRR

Youssef FILALI-MEKNASSI, Director, Division of Water Sciences, Secretary of IHP, on behalf of Ms. Audrey Azoulay, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)

TAKARA Kaoru, Chair Holder, Research and Educational Unit of UNESCO Chair on Water, Energy and Disaster Management (WENDI), Professor and Dean, GSAIS in Human Survivability, Kyoto University

Johannes CULLMANN, Director, Water and Cryosphere, World Meteorological Organization (WMO)


TANAKA Akihiko (GRIPS)


Fadi Georges COMAIR (IHP)

IWASAKI Eiji (JICA)


YAMADA Kunihiro (MLIT)


NISHIKAWA Kazuhiro (PWRI)


MATSUOKA Yuki (UNDRR)


Youssef FILALI-MEKNASSI (UNESCO)


TAKARA Kaoru (WENDI)


Johannes CULLMANN (WMO)

(Written by TOMIZAWA Yosuke)

Publication of Collection of Critical Situations during Flood Emergency Response (Main Content: local government response and Appendix: local government response under COVID-19)

水害対応ヒヤリ・ハット事例集（地方自治体編及び別冊：新型コロナウィルス感染症への対応編）の作成・公開

ICHARM has published a leaflet entitled "Collection of Critical Situations during Flood Emergency Response," aiming to improve the emergency response capacities of local governments for more effective management of flood disasters that frequently occur across Japan in recent years.

Several local governments in the country have recently published after action review reports (post-disaster reports) in which they review their emergency response during a disaster and identify lessons to improve their efforts based on their disaster experience. These reports often include valuable suggestions for other local governments to improve their emergency response for future disasters.

Defining critical situations in which local government officers panic, don't know what to do, cannot make a decision, are confused or in dilemma, etc., during an emergency response effort, Senior Researcher OHARA Miho collected typical critical situations from the review reports of past flood disasters. The leaflet features 28 cases of critical situations, each printed on a two-page spread with lessons to assist local government officers in taking more practical measures in terms of "Facilities", "Management", and "Human skill".

Also provided with the leaflet is "Appendix for local government response under COVID-19," which lists possible critical situations and necessary countermeasures during flood emergency response under COVID-19.

We hope this publication can help local government officers to cope with disasters not as something distant from their reality but as their immediate problem and enhance the response capacity of their organizations against disasters.

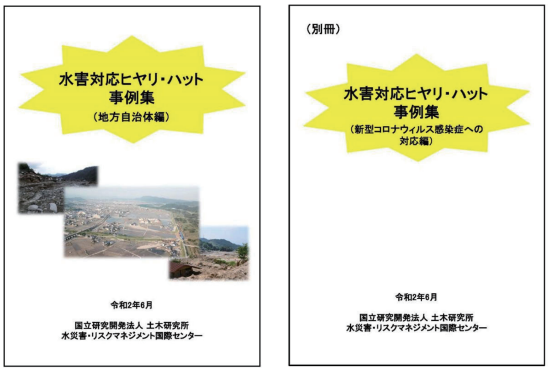


Figure 1 Cover page of the main content and appendix
図 1 「地方自治体編」及び別冊の表紙

Figure 2 Example of the page in the main content
図 2 「地方自治体編」での紙面の例

(Written by OHARA Miho)

ICHARM は、昨今の全国的な水害の頻発に鑑み、地方自治体の防災担当部署の災害対応力の向上を目指して、「水害対応ヒヤリ・ハット事例集」を作成し、ホームページでの公開を開始しました。

近年、日本では、災害発生後に地方自治体自らの災害対応を検証し、検証報告書を公開している例があります。その中には、うまくいかなかった対応事例についての傾聴すべき反省や改善案が数多く含まれており、他の地方自治体にとっても災害対応の参考となる事例が少なくありません。

そこで、大原美保主任研究員は、水害対応において、職員が「困る・焦る・戸惑う・迷う・悩む」などの状況に陥る事例を「水害対応ヒヤリ・ハット事例」として新たに定義し、地方自治体が公表している過去の水害での災害対応検証報告書などからこれらの事例を抽出し、冊子「地方自治体編」に取りまとめました。本冊子には、28 の典型的な事例とともに、「設備等」「仕組み」「スキル」という 3 つの観点からの教訓が見開きページで紹介されています。

また、別冊の「新型コロナウィルス感染症への対応編」では、新型コロナウィルスへの感染が懸念される中での水害発生を想定し、起こりうる事例と望ましい対策を各ページで紹介しました。

この教材が、防災に関わる地方自治体の職員にとって、災害を決して遠い存在ではなく、「わがこと」として正面から向き合い、自らの災害対応力を磨き、ひいては地方自治体全体の地域防災力の底上げをはかるきっかけとなることを願います。

ICHARM's efforts for addressing flood disasters considering the prevention of COVID-19 infection
COVID-19 の感染防止を考慮した洪水災害に向けた ICHARM の取り組み

(1) Toward the establishment of research, education, and international networking in a new-normal era
新しい日常時代の研究・教育・国際協力の確立を目指して

気候や社会の変化による水災害リスクの増加に加え、新型コロナウィルス感染症 (COVID-19) 拡大によって、水災害対応は一層困難になっています。この課題に対応するには、あらゆる活動が著しく制限される状況下においても有用な科学知を生み出し、現場に適用し、国際的に広く普及させるための方法論を確立することが求められています。

研究面においては、自らの分野の蓄積を基に、分野を超えて協働し、社会の参加を得て、課題解決に必要な統合的な科学知を如何に創成できるかが鍵です。研究状況をできるだけ見える化して、利用可能なデータや方法論によって生まれる初期段階の価値を遠隔的手法によって広く共有し、協働のレベルを段階的に上げていく戦略が有効と思われます。

教育にはモチベーションや集中力の維持が必要で、人格的な適時の対応が求められる場合もあります。また現場での体験学習も異なる価値観の理解や未体験の技術の習得に効果的です。時空間の共有がなければ達成できない教育要素を十分認識した上で、遠隔ではどこまでできるかを限界まで突き詰めて、対面・遠隔のハイブリッドな教育システムの設計と実現方法の開発が求められています。

国際協力の推進は、初期段階ではいわゆる肌感覚の共有が必要で、中間段階ではモチベーションや推進力の維持、最終段階では包括的なレビューを基に次の段階の共同設計が求められます。これまではいずれの場面でも、対面協議が用いられ、腹を割った熟議も必要でした。ただし、協力の進捗管理は遠隔でも効果的に進められてきたことに鑑み、研究や教育の可能性や成果物を効果的に組み合わせることで、遠隔協議のみによる溝を埋められないかを考える必要があります。

COVID-19 によって与えられたこの挑戦を好機と捉え、ICHARM では、厳しい状況下でも持続的な研究、教育、国際協力を遂行できる体制の確立を模索し始めております。その努力の一端をニュースレターにて順次紹介させて頂きます。

Flood disaster risk reduction has become even more challenging due to the spread of coronavirus disease (COVID-19), as well as changes in the climate system and societies. To reduce water-related disaster risks under COVID-19, the science community is urged to establish methodologies for creating usable scientific knowledge, applying it to society, and disseminating it internationally even in an extraordinary situation, such as the current one, where each and every activity is extremely restricted.

Talk at the IFI Webinar on 3 July 2020
IFI ウェビナー（2020 年 7 月 3 日）

In research, the key is to create integrated scientific knowledge which assists society in making decisions on solutions by promoting interdisciplinary and transdisciplinary cooperation based on achievements and experiences in each discipline. To this end, information sharing and closer cooperation are critical. Progress in research should be visualized as clearly as possible. Values produced at the early stage of research, though created using only data and methodologies available of the time, should be shared widely across communities through remote communications. By doing so, the level of cooperation should be upgraded step by step.

In education, it is important for both educators and learners to keep motivation and concentration high. It is also important to provide an appropriate learning environment in a timely manner according to learners' personalities. On-site and hands-on training is effective in some cases for learners to understand different viewpoints and learn technologies they have never seen before. Training organizers should be well aware that some educational goals can be achieved only through temporal and spatial co-experiences. However, they also should pursue the potential of e-learning as much as possible and then design and develop a hybrid education system by adopting the merits of face-to-face and remote approaches.

In a typical case of successful international cooperation, participants share the same 'gut feeling' about the project, based on years of their experience, at the early stage. They stay motivated and actively engage in the co-producing process at the intermediate stage, and promote the co-design process to create a next plan, following a comprehensive review, at the final stage. At any stage, participants almost always put a high priority on face-to-face discussions, including occasional heart-to-heart talks. However, now that people have learned that project management can be effectively conducted remotely, a new approach to international cooperation should be sought out. There may be gaps that cannot be filled by remote communications alone, but they can be filled by creatively combining the possibilities and outputs of research and education.

Determined to turn these challenges given by COVID-19 into opportunity, ICHARM has already begun making efforts to strengthen its capacity to conduct research, education, and international cooperation in a sustainable way, even under a critical situation. Please read on to learn the recent developments of ICHARM's activities in this context.

(Written by KOIKE Toshio)

(2) Use of Collection of Critical Situations during Flood Emergency Response (Appendix: local government response under COVID-19)
水害対応ヒヤリ・ハット事例集（新型コロナウィルス感染症への対応編）の活用

ICHARM has published a leaflet entitled "Collection of Critical Situations during Flood Emergency Response," aiming to improve the emergency response capacities of local governments in Japan. It consists of the main content featuring emergency response efforts by local governments in general and an appendix featuring the same topic specifically under COVID-19.

In emergency response during a flood disaster amid the COVID-19 crisis, it is important to conduct infection prevention measures in guiding residents' evacuation and admitting them to evacuation centers, in addition to the measures taken in conventional flood disaster response. To this end, the "Appendix for local government response under COVID-19" describes 28 possible critical situations and necessary countermeasures in case of a flood disaster under the plague in terms of "Facilities," "Management," "Public announcement" and "Emergency response." The appendix refers to several guidelines issued by the Cabinet Office and the Ministry of Health, Labour and Welfare of Japan, and a guide to planning flood disaster management under COVID-19, which was co-authored by Associate Professor KOYAMA Maki of Gifu University and Professor KANBARA Sakiko of the University of Kochi. However, the user should note that this leaflet only covers the disaster phase from the onset of a disaster to response efforts at evacuation shelters, not including the rehabilitation and reconstruction phase.

Since no local governments have ever experienced flood emergency response under COVID-19, we hope that this publication could provide some hints for them to plan necessary countermeasures considering their needs and situations, including the prevalence of the disease among the residents.

Figure 1 Sample page of the appendix on local government response under COVID-19
図 1 「新型コロナウィルス感染症への対応編」での紙面の例

(Written by OHARA Miho)

ICHARM は、地方自治体の防災担当部署の災害対応力の向上を目指して、「地方自治体編」と別冊「新型コロナウィルス感染症への対応編」から構成される「水害対応ヒヤリ・ハット事例集」を作成し、ホームページでの公開を開始しました。

新型コロナウィルスへの感染が懸念される状況では、従来からの水害対応に加えて、住民の避難誘導や避難所等での受け入れ等において感染予防対応が必要です。別冊の「新型コロナウィルス感染症への対応編」では、新型コロナウィルスへの感染が懸念される中での水害発生を想定し、28 の起こりうる事例とともに、「設備等」「仕組み」「事前の周知」「災害対応中」という 4 つの観点からの望ましい対策を紹介しました。作成にあたっては、内閣府防災担当や厚生労働省のガイドライン等、小山真紀准教授（岐阜大学）・神原咲子教授（高知県立大学）らによる「COVID-19（新型コロナウィルス感染症）流行下における水害発生時の防災・災害対策を考えるためのガイド」等を参考にしました。なお、対象とする災害フェーズは、発災から避難所での対応までとし、生活再建支援や復興に関する対応は含みません。

新型コロナウィルスの感染が懸念される状況での災害対応は、全ての地方自治体にとって未曽有の対応であり、本事例集に記載した対策のみで万全であるという保証はありません。しかしながら、本事例集が、それぞれの地方自治体や地域の実情や感染蔓延状況に沿った必要な対策を検討する際のヒントとなることを期待します。

(3) Collaboration between the IDRIS disaster information sharing system and the BOSS-SHIFT disaster response support system
災害情報共有システム IDRIS と災害対応支援システム BOSS・SHIFT の連携

ICHARM では研究開発協定を結んでいる新潟県東蒲原郡阿賀町において、2019 年（令和元年）8 月より ICHARM が進める災害情報共有システム IDRIS（ICHARM Disaster Risk Information System）の実証実験を進めています。

2019 年 10 月に発生した、台風 19 号により全国的に大きな被害が生じましたが、阿賀町も阿賀野川やその支川の越水等により水災害が生じました。その際、IDRIS の特徴のひとつである水災害時の相互情報提供機能が、阿賀町の水災害時の対応行動を十分に支援できず計画通りに IDRIS を利用できなかったため、IDRIS の機能強化の必要性が明らかとなりました。他方、地震防災を中心とした災害時の地方自治体の対応行動に関しては、東京大学生産技術研究所目黒公郎研究室・沼田宗純研究室が先行して優れた研究成果を挙げていました。これらの研究成果は Business Operation Support System (BOSS)・System for Human - resource Input and Functional Team - building (SHIFT) というシステムに統合され、災害時における地方自治体の対応行動管理という点では、極めて有効な取り組みであり、IDRIS のもつ水災害に関する情報の集約機能に BOSS・SHIFT の機能を追加することで、阿賀町の実証実験時に問題となった地方自治体の災害対応機能が強化されると考えられます。

東京大学生産技術研究所目黒研究室・沼田研究室も、BOSS・SHIFT の水災害分野への適応を始めていたタイミングでした。そのため、ICHARM と東京大学生産技術研究所目黒研究室・沼田研究室は、IDRIS と BOSS・SHIFT の連携を開始しました。

現在、COVID-19 感染の懸念がある中での出水期を迎え、ICHARM では、水害対応ヒヤリ・ハット事例集（地方自治体編）に加え、別冊：新型コロナウィルス感染症への対応編を作成し、これを BOSS・SHIFT が参照する内閣府の災害時標準手順書（Standard Operating Procedure: SOP）と関連づけ、東京大学などが運用するデータ統合・解析システム（DIAS）に実装し、IDRIS、BOSS・SHIFT の全国自治体への展開を行うべく、研究連携を加速しています。

ICHARM has been conducting demonstration experiments of the ICHARM Disaster Risk Information System (IDRIS), a disaster information sharing system, at Aga Town, Higashi-kanbara County, Niigata Prefecture, in northern Japan since August 2019 under the research agreement between Aga Town and ICHARM.

In October 2019, Aga Town suffered significant damage from a massive water-related disaster due to overflows of the Agano River and its tributary during Typhoon Hagibis, just as many parts of the country did. Although IDRIS was expected to assist the town in taking effective disaster response measures in a situation like this one, the system did not work as expected. As one of its key characteristics, IDRIS is designed to ensure two-way communication between the town office and other disaster-related offices during a disaster. However, because the communication function did not work well enough to support the town's disaster response plan, Aga Town was unable to use the system as planned. As a result, ICHARM learned that IDRIS needs improvement to function well to support the municipal action during an actual disaster.

To improve IDRIS, ICHARM decided to adopt the Business Operation Support System (BOSS) and the System for Human-resource Input and Functional Team-building (SHIFT). These advanced systems are pioneered by the two research teams of the Institute of Industrial Science (IIS), the University of Tokyo, led by Professors MEGURO Kimiro and NUMADA Muneyoshi. Both teams have been producing excellent research achievements on local governments' response to disasters, particularly earthquake disasters. Their work has been very informative and insightful in terms of crisis management during a disaster. Coupled with BOSS-SHIFT, specializing in the management of emergency response of local governments, IDRIS, specializing in the integration of information on water-related disasters, should be improved and able to solve the problem Aga Town faced during the 2019 disaster in the demonstration experiment.

The timing for this collaboration was also right because the two research teams had just started looking for an opportunity to apply BOSS-SHIFT to water-related disasters. This has since accelerated the collaboration between ICHARM and the research teams, and now the integration of IDRIS and BOSS-SHIFT is in progress.

Meanwhile, ICHARM has started another project. As the flood season is approaching amid the COVID-19 pandemic, ICHARM has devised "Collection of Critical Situations during Flood Emergency Response". The project has already been underway to integrate this collection with the Standard Operating Procedure (SOP)of the Cabinet Office, which was used to build the BOSS-SHIFT system. ICHARM is striving for further research collaboration with the University of Tokyo and other relevant organizations to promote the nationwide use of IDRIS and BOSS-SHIFT through DIAS, which is also operated by the University of Tokyo.

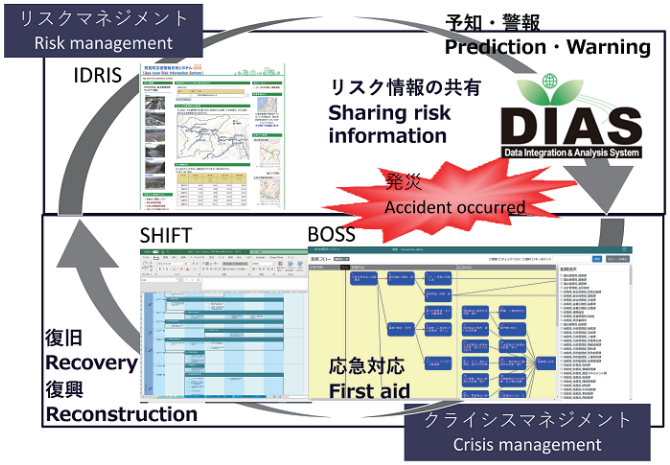


Figure 1 Collaboration between the IDRIS disaster information sharing system and the BOSS -SHIFT disaster response support system
図 1　災害情報共有システム IDRIS と災害対応支援システム BOSS・SHIFT の連携

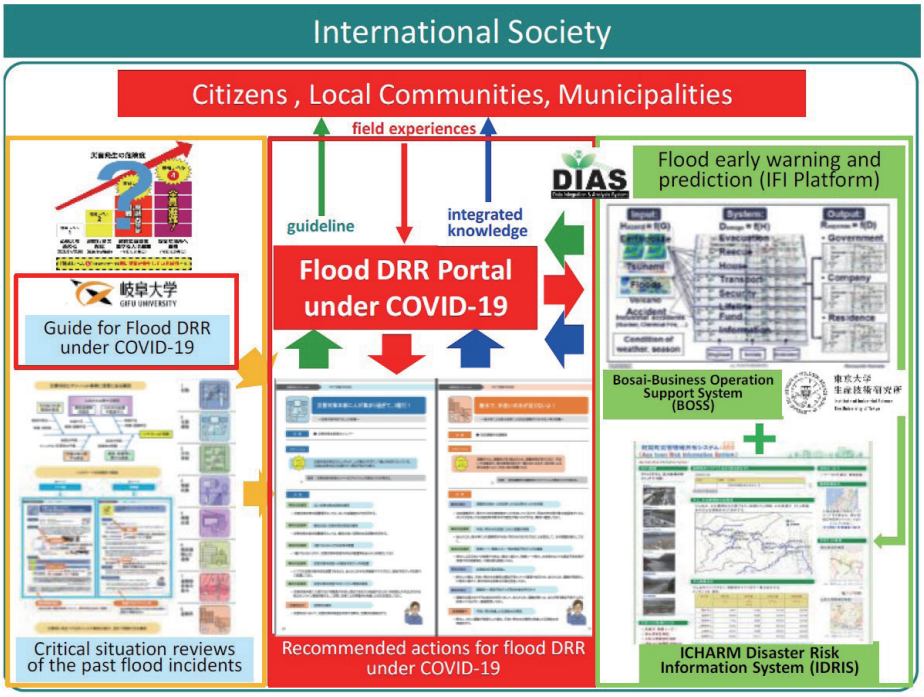
(Written by DENDA Masatoshi)

(4) ICHARM's contribution to international communities on flood disaster risk reduction considering the prevention of COVID-19 infection
新型コロナウィルス感染症拡大防止を考慮した洪水被害リスク軽減に係る国際コミュニティへの貢献

Amid the unprecedented outbreak of COVID-19 infection all over the world, so many international and regional conferences or events have been postponed or canceled. At the same time, the flood season is approaching just like any other year in many parts of the countries around the world, during which tremendous flood damage may result. Because of that, it is critically important to plan preventive measures now for flood disasters risk reduction. Under such circumstances, ICHARM has started an effort to address flood disaster risk reduction considering the prevention of COVID-19 infection, hoping to support the international and regional communities, especially in Asia and the Pacific, where flood disasters may give serious impact on their sustainable development.

As you may have read an article in this newsletter, ICHARM has currently been elaborating guidelines for early warning and evacuation in consideration of preventing the infection of COVID-19. ICHARM is also developing an information sharing system for municipalities by utilizing existing information systems for disaster risk reduction: IDRIS, BOSS-SHIFT and DIAS. To disseminate such efforts in the IFI (International Flood Initiative) implementing countries and others, ICHARM organized a webinar titled "ICHARM's efforts for addressing flood disasters considering the prevention of COVID-19 infection" on July 3, 2020. This webinar consisted of the following presentations by ICHARM on guidelines and tools which have recently been developed for flood disasters risk reduction:

- Objectives and concept (by Executive Director KOIKE Toshio)
- Collection of critical situations for local governments during flood emergency response (by Senior Researcher OHARA Miho)
- Overview and improvement of IDRIS considering critical situations (by Senior Researcher DENDA Masatoshi)



Presentation slide of Executive Director KOIKE
小池センター長の発表資料

The webinar attracted more than 60 people from the IFI implementing countries (the Philippines, Sri Lanka, and Myanmar) and others. In particular, high-level participants attended from the Mahaweli Authority and the Disaster Management Center of Sri Lanka, the Directorate of Water Resources and Improvement of River Systems

新型コロナウィルス（COVID-19）により、全世界にわたって経験したことがないような感染症が拡大する中、多くの国際的・地域的な会議や行事が延期又は中止となっています。一方で、世界各国の多くの地域において、洪水は例年と変わらずに発生すると予想されることから、それにより深刻な被害の発生が懸念されています。これに対し、予防的な対策を講じることによって、いかに洪水被害リスクの軽減を図るかが極めて重要となってきています。こうした状況下において、ICHARM では COVID-19 の感染症拡大防止を考慮しつつ、洪水被害リスクの軽減を図る取り組みを進めており、これは洪水被害が持続可能な発展に深刻な影響を及ぼしかねないアジア太平洋地域における国際・地域コミュニティにとって特に有用と考えています。

本号のニュースレターで既に紹介されている通り、ICHARM では COVID-19 の感染症拡大防止を考慮した早期警報や避難に関するガイドラインを作成するとともに、IDRIS や BOSS・SHIFT、DIAS といった既存の防災情報システムを活用した地方自治体向けの情報共有システムの開発を進めています。ICHARM ではそうした取り組みを IFI 実施国等に対して普及すべく、2020 年 7 月 3 日に「COVID-19 の感染防止を考慮した洪水災害に向けた ICHARM の取り組み」と題したウェビナーを開催しました。本ウェビナーでは、ICHARM から洪水被害リスク軽減に向けて最近開発したガイドラインやツールについて、以下の発表が行われました。

- 目的及び概念（小池俊雄センター長）
- 水害対応における地方自治体のヒヤリ・ハット事例集（大原美保主任研究員）
- ヒヤリ・ハット事例を考慮した IDRIS の概要とその改良（傳田正利主任研究員）

ウェビナーには、IFI 実施国のフィリピン、スリランカ、ミャンマー等から 60 名以上が参加し、特にスリランカ・マハウェリ管理局及び災害管理センター、ミャンマー水資源河川系開発局、フィリピン大学ロスバニョス校からはそれぞれ高官が参加されました。日本と同様、これらの国でも COVID-19 の感染防止を考慮した水関連災害対策が喫緊の課題となっていることから、参加者からは高い関心が寄せられました。このため、発表後の討論では、今回報告されたツールを英訳して、各国で活用できるようにしてほしいとの声が寄せられました。

ウェビナーの様子と発表資料は、ICHARM のホームページに掲載しています。
http://www.icharm.pwri.go.jp/special_topic/20200707_IFIwebinar_j.html

また、5 月 19 日には日本政府信託基金の支援を受け、「アジア太平洋地域における COVID-19 への対応強化のための科学」と題した特別ウェビナーが UNESCO ジャカルタによって開催されました。本ウェビナーには 24 か国から 1,600 名を超える地域関係者が参加し、ICHARM からは小池センター長が主要な発表者として参加しました。その成果として、COVID-19 の課題に対してアジア太平洋地域の UNESCO 科学ファミリーによる行動提言が打ち出されました。その中で、「UNESCO 及びその科学ネットワークはアジア太平洋全域にわたる科学研究と技術革新について、科学と社会とのつながりを強化するよう活用するとともに、COVID-19 や他の新たな課題に対処できるよう、事実に基づく政策行動へと役立てるために協働していく。」ことが確認されました。

更に、5 月 29 日には水と災害ハイレベル・パネルの第 15 回会合がオンラインで開催され、小池センター長がアドバイザーとして参加、"Alliance of Alliances for Research and Education for Water and Disasters" と題して発表を行い、その中で、COVID-19 の感染症拡大下での水関連災害対応を支援するシステムづくりを紹介しました。本会合では「新型コロナウィルス感染症大流行下で水関連災害に対処するための原則」が作成され、「災害の影響を受けた地域が感染拡大の震源地となってしまうことを予防し、災害からの迅速な復旧を支援するためには、現在の感染症大流行下に対応して特別に策定された災害リスク軽減戦略と行動が必要である。」とされています。これは 10 の原則を提唱しており、原文としての英語や中国語、フランス語、スペイン語、ヒンディー語、インドネシア語、日本語の 7 つの言語に翻訳されることとなっています。

本原稿を執筆している 2020 年 7 月半ば頃の時点においても、未だ COVID-19 による感染症拡大が懸念されることから世界各国との往来に大きな制約を受けておりますが、ICHARM では、最新のオンライン技術など、利用可能なツールを最大限活用しつつ、IFI プラットフォーム参加機関や世界各地のパートナー機関との連携・協働を図ることによって、国際ネットワーク活動の一層の推進に取り組んでまいりたく思っております。

(DWIR) of Myanmar, and the University of the Philippines Los Baños (UPLB). As is the case in Japan, water-related disaster management in considering the prevention of COVID-19 infection is an urgent challenge for those countries; thus, all the participants showed a great interest in this theme. For this reason, some participants eagerly requested that the tools and methods presented at the webinar be translated into English for dissemination and utilization in each country.

The video and presentation materials of the webinar have been posted on the ICHARM website.

http://www.icharm.pwri.go.jp/special_topic/20200707_IFIwebinar.html

Another special webinar, "Science to Enable and Empower Asia Pacific for COVID 19 Response," was hosted on May 19 by UNESCO Jakarta Office with support from Japanese Funds-in-Trust (JFIT), attracting more than 1,600 regional stakeholders from 24 countries. ICHARM Executive Director KOIKE Toshio participated as one of the key speakers. As its output, the webinar delivered the Asia Pacific Recommendations of Action by the UNESCO Science Family in Asia and the Pacific in response to COVID-19 challenges in reaffirming that "UNESCO and its science networks will work collaboratively to mobilize scientific research and innovation across Asia and the Pacific to strengthen the interface between science and society and to help deliver evidence-based policy actions for managing COVID-19 and other emerging challenges."

https://en.unesco.org/news/regional-stakeholders-chart-science-familys-role-during-and-after-covid-19-pandemic

On May 29, the 15th meeting of High-level Experts and Leaders Panel on Water and Disasters (HELP) took place virtually. Executive Director KOIKE participated as an advisor and presented "Alliance of Alliances for Research and Education for Water and Disasters," referring to the development of a support system for effective response to water-related disasters under the COVID-19 crisis. The meeting created "The Principles to Address Water-related Disaster Risk Reduction (DRR) under the COVID-19 Pandemic," which states that "DRR strategies and actions specially designed for the current pandemic situation will protect disaster-affected areas from becoming epicenters of pandemic explosion and assist with swift recoveries from disasters." The ten principles advocated by the panel are to be translated into seven different languages: English (original), Chinese, French, Spanish, Hindu, Indonesian and Japanese.

https://www.wateranddisaster.org/covid-19/

At the middle of July 2020, when this article was being prepared for this newsletter, many people around the world still have to refrain from traveling to and from overseas due to the concern of a further spread of COVID-19 infection. In spite of these difficult circumstances, utilizing advanced online technology and other available tools, ICHARM will continue to make best efforts in promoting international networking activities through linking and collaborating with the IFI Platform participating organizations and other partners of the world.

Scene of the webinar at ICHARM
ICHARM でのウェビナー開催状況

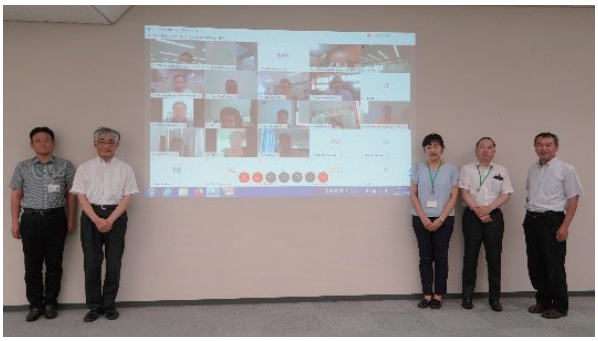


Photo with the participants of the webinar
ウェビナー参加者との写真

(Written by IKEDA Tetsuya)

Research

Special contributions on flood disasters due to Typhoon Hagibis in 2019

In recent years, Japan has frequently been hit by super typhoons and suffered severe flood damage to so many parts of the country. Among the recent typhoons, Typhoon Hagibis in October 2019 was a particularly catastrophic one, passing the archipelago northward from Kanto to Tohoku Regions, while keeping its strength, and leaving serious flood damage over a wide area. Although reconstruction works are still going on in the damaged areas, the typhoon season is about to start again, urging the country to prepare well for water-related disasters.

This edition of ICHARM Newsletter carries special contributions from two experts on flood disasters due to Typhoon Hagibis. The first contribution is from Professor YOSHITANI Junichi at Shinshu University on the flood disasters of the Chikuma River in Nagano Prefecture, where levee breaks due to the typhoon caused wide-spread inundation. He made a huge contribution to ICHARM for long years as a chief researcher and the deputy director until 2016. The second one is from Mr. KONAMI Takahiro, the director of the Fukushima Office of River and National Highway, Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT). He reports the flood disasters of the Abukuma River in Fukushima Prefecture and the reconstruction plan for the affected areas. He served at the UNESCO Headquarters in Paris, France, from 2015 to 2017, during which he provided so much support and cooperation to ICHARM activities.

2019 年台風 19 号による洪水についての特別寄稿

近年、日本では大型台風が頻繁に来襲し、多くの地域で甚大な洪水被害をもたらしてきました。特に 2019 年 10 月には大型の台風 19 号（Hagibis）が強い勢力のまま関東地方から東北地方にかけて北上し、広範囲にわたって深刻な洪水被害が発生しました。現在、被災地では復旧活動が進められていますが、今年もまた台風シーズンを迎え、水関連災害の発生に十分に備えることが必要となってきています。

このたび、台風 19 号による洪水被害に関して 2 名の方から特別寄稿をいただきました。1 つ目は、2019年台風19号によって破堤し、広範囲にわたって浸水被害が生じた長野県の千曲川での洪水について、信州大学の吉谷純一教授から投稿いただきました。皆さんご存じのように、吉谷教授は 2016 年までの長年にわたって、上席研究員やグループ長の立場として ICHARM の活動に多大な貢献を賜りました。また、同じく甚大な被害を受けた福島県の阿武隈川の洪水とその後の復旧計画について、国土交通省東北地方整備局福島河川国道事務所の小浪尊宏所長より投稿いただきました。小浪所長は 2015 年から 2017 年にかけてフランス・パリの国連教育科学文化機関（UNESCO）本部に勤務され、ICHARM の活動に多大なご支援・ご協力を賜りました。

Levee-breach flood disaster in the suburban area of Nagano City along the Chikuma River
長野市郊外での大河川千曲川堤防破堤災害

YOSHITANI Junichi, Professor, Water Environment and Civil Engineering, Faculty of Engineering, Shinshu University /
Leader, Chubu & Hokuriku Region 2019 Typhoon No.19 Heavy Rain Disaster Investigation Team, Committee on Hydroscience and Hydraulic Engineering, Japan Society of Civil Engineers
吉谷純一　信州大学工学部水環境・土木工学科　教授 /
土木学会水工学委員会　令和元年台風 19 号豪雨災害調査団　中部・北陸地区　団長

October in Japan is not regarded as the flood month. However, in October 2019, Typhoon Hagibis made landfall in Japan while keeping its extreme strength, bringing heavy rainfall over the basin of the Chikuma River, the longest river in Japan. The rainfall peaked at 8 p.m. on October 12, and the continuous rainfall reached 579 mm at a site near the river source. About eight hours after the heavy rainfall, the floodwaters arrived in Nagano City, which is located some 80 km downstream of the river source. In Nagano City, the river flows run about 1km wide between about 5-meter-high continuous levees. The floodwaters exceeded the levee crowns, overflowed at 12

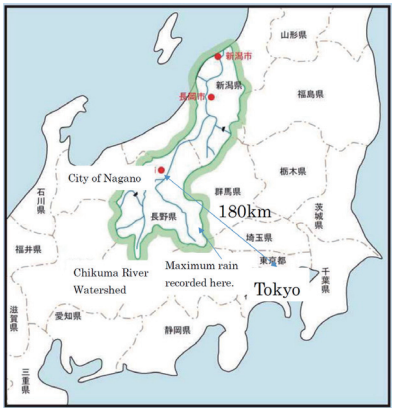


Figure 1 Location of the Chikuma and Shinano River watershed
図 1　千曲川及び信濃川の流域位置図

日本の 10 月は非洪水期です。しかし、2019 年 10 月は例年とは異なり、台風 19 号（ハギビス）が強大な勢力を保ったまま日本に上陸し、日本一の河川延長を持つ千曲川に 10 月 12 日午後 8 時に最大となった大雨をもたらしました。地点最大の連続雨量は、水源地近くで 579mm でした。豪雨発生から約 8 時間後、約 80km 下流の長野市に洪水が到達しました。長野市内で千曲川は約 5 mの高さの連続堤防、約 1km の川幅を持ちます。長野市とその周辺の計 12 箇所で堤防から水があふれ、市街地が浸水しました。越水地点のうち長野市郊外の 1 箇所が 10 月 13 日未明に 70m 幅で決壊し、大被害が発生しました。

住宅地へ流れ込んだ氾濫水は長野

市長沼地区など約 9km^2 の面積に広がりました。ここで 2 名が亡くなり、多数の施設に大被害が発生しました。堤防決壊地点から 350 m程度の範囲にある家屋は氾濫水の大きな流体力により全壊しました。また、氾濫域の住宅、リンゴ畑、新幹線車両基地、流域下水処理場、商業施設は、最大 4.5m の浸水と大量の堆積土砂により被災しました。長野県の被害総額は直接被害額だけで 25 億 USD を上回ります。

長沼地区付近は長野市で最も地盤が低い土地です。地区住民はその危険性を十分に認識し、地区独自の洪水時避難計画を自主的に作成し、日頃から水害に備えていました。さらに、防災機関は防災気象情報や避難情報の配信に加え、携帯電話位置情報を用いたプッシュ型の情報提供サービスを開始しています。加えて、長野市は、想定最大規模降雨シナリオによる精緻な氾濫情報を記載した新しい洪水ハザードマップを 2019 年 8 月に全戸に配布しました。このマップの長沼地区を見ると、10m 以上の氾濫水深、堤防から 200 ～ 900 m程度までの家屋倒壊危険ゾーンを示しています。マップは今回の浸水をかなり正確に予測しています。マップが示す危険ゾーンまたは 3m 以上の浸水域では、2 階への避難は危険で、早期の立ち退き避難が必要です。なお、日本の標準的家屋は木造 2 階建てです。

多様な防災情報と地区住民の備えにもかかわらず、越水発生時点で立ち退き避難した住民は 50%以下で、住宅 2 階に避難していた 1,700 名以上の住民が早朝にヘリコプターやボートで救出されました。もし、住宅 2 階が大きく浸水していれば、甚大な人的被害が発生した可能性があります。

後の調査で、地区住民は「堤防は絶対に決壊しない」と信じていたことが判明しました。越水は堤防決壊を招きます。何がこの誤解を招いたのか判明していませんが、桜づつみがその一因と考えています。この桜づつみは、桜並木植樹のための堤防の片側法面への盛土です。盛土は堤防として必要とされる強度を持ちませんが、外見上は堤防幅が増加し堤防が強化されたように見せます。立ち退き避難しなかった住民は、マップが示す浸水深は " 堤防決壊というあり得ないシナリオの場合 " と解釈し、住宅 2 階への避難で安全と判断したのかもしれません。

ハザードを誤解したまま、精緻なリスク情報を得ると、人は誤った判断をする可能性があると推測します。今後、誤解の原因調査と対住民向けハザード・リスク情報理解支援の体制作りが必要と思います。

Figure 2 Levee-breach flooding in the suburban area of Nagano City (photo taken at 1:10 p.m., October 13, 2019, by the Ministry of Land, Infrastructure, Transport and Tourism)
図 2　長野市郊外での破堤による浸水（2019 年 10 月 13 日午後 1 時 10 分。国土交通省提供）

locations in and around Nagano City, and inundated its suburban area. At one of the 12 locations, the levee breached about 70 m wide before dawn on October 13, which resulted in significant damage to the area.

The floodwaters pouring into the inland gradually spread over the area of about 9 km^2 covering Naganuma and other districts of Nagano City, where two residents lost their lives and many structures and facilities were seriously damaged. A strong hydrodynamic force of the floodwaters completely destroyed the houses located within about 350 m from the breach point. Other houses, apple orchards, a bullet train yard, a basin-area sewage treatment plant, and commercial facilities in the flooded districts were all inundated by the floodwaters rising up to 4.5 m at the peak and buried in a large volume of sediment. The damage was estimated to exceed 2.5 billion USD, and that is the direct damage only.

Naganuma District is on the lowest ground in Nagano City. The residents know too well about the risk they face by living there. In fact, they had voluntarily produced their own flood evacuation plan and prepared other measures for possible flooding before the 2019 disaster. Furthermore, a regional disaster management organization had already started a push notification service to individual phone users (the

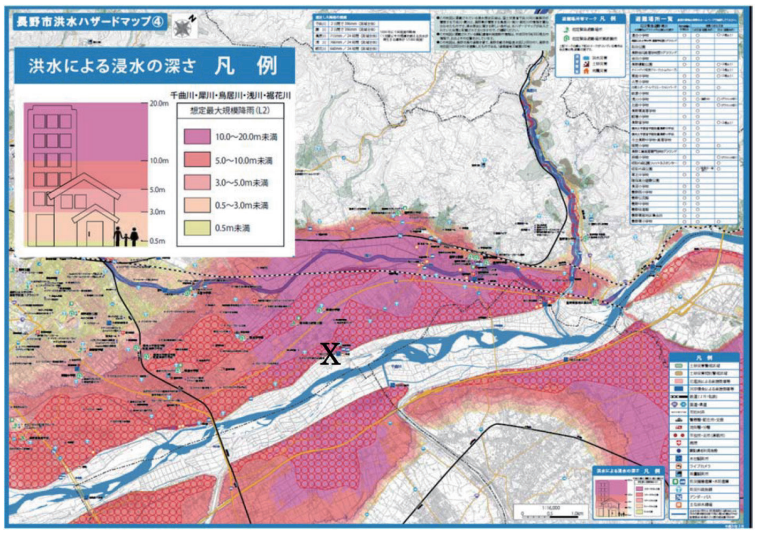


Figure 3 New flood hazard map of Nagano City. Different color densities are used for inundation depths, and red circles for high flow-velocity zones. The levee breach occurred at the location marked as X.
図 3　長野市の新しい洪水ハザードマップ。色の濃さは浸水の深さ、赤い丸は流速の大きい地域を示している。図中 X の地点で破堤が生じた。

delivery of information without a request from the resident) using smartphone GPS, besides delivering elaborated information about weather and evacuation. Nagano City, too, revised a flood hazard map by adding detailed inundation information in case of the probable maximum rainfall and distributed to every household in August 2019, two months before the disaster. According to this hazard map, Naganuma District is in the so-called house-collapse-risk zone where, once a levee breaches, high-speed flows can travel as far as 200 to 900m and wash away wooden houses. Most parts of Naganuma District are also categorized as over-10-meter-deep inundation zone. In this respect, the map predicted the October 2019 flooding rather accurately. The map suggest that the residents in this zone should evacuate from the district before floodwaters arrive, because the standard house type is the two-story wooden house in Nagano and other parts of Japan, whose second floor is only 3 m high from the ground. Early evacuation to a no-inundation place is essential.

Although provided with various types of disaster-related information and steadily preparing for floods, less than 50% of the residents evacuated from their houses before overtopping flows occurred. As a results, more than 1,700 residents were rescued early the next morning by helicopter or boat. If the floodwaters had risen higher up to the second-floor level, casualties could have been by far greater.

A post-disaster investigation found that the residents were groundlessly convinced that the levee would never breach. Since any overflow is likely to result in a levee breach, it is not clear why they were mistaken about the sturdiness of the levee. One possible reason may be related to the additional soil bank built for cherry-tree planting, which is called “sakura-zutsumi” in Japanese. This soil bank is heaped up on the land-side slope of the levee. Such a bank is not part of the levee and therefore does not have the sturdiness a levee is supposed to possess. However, it looks as if the levee obtained additional width and sturdiness. Considering that many residents took an inappropriate action of staying at their homes, they may have misinterpreted the over 10-meter inundation depth indicated on the hazard map as a result only from a levee breach. They may have thought a levee breach to be the worst possible scenario that would never happen. That may be why they believed the upstairs was safe enough as a shelter.

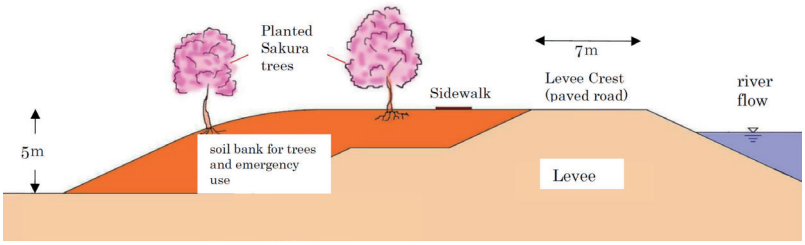


Figure 4 Cross-section of the tree-planted soil bank on the levee slope
図 4　堤防のり面での植樹盛土横断図

The case of the Chikuma River flood disaster suggests that people may make a wrong judgment when they are provided with detailed risk information without accurate interpretation of hazards. Further investigation is needed to understand why they were mistaken about the information of the map, and it is also necessary to create the framework to assist the general public in improving their understanding of information on hazards and their risks.

Formulation of the Abukuma River Integrated Flood Management Project after a severe flood by Typhoon Hagibis in 2019
令和元年東日本台風の被災を受けた阿武隈川緊急治水対策プロジェクトについて

KONAMI Takahiro, Director, Fukushima River and National Highway Office, Ministry of Land, Infrastructure, Transport and Tourism of Japan
小浪尊宏　国土交通省福島河川国道事務所所長

令和元年 10 月 12 日から 13 日にかけて、令和元年東日本台風（台風 19 号・Hagibis）が日本列島を縦断し、関東、東北地方まで、広い範囲で記録的な大雨と洪水被害をもたらしました。この洪水は阿武隈川の全ての基準観測所の記録を更新し、流域全体において歴史に残る大災害となりました（表 1）。

２ヶ月後の 12 月 3 日から 4 日にかけて、大規模な河川はん濫時の被害軽減策を推進するため水防法に基づき設置されている「阿武隈川上流大規模氾濫時の減災対策協議会（減対協）」を臨時に開催し、直轄区間の 10 市町村のうち 9 の首長が出席しました。この会議において、①河川における治水対策、②減災型都市計画、③地区単位・町内会単位での避難体制、④バックウォーターも考慮した危機管理対策の 4 つの課題に基づき緊急治水対策を進めることが合意されました。

令和 2 年 1 月 31 日、国と地方の関係行政機関によって 5 項目の対策からなる「阿武隈川緊急治水対策プロジェクト」が合意されました。5 項目のうち 4 つは上記の各課題に対応しており、残る一つは市町村の実情に応じた取り組みです。

プロジェクトの概要は図 1 の通りです。治水対策、減災型都市計画、地区単位の避難体制、バックウォーター対策、市町村の実情に応じた取り組みの 5 つの柱から構成されています。

阿武隈川では平成 28 年に減対協を設置し、令和元年のような大規模水害への備えの重要性は首長や地域の代表者に一定程度認識されていました。結果として、水害によって 8 名の方が亡くなったことは痛恨でありますが、1.2 万戸弱の浸水が生じた中で多くの住民が無事避難できたことも事実であります。

三春ダム、摺上川ダム、浜尾遊水地に加え、これまでに整備された堤防を含め、治水施設は、その機能を十分に発揮しました。これらの貯水施設は約 3 千万 m^3 の洪水を貯留し、洪水の 90%は河道から安全に流下したと推計されています。ただ、洪水全体のおよそ 2%が残念ながら溢れ、11,526 戸（令和 2 年 3 月 30 日時点）の浸水被害につながってしまいました。

ハード・ソフトの対策は概ね機能しましたが、前述の通りまだ多くの課題が残っており、河川管理施設の整備、避難対策ともさらなる改善が必要だということで、上記のプロジェクトが合意されたものです。

図 2 はハード対策の大半を占める直轄河川事業の概要となります。阿武隈川上流計約 130 億円の災害復

On October 12-13, 2019, Typhoon Hagibis struck many places throughout Japan, bringing record rainfall, which resulted in severe flood disasters in Kanto, Tohoku and other regions of the country. In the Abukuma River basin in the Tohoku region, almost all nationally managed water gauges recorded unprecedented flood discharges. A historic flood disaster caused tremendous damage to the whole basin, as shown in Table 1.

Observatory name (Municipality name)	Danger level	HWL	Previous record (date)	2019 record (time, date)
Fushiguro (Date City)	5.00m	7.27m	6.00m (17 Sep 1948)	6.34m (1:30, 13 Oct)
Fukushima (Fukushima City)	5.40m	6.56m	5.90m (15 Aug 1986)	6.43m (3:20, 13 Oct)
Nihonmatsu (Nihonmatsu City)	10.40m	13.18m	11.57m (22 Sep 2011)	12.80m (4:50, 13 Oct)
Motomiya (Motomiya City)	7.90m	9.29m	9.63m (23 Jul 1941)	9.73m (2:10, 13 Oct)
Akutsu (Koriyama City)	7.90m	8.68m	9.20m (21 Sep 2011)	10.01m (1:30, 13 Oct)
Sukagawa (Sukagawa City)	7.70m	7.99m	9.00m (23 Jul 1941)	9.61m (7:20, 13 Oct)
Yagita (Fukushima City)	2.00m	3.46m	2.50m (6 Aug 1989)	2.55m (23:10, 12 Oct)

Source: MLIT　　*Underlined records exceeded HWL

Table 1 Records of the water levels of the main nationally-managed water gauges in the upper Abukuma River
表 1　阿武隈川上流で国が管理する主な水位計での水位記録

On December 3-4, 2019, about two months after the disaster, the Abukuma Mega-flood Management Committee (MMC), established under the stipulation of the Flood Control Act to promote damage reduction measures against mega-flood disasters, was held extraordinarily. The meeting was attended by nine out of ten mayors whose municipalities are located along the nationally managed section of the Abukuma River and agreed to formulate an integrated flood management plan, aiming to strengthen flood risk management by improving its four different aspects: river infrastructure improvement, flood-risk-conscious urban design, adaptive district-level flood evacuation plan, and preparedness for disasters due to backwater-prone tributaries.

On January 31, 2020, all relevant national, prefectural and municipal authorities agreed to cooperatively carry out the Abukuma River Integrated Flood Management Project (Abukuma IFM), which consists of five major project items. Four of them correspond to the four challenges stated in the previous paragraph, and the last item addresses programmes particular to the needs and conditions of each municipality.

Figure 1 is an overview of the Abukuma IFM, showing its five pillars: river infrastructure improvement, flood-risk-conscious urban design, adaptive district-level flood evacuation plan, preparedness for disasters due to backwater-prone tributaries, and local municipal programmes.

Established in 2016, the Abukuma MMC has contributed to fostering shared understanding among the mayors and local community leaders about the importance of

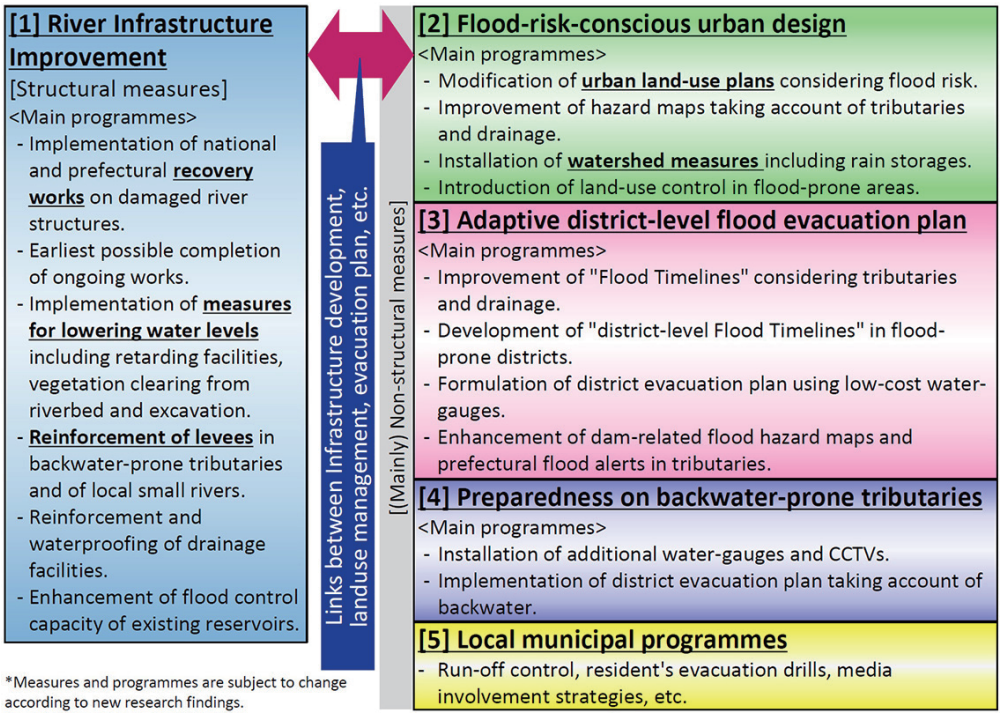


Figure 1 Overview of Abukuma Integrated Flood Management Project
図 1　阿武隈川統合洪水管理プロジェクトの概要

preparedness for mega-flood disasters such as the 2019 flood disasters. Because of that, they demonstrated strong leadership in the evacuation of the residents. Unfortunately, eight people lost their lives in the disaster, but many people were able to evacuate safely from some twelve-thousand inundated buildings.

River infrastructure, including two large dams (Miharu Dam and Surikamigawa Dam), one retarding basin (Hamao Retarding Basin), and completed and partially completed levees, played their role in flood risk mitigation very well. Those reservoirs held 30 million cubic meters of floodwater in total, and the river channels are estimated to drain 90% of floodwater safely. However, approximately 2% of it overflowed and inundated 11,526 buildings (as of March 30, 2020).

Although structural and non-structural measures worked well in the 2019 flood disaster, relevant authorities made a unanimous decision to adopt the Abukuma IFM, for they learned that many challenges remain to be solved for further improvement of river infrastructure and evacuation issues.

Figure 2 shows the river infrastructure work led by MLIT, which accounts for the largest portion of the structural measures in the project. It consists of recovery work for a budget of 13.0 billion yen (123 million USD) and improvement work for 99.9 billion yen (942 million USD). The improvement work of this scale is the largest ever in the Abukuma River basin, including excavation of 2.2 million cubic meters, levee construction of 400 meters, and retarding basin of 9 million cubic tts. In addition to these efforts by the national government, the prefecture has allocated a budget of 33.4 billion yen (315 million USD) for recovery and improvement work. In total, 146.3 billion yen (1,380 million USD) is scheduled to be invested in flood risk reduction in this area.

The implementation of non-structural measures has also started along with the Abukuma IFM. To promote flood-risk-conscious urban design, the municipalities have started discussions on urban design considering flood risk and the designation of Disaster Risk Areas (DRA) required by the Building Standards Act. Each municipality has also been working toward the formulation of Flood Timelines, or Flood Disaster Response Plans, to develop an adaptive district-level flood evacuation plan. Flood Timelines show a chronological list of simple instructions regarding "who should do what and when" during the time when a flood event is imminent. To support these activities, additional water gauges and CCTVs will be installed as

旧事業及びそれと一体として進められる改良復旧事業である「阿武隈川上流大規模災害関連事業（事業費約 999 億円）」により構成されています。これは、阿武隈川の改良復旧事業としては史上最大規模となります。同事業は、220 万 m^3 の河道掘削、400m の堤防整備、900 万 m^3 の遊水地整備などを含んでおり、これに加え、県事業としても、災害復旧及び改良復旧事業計 334 億円の予算が計上されております。双方を合計すると 1,463 億円となります。

緊急治水対策に基づくソフト施策も始まっています。減災型都市計画として、各市町村では立地適正化計画への洪水リスクの反映や、建築基準法に基づく災害危険区域制度の活用について検討が始まっています。地区単位・町内会単位での避難体制の強化のため、洪水の発生時期から遡った時系列に沿って「いつ」「誰が」「何を」備えるのか定める「洪水タイムライン（防災行動計画）」の整備も進んでいます。これらを支えるため、バックウォーターも考慮した危機管理対策の一環として支川に新たに水位計や監視カメラが設置される予定です。このほか、市町村独自の取り組みとして、たとえば伊達市では防災専門員を採用する予定ですし、本宮市では防災行政無線のデジタル化及び難聴者用の文字放送のためのシステム改修を進めることとなっています。

詳細については、以下のリンクから「阿武隈川緊急治水対策プロジェクト」を参照ください。日本語版・英語版とも用意しております。（http://www.thr.mlit.go.jp/fukushima/antenna/abu_project.html）

阿武隈川緊急治水対策プロジェクトは令和 10 年度までを予定しています。ソフト対策は 1～2 年程度で推進を図る予定ですが、ハード整備はもう少し時間を要します。

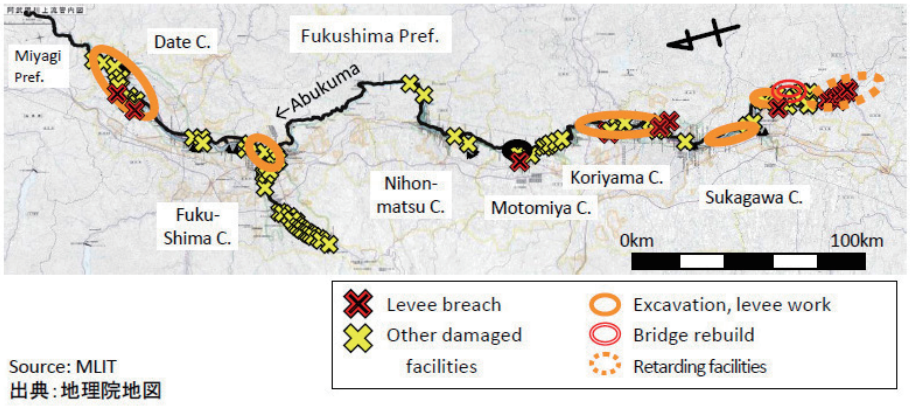
阿武隈川流域の経験が、我が国の他地域での洪水対策の経験とともに、ICHARM やニュースレターの読者の皆さまを通じて共有されることを期待します。また、ICHARM が主導する国際洪水イニシアチブ (IFI) のサポートとともに、洪水リスクの高い国や地域における統合洪水管理の構築に寄与することができれば幸いです。

a part of preparedness for disasters due to backwater-prone tributaries. As to municipal programmes, for example, Date City is planning to hire an expert in disaster risk reduction. Motomiya City also has a plan to install a digital wireless-activated disaster warning system and a text broadcasting system for hearing-impaired persons.

A brief description of the Abukuma IFM is available in Japanese and English at: http://www.thr.mlit.go.jp/fukushima/antenna/abu_project.html.

The Abukuma IFM will continue until 2028. The implementation of non-structural measures will be completed in one or two years, while structural measures will take longer for full implementation.

I hope that the experience in the Abukuma River basin, along with other cases of heavy flood disasters in Japan, will be shared by many people around the world through ICHARM researchers and readers of this newsletter. It will be my pleasure if the Abukuma case is found useful for the implementation of integrated flood management projects in flood-prone communities and states as well as to support the International Flood Initiative led by ICHARM.



Recovery Work of damaged facilities	
Project cost: 13.0 bil. Yen (123 mil. USD)*	
Project duration:	FY2019-FY2020
Levee recovery : 62	Sluice gate repair : 8
Ground sill repair : 14	

Large-scale Recovery-related Improvement Work	
Project cost: 99.9 bil. Yen (942 mil. USD)*	
Project duration:	FY2019-FY2028 (10 years)
Excavation volume:	2.2 mil. cubic m
Levee construction:	400 m
Bridge rebuilding: 2	Retarding facilities: 3

* 1 USD = 106 Japanese Yen

Figure 2 Overview of the recovery and improvement work by MLIT
図２　国土交通省による災害復旧・改良復旧事業の概要

Figure 3 Aerial photo of inundation in Sukagawa City
図３　須賀川市の浸水状況

Figure 4 Aerial photo of inundation in Koriyama City
図４　郡山市の浸水状況

Figure 5 Aerial photo of inundation in Motomiya City
図５　本宮市の浸水状況

Introduction of ICHARM research projects / 研究紹介

ICHARM sets three principal areas of activity: research, capacity building, and information network. It plans and implements projects in these areas in order to fulfill its mission, always keeping in mind "localism", a principle with which we respect local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends of disasters.

At present, ICHARM conducts innovative research in the following five major areas:

(1) Water-related disaster data archiving, sharing and statistics

(2) Risk assessment on water-related disasters

(3) Monitoring and forecasting water-related disaster risk changes

(4) Support through proposal, evaluation and application of policies for water disaster risk reduction

(5) Support for improving the capacity to practice disaster prevention and mitigation

This issue introduces a researcher as listed below:

HARADA Daisuke, Research Specialist

Characteristics of flood flow with a large amount of sediment -On the analysis of the Gofukuya River flood hazard due to Typhoon Hagibis, 2019.-

ICHARM は、その使命を果たすため、世界及び地域での災害の傾向及び経験と災害対応に関する地域のニーズ、重要課題、開発段階等を踏まえつつ、自然、社会及び文化といった地域の多様性を考慮する原則というローカリズムを念頭に、研究、能力育成及び情報ネットワーク構築の 3 本柱を有機的に連携させて、現地実践活動を実施しています。

そのうち、研究としては

(1) 水災害データの収集、保存、共有、統計化

(2) 水災害リスクのアセスメント

(3) 水災害リスクの変化のモニタリングと予測

(4) 水災害リスク軽減の政策事例の提示、評価と適用支援

(5) 防災・減災の実践力の向上支援

の 5 つの柱のもと、革新的な研究活動を行っています。

本号では、原田大輔専門研究員の行っている「多量の土砂を含む洪水流の特徴　～ 2019 年台風 19 号による五福谷川洪水氾濫の解析～」を紹介します。

Characteristics of flood flow with a large amount of sediment -On the analysis of the Gofukuya River flood hazard due to Typhoon Hagibis, 2019.-

多量の土砂を含む洪水流の特徴　～ 2019 年台風 19 号による五福谷川洪水氾濫の解析～

HARADA Daisuke, Research Specialist
原田大輔　専門研究員

Typhoon Hagibis in 2019 caused flood disasters across eastern Japan, inducing significant damage to many places in the area. Particularly, along the Gofukuya River, a tributary of the Abukuma River system, many events of landslide and debris flow occurred in the mountainous area. Part of the sediment produced in the mountains was transported by the flood flow and deposited in the plane area lying downstream. This deposition assumingly increased the severity of the flood disaster in the area. Since this event, ICHARM has been conducting research on floods with a massive transport of sediment, which have been frequent in Japan in recent years, to clarify their mechanisms and phenomena and study effective methods for sharing information in the event of such disasters.

We conducted a field survey in the Gofukuya River after the 2019 flood disaster. Figure 1 shows the inundated area, whose photo was taken from downstream to upstream. A dyke breached around the bent part immediately downstream of the exit of the valley. A lot of sediment and water seem to have overflowed from this point to the downstream plane area.

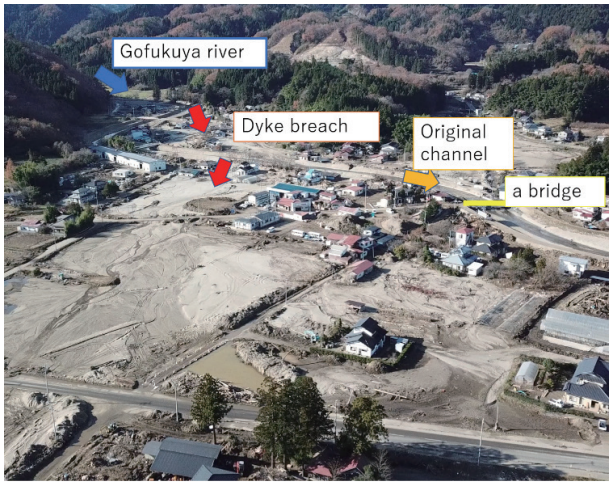


Figure 1 Inundated area due to a flood flow with a huge amount of sediment deposition in the Gofukuya River
図 1　五福谷川の氾濫域：多量の土砂が堆積している状況

In order to conduct flood flow simulation in this inundated area, sediment inflow supplied from the mountainous area has to be properly evaluated. Though the process is quite complicated and difficult to be simplified, we are currently developing an evaluation method whose schematic image is illustrated in Figure 2. At this stage, assuming that the sediment transported to the basin deposits in blue rectangle areas, each measuring a length of L and a width of B, this method computes wash

2019 年の台風 19 号による災害では、東日本の広範囲で河川の氾濫が発生し、甚大な被害が発生しました。特に阿武隈川水系の五福谷川では山間部で多数の崩壊・土石流が発生しました。上流域で生産された土砂の一部は洪水流によって下流に流出し、下流の平野部には多量の土砂が厚く堆積しており、平野部での洪水流による被害を助長したと考えられます。ICHARM では、近年頻発化しているこのような多量の土砂流出を含む洪水氾濫について、その発生メカニズムや現象の解明、さらには災害時の効果的な情報共有方法の検討等を目的とした研究を行っています。

ICHARM では災害発生後に五福谷川の現地調査を行いました。図 1 は、五福谷川の氾濫域の状況について、下流から上流を向いて撮影したものです。谷の出口付近よりもやや下流側の河道が湾曲している箇所の付近において破堤が生じており、ここから下流側に向けて多量の土砂と洪水流が氾濫したと考えられます。

この氾濫域で洪水流の解析を行うためには、上流の山間部からの土砂流入量を適切に評価する必要があります。これは極めて複雑でモデル化が困難なプロセスですが、ここでは図 2 のように推定します。生産された土砂が図のように、流域の各箇所に長さ L，幅 B で堆積しているとします。各堆積物に作用する掃流力から、掃流砂量 Qb が計算でき、これに河床に含まれている細粒分の割合を乗じることで、ここから流出するウォッシュロードの量 Qw を算出します。これらを足し合わせることで、山地区域から下流平野部（計算区間）

に流入する土砂量を評価することができます。

このようにして算出した土砂量を上流端（谷の出口）で与え、洪水流の計算を行った結果が図 3 です。図 3 の左は、ピーク流量時の水深コンター及び流速ベクトルであり、右は計算前後での標高の変化です。白点線で囲ってある部分の河道に近い箇所で五福谷川の破堤・氾濫が発生していて、ここから堤内地（五福谷川と内川に囲まれた部分）に多量の流水と土砂が流入していることが分かります。これは図 3 の右に示す標高の変化からも分かる通り、河道内に土砂が堆積した結果、河道の容量が減少していることで破堤・氾濫がより顕著になっていることが分かります。氾濫域では土砂が堆積する分、浸水深が深くなります。

以上のように、五福谷川における多量の土砂を含む洪水流について、これを数値計算によって再現する手法を提案し、その特徴を明らかにしています。今後、同様の中山間地河川の川づくりや避難計画に資するよう、ここで紹介したような新しい解析法を提案していきます。

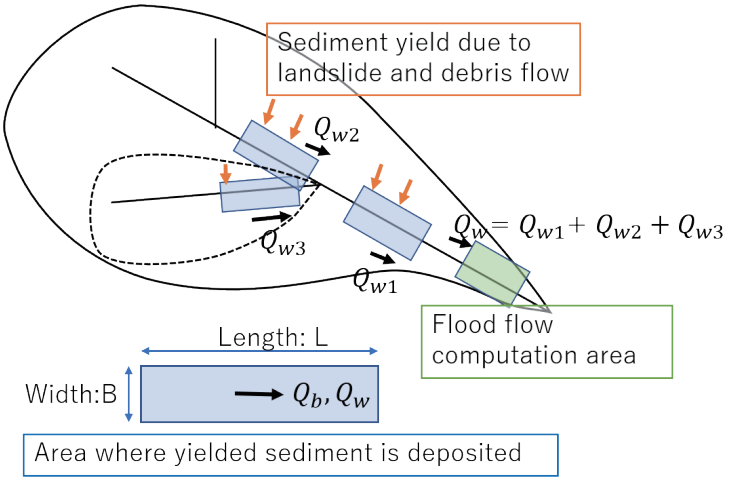


Figure 2 Schematic image of sediment supply from the basin
図２　流域からの土砂供給に関する模式図

load supply from each area *Qw* by first estimating bedload transport *Qb* from the tractive power acting on the deposited sediment in the area and then multiplying *Qb* by the content ratio of wash load in the deposition. The wash load inflow supplied from the mountainous area to the basin is therefore evaluated as a summation of the wash load production from the respective areas indicated as blue rectangles.

Figure 3 shows the computation results of the flood flow, in which the upstream suspended sediment concentration is given, as explained above. Figure 3 (left) shows depth contours and velocity vectors at the peak discharge. Figure 3 (right) shows the difference in elevation before and after the flood in the computational domain. The results found that due to the dyke breach at the white dotted area, a lot of sediment and floodwaters flowed into the plane area surrounded by the levee of the Gofukuya and Uchi Rivers. Figure 3 (right) also shows that the dyke breach and the flood inundation are worsened due to the sediment deposition in the river. The inundation depth in the residential area was deep due to the sediment deposition in the area.

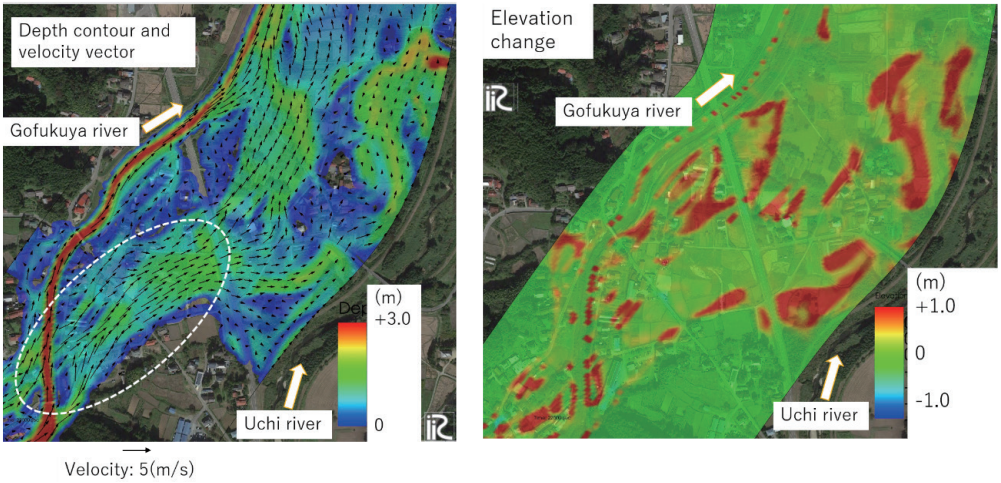


Figure 3 Computational results of the flood flow in the Gofukuya River: depth contours and the velocity vectors (left) and elevation changes (right)
図３　五福谷川における洪水流の計算結果：水深コンター及び流速ベクトル図（左）、計算前後の標高の変化（右）

In this study, we have developed a method to simulate a flood flow with massive sediment production, and clarified the characteristics of the flood flow in the Gofukuya River through computation. ICHARM will continue to develop methods to simulate phenomena, such as the one explained here, to contribute to river improvement and evacuation planning.

Casualties of flood disasters during the recent three years in Japan
日本における過去 3 年間の水害での人的被害発生状況

The western and central regions of Japan were severely affected by heavy rainfall due to the influence of seasonal rain fronts from July 4 to 14, 2020. Emergency heavy rain warnings were issued in seven of the 47 prefectures. According to a report by the Ministry of Land, Infrastructure, Transport and Tourism of Japan, as of July 9, floods occurred at 100 locations along 84 rivers while landslides at 179 locations in 23 prefectures. Floodwaters inundated an area of 1060 hectares in the Kuma River basin in Kumamoto Prefecture in the Kyusyu region of the southern part of Japan, including 450 hectares in Hitoyoshi City alone, located in the upper reach of the river. This disaster, officially named the "July 2020 Heavy Rain," was reported to leave 76 dead, 1 in cardiopulmonary arrest, and 8 missing as of July 16 according to the situation report by the Fire and Disaster Management Agency. In the recent three years, severe disasters due to extreme rainfall events have occurred annually in Japan. The heavy rain in July 2018 claimed 263 deaths, and Typhoon Hagibis and the heavy rain in October 2019 claimed 104 deaths, in addition to the most recent one in July 2020.

Figure 1 shows the proportion of deaths by age group in the three heavy rain disasters. People aged 65 or older, excluding those with undisclosed identity, account for 60.0%, 65.1%, and 82.1% in 2018, 2019, and 2020, respectively. Many older people lost their lives in the July 2020 disaster, while no people under 40 years old died probably because they were able to evacuate safely. This fact suggests that early evacuation of the elderly is the key issue to reduce casualties in the future.

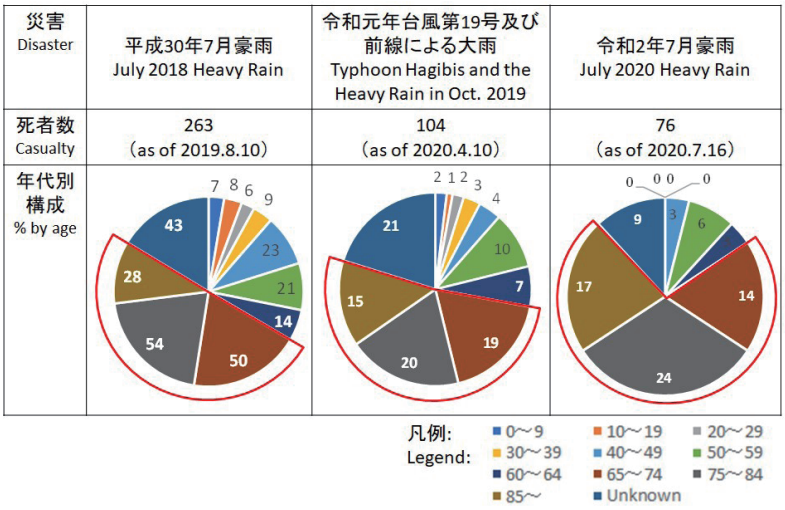


Figure 1 Casualties due to floods in the past three years
図 1　過去 3 年間の水害での死者発生状況

Figure 2 shows death tolls in metrological disasters in 43 years from 1978 to 2020, during which disaster statistics by prefecture also exist. The July 2020 heavy rain disaster caused 65 deaths in Kumamoto Prefecture alone, the sixth highest death toll that a single prefecture recorded in the 43 years. The total deaths of 73 are also rather high, ranked eleventh in the same period.

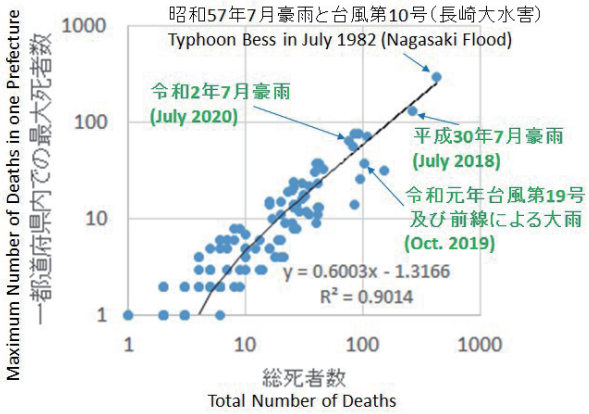


Figure 2 Casualties due to meteorological disasters in the past 43 years
図 2　過去 43 年間の気象災害での死者発生状況

This disaster casualty analysis will be continued since the figures may change as post-disaster damage surveys progress.

(Written by OHARA Miho)

2020 年 7 月 4 日から 14 日にかけて、梅雨前線の影響により西日本から中部地方の各地で豪雨が発生し、7 県に対して大雨特別警報が発表された。国土交通省の 9 日時点での取りまとめによれば、全国 84 河川の 100 カ所で氾濫し、土砂崩れは 23 県で 179 件発生した。熊本県内の球磨川流域では 1060 ヘクタールが浸水し、上流域の人吉市は 450 ヘクタールに渡って広く浸水した。本豪雨災害は、気象庁により「令和 2 年 7 月豪雨」と命名され、7 月 16 日付での消防庁被害報によれば、人的被害は死者数 76 人、心肺停止 1 名、行方不明者 8 名に上っている。平成 30 年（2018 年）7 月豪雨では 263 人が、令和元年 (2019 年) 台風第 19 号及び前線による大雨の災害では 104 人が亡くなっており、過去 3 年間において立て続けに大水害が発生している。

図 1 には、これら 3 つの災害での死者の年代別構成を示します。身元非公表者を除いた総死者数における 65 歳以上の高齢者の割合は、2018 年・2019 年・2020 年の災害でそれぞれ 60.0%・65.1%・82.1% となっています。令和 2 年 7 月豪雨災害では、40 歳未満の死者はおらず、若い世代が避難できた一方で、逃げ遅れた高齢者が多数亡くなり、改めて高齢者の避難の課題が浮き彫りになりました。

図 2 は、都道府県別の災害統計データが存在している 1978 年〜2020 年までの 43 年間の気象災害での死者の発生状況です。令和 2 年 7 月豪雨災害での熊本県内での死者 65 名は、過去 43 年間の気象災害での一都道府県内での死者数としては、歴代 6 番目の多さとなりました。総死者数では 11 番目です。なお、この数値は今後も変動しうるため、引き続き、分析を続ける予定です。

Training & Education

Updates on the daily life of master's students: What DMP students are feeling and tackling amid the COVID-19 outbreak
コロナ禍において修士学生が感じていること、取り組んでいること

ICHARM では、2007 年以降、JICA、GRIPS と共同し、外国人行政職員を対象として、１年間で学位取得できる修士コースを設けています。例年、10 月から翌年３月の６カ月間は主に講義が行われ、４月から８月にかけては主に論文執筆に取り組みます。

この度の COVID-19 の世界的な感染は、当該研修のプログラムにも少なからず影響を与えました。当初予定されていた３月下旬の福岡堰（つくばみらい市）への視察や、４月中旬の近畿方面（淀川流域）への視察が中止となり、同じく４月上旬に予定されていた北陸方面（信濃川流域）への視察が延期となりました。

また、生活面においても様々な制約が課せられました。学生達は、外出の自粛は勿論のこと、３月中旬から１カ月程度、普段生活している筑波国際センター（以下、TBIC と称する。）から市内のホテルに移って滞在することとなりました。

TBIC に戻った後も、学生達は２グループに分かれ、隔日で ICHARM に通学することとなり、通学日以外は TBIC にてリモートによる自習形態となりました。

このような状況の中において、学生達は修士論文作成に向け、マスク着用や密集を避ける等衛生面に気を付けながら論文の中間発表会に臨んだほか、オンラインにより指導教員から講義やアドバイスを受けました。

今般、異国の地で COVID-19 の影響下にあって、率直に感じたことや日々取り組んでいること、これまでの半年間の研修を振り返って印象に残ったこと等についてアンケートを実施し、何名かの学生達から回答を頂いたので、以下、掲載いたします。

① 異国の地で研修中に COVID-19 感染拡大の事態に巻き込まれたことに対し、率直にどのように感じていますか？また、このような事態においても、修士論文作成に向けて、日々のモチベーションを維持するために、何か工夫していることはありますか？

A: 常に論文に係る様々な課題に集中して忙しくさせることで、世界中の悪い状況について深く考えないようにしている。

B: COVID-19 が急速に世界に広まっているので、予防的な措置を講じて対応していくことが必要だと思うし、自分でも実践している。

C: 私の母国は、日本より深刻な状況なので、ある意味幸運である。私の両親や同僚が直面している事態に比べ、日本に滞在している方が、はるかに制限が少ない。

D: 日本では私達の面倒を見てくれる家族がいないので、COVID-19 の

Since 2007, ICHARM has provided a one-year master's program in collaboration with JICA and GRIPS, which is designed for officers of overseas government organizations. Students attend lectures in the first six months from October to March and work on their individual theses in the second six months from April to August.

The global pandemic of COVID-19 has had a considerable impact on this training program. The visits to the Fukuoka weir in Tsukubamirai, Ibaraki, in late March and to the Yodo River basin in the Kinki region in mid-April were canceled, and the visit to the Shinano River basin in the Hokuriku region, which was initially scheduled in early April, has been postponed.

The students have been forced to live a highly restricted life for the past few months. Not only have they refrained from going out, but they had to stay at a hotel for about a month from mid-March, instead of the Tsukuba International Center (TBIC), where they usually stay during the training.

After having returned to TBIC, the students were divided into two groups, and the two groups took turns coming to ICHARM every other day. When it was not their turn, they had to stay at TBIC and study by themselves, using an online system.

In such extremely inconvenient conditions, the students attended lectures, asked their supervisors for advice, and made interim presentations, while taking precautions against COVID-19, such as wearing masks, practicing social distancing, and using an online system.

Discussion with Supervisor on ONLINE
指導教員とのオンライン討論

Lecture from Supervisor with wearing Masks
マスクを着用した講義聴講

Recently, ICHARM asked the students some questions about how they were handling this very unusual situation, being in a foreign country under the COVID-19 crisis. They were also asked about what they found most impressive, memorable, interesting, etc., during the first half of the training program.

The following are the questions and comments from the students:

Practicing social distancing at the 2nd Interim Presentation
間隔を空けての第２回修士論文中間発表会

Q1: How do you feel about being caught in the COVID-19 pandemic during the training in Japan? And is there anything you are doing to maintain your motivation to complete your master's thesis under this gloomy circumstance?

<Student A> Every time I tried to make myself busy with different tasks so that I can avoid to think too much about the worse conditions all over the world.

<Student B> The COVID-19 spread all over the world, so we have to tackle by

some precautionary measures which I am doing.

<Student C> I feel lucky because the COVID-19 situation in my country is far worse than in Japan, and here I can experience less confinement when compared to the situation my parents and colleagues are facing.

<Student D> I feel afraid of facing with COVID-19 because in here we have no family to take care for us. But on the other hand, Japan has better medical service than my country and JICA and ICHARM really taking care of us.

<Student E> I do care of visiting crowded area and protecting my body without affecting any health problem. If I bored staying in my room, I made cooking my traditional food with my friend and exchanged our experiences during learning thesis.

<Student F> I am quite frustrated because I was expecting the Olympic Games and all the supporters from around the globe to share this unique event with the Japanese people.

Q2: Looking back at your experience in the first six months, what did you find most impressive or interesting in terms of policies and measures for water-related disaster risk reduction in Japan? And what policies or measures in Japan do you think would be or would not be useful in your country?

<Student A> I learned Japanese people have registered the facts and learnings of the past events in order to improve the future for the next generations, even in stones in ancient times.

<Student B> Japan has big past history and culture which is the most impressive for me and especially this historical and cultural period is still kept in present through some museum.

<Student C> Japanese people tend to consider the others when taking actions in their daily life, and I think that makes Japanese society more peaceful. This kind of behavior would help my country.

<Student D> Some of the structures, like underground water storage tank, in Japan are not feasible to implement in our country, but these can broaden our eyes and can have inspiration.

<Student E> The impression studying in Japan is exploring the different lifestyle and culture. On site visits, I learned highly advanced dam operation and management system and effective dam control system.

Q3: If there is anything else you would like to tell people in your organization at home or newsletter readers around the world, please comment.

<Student A> This pandemic is challenging to mankind. The only way out is to leave behind our selfishness and start thinking about the others.

<Student B> ICHARM is the good source to learn new things and easily implement in our country. ICHARM is also connecting the people from all over the world especially developing countries.

<Student C> I think we should never forget that we are part of the same world and always be aware that overcoming such a bad situation will only be possible if everyone can overcome it. I can only hope that the pandemic changes to a place where people care more for one to another.

<Student D> Our organization needs more knowledge workers and it needs to open our door to work together with the whole world.

Remember the moment at site visit
to Kochi area before COVID-19
COVID-19 感染拡大前の現場視察（高知県）

(Written by MIYAZAKI Ryosuke)

蔓延に恐怖を感じている。その代わり、日本は母国よりも医療サービスが進んでおり、JICA や ICHARM の職員の方々が、私達の面倒を非常によく見てくれている。
E: 人混みを避ける、体調に気をつけて自分の身を守るなど注意している。部屋にいて退屈なときは、同僚と母国の料理を一緒に作ったり、論文作成に向けて意見交換をしたりしている。
F: 東京オリンピックで、世界中から多くの人々が集まり、この特別なイベントを日本の人々と共に楽しめると期待していただけに、とても残念である。

② これまでの半年間の研修を振り返ってみて、日本の水災害対策の何が最も印象的で興味深かったですか？また、その中でどのような機能が自国の政策に役立ちそうですか？または、役立たなさそうですか？

A: 日本人は過去の事実や経験から学んだことを、その昔には石に刻みながらも記録することで、未来を担う次世代の人々に継承し続けていることを学んだ。
B: 日本の壮大な歴史や文化は私にはとても印象的であり、特にその歴史的、文化的遺物が今でもいくつかの博物館に残されていることが興味深かった。
C: 日本の社会が安定しているのは、日本人は日常生活の中で、常に相手の事を考えながら行動する傾向にあるからである。そのような振る舞い方が私の国にも参考になれば良い。
D: 巨大な地下貯水槽など日本のいくつかの建造物は、我々の国には適用出来ないと思われるが、我々の視野や考え方を広げてくれた。
E: 日本で勉強することで、異なった生活や文化を体験することが出来た。研修旅行では、特に最先端のダム操作・管理システムを学ぶことが出来た。

③ その他、自身の所属機関やニュースレター読者に向けて何か伝えたいことがありましたら、自由に記載願います。

A: この COVID-19 の感染拡大は、人類にとっての課題である。唯一の解決策は、自己中心的な考え方を捨て、他人を思いやる気持ちを持つことである。
B: ICHARM は新しい知識を、我々の国に適用しやすいかたちで学ぶことが出来る素晴らしい施設である。また、特に発展途上国の人々と深く連携している。
C: 我々は同じ世界に住んでいるということは忘れてはならないし、このような悪い状況を克服するには、一人ひとりがそうした状況に打ち勝たなければならないということだ。この感染拡大が、人々がお互いを常に思い遣る世界に変えてくれることを切に望む。
D: 我々の組織に必要なのは、今以上に知識の豊富な人材を確保することと、世界中の人々と協力して仕事ができるような開かれた環境を整えることである。

Action Reports from ICHARM Graduates

ICHARMでは、政策研究大学院大学（GRIPS）、国際協力機構（JICA）と連携して、世界各国から洪水対策の行政官を対象として、1年間の修士課程「防災政策プログラム　水災害リスクマネジメントコース」を実施するとともに、3年間の博士課程「防災学プログラム」を実施しています。これまで100名を超える実務者・研究者の方々が各課程を修了し、帰国後、本研修で習得された知識や経験を生かして、様々な分野において活躍されています。

ICHARMニュースレターでは、こうした卒業生の方々から、ご活躍の様子について寄稿していただくこととしております。本号では2014年度（2期）博士課程卒業のKarina Vink氏（オランダ）から寄稿いただきましたので、ご紹介します。

ICHARM provides graduate-level educational programs for foreign government officers in charge of flood risk management in collaboration with GRIPS and JICA: a one-year master's program, "Water-related Risk Management Course of Disaster Management Policy Program," and a three-year doctoral program, "Disaster Management Program."

Since their launches, over 100 practitioners and researchers have completed either of the programs. They have been practicing knowledge and experience acquired through the training in various fields of work after returning to their home countries. This section is devoted to such graduates sharing information about their current assignments and projects with the readers around the globe. Dr. Karina Vink, who graduated from the doctoral program in 2015, has kindly contributed the following article to this issue.

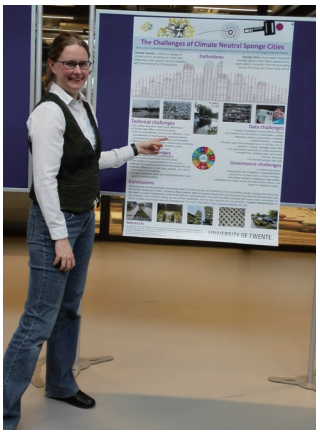
Karina Vink

Postdoctoral Researcher, University Twente, Faculty of Engineering Technology (ET), Department of Civil Engineering, Enschede, Netherlands

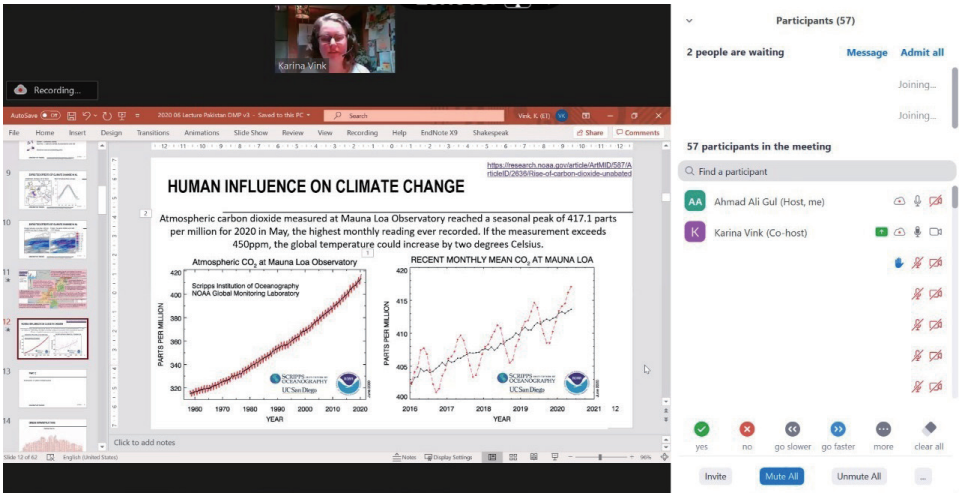
ICHARM is where I have spent most of my time in Japan, and where I have had the honor and pleasure of meeting numerous friends and expert colleagues. In total, I have spent 7 and a half exciting years in Japan, starting just half a year after the Great East Japan Earthquake and Tsunami in 2011. I was initially living in the Netherlands and applying to the ICHARM PhD program, which was just in its first year of existence. Hearing the news of the terrible disaster only strengthened my resolve to join the program and learn how to make a difference in disaster preparedness. Through the excellent guidance of Prof. Takeuchi as well as the entire staff and students, I completed the Ph.D. program in disaster management on vulnerable people and flood management policies. Afterwards, I worked at ICHARM as research specialist on risk indicators, evaluating the data requirements for existing global disaster risk indicator databases such as the UNISDR Sendai Framework. Following my career at ICHARM, I was a postdoctoral researcher at the National Institute for Materials Science (NIMS), Tsukuba, Japan. There, I analyzed the efficiency of the micro-grid using renewable energy situated at the WPI-MANA/NanoGREEN building. This entire period was truly a unique opportunity for me for gaining in-depth knowledge, building an international network, and experiencing intercultural life and friendships.

Since April 2019 I have moved back to the Netherlands with 2 new family members who were born in Japan. On behalf of my partner and myself, I want to express how greatly we appreciate all the support we received from our colleagues and friends to help make this possible. We continuously endeavor to have our children speak Japanese. Honestly, it did take a bit of adapting to being back again after such a long time, with shaking hands, cycling on the right hand side of the road, and seeing people wear shoes in their houses. Not to mention to stop bowing when speaking on the phone. All in all it was a smooth transition, again due to the help of our many family, friends, and colleagues that we were able to meet over the years. Thank you so much everyone!

I am now working as a postdoctoral researcher on urban green infrastructure, sustainable development, and disaster reduction in two departments of the engineering faculty at the University of Twente, namely: Water Engineering and Management, and Construction Management and Engineering. I have received a very warm welcome with over 70 new colleagues, who immediately embraced me as part of the team and put me to work on several projects. I have spent most of my time writing a systematic review on how the effects of urban green infrastructure on water and energy resources have been quantified, teaching in the master's course Urban Resilience in a Changing Climate, guiding bachelor and master students, and writing funding proposals. I am proud to so far have helped bring in 400,000 euro of funding to research regional energy transitions. Last year I presented my research on the Challenges of Climate Neutral Sponge Cities at the conference Extreme Events, Building Climate Resilient Cities at Hannover, Germany. During my time at the University Twente, I have found that teaching is where my true passion lies and I aim to continue to expand my experience. Recently, my network of former ICHARM students and colleagues has allowed me to give an online lecture in Pakistan for the University of Management



Presenting the Challenges of Climate Neutral Sponge Cities



Online Lecture Pakistan

and Technology about green infrastructure and urban resilience with over 50 students attending. The course coordinator is Dr. Ahmad Ali Gul, former M.Sc. and Ph.D. graduate of ICHARM, who is now part of the team developing disaster management curriculum in the UMT. I am grateful to be able to contribute to this program, and am interested in doing the same for comparable courses that you as a reader may be involved in.

Water Engineering and Management Department, University Twente

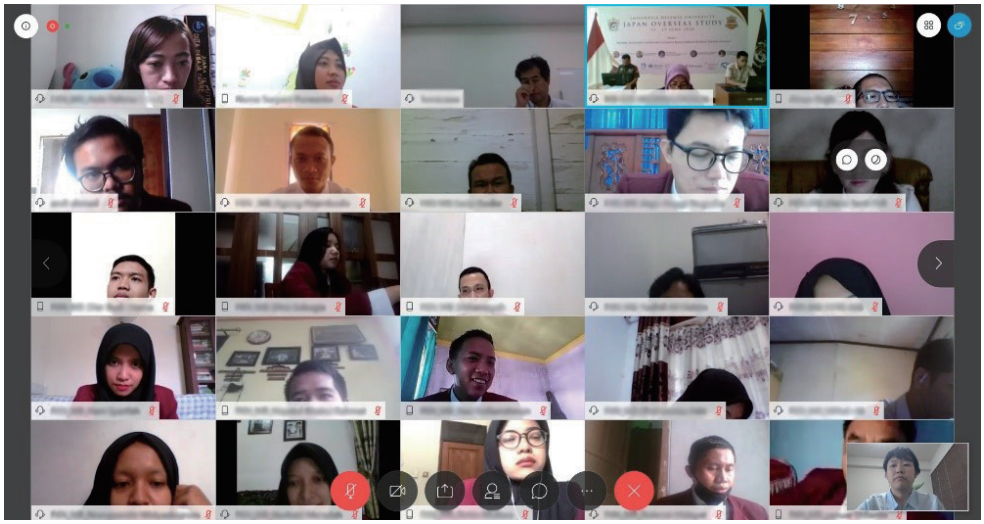
It has not been all good news though. I am very sad to report that last year one of my bosses has suddenly passed away at only 52 years of age. Professor Arjen Hoekstra was the Chair of the Department of Multidisciplinary Water Management, and I would like to take this moment to share with you more of his achievements relevant to water management professionals. Prof. Hoekstra was most famous for creating the basis for the interdisciplinary field Water Footprint Assessment, which deals with the relation between water management, consumption and trade. He also developed a variety of educational instruments, including the River Basin Game and the Globalization of Water Role Play. He led several interdisciplinary research projects and acted as an adviser to diverse governments, social organizations, companies and multilateral institutions such as UNESCO and the World Bank. Just last year, Prof. Hoekstra received the ERC Advanced Grant, Europe's most prestigious research award. We are working very hard as a team to continue his work with the partners of the various international networks. You can still find his work on the water footprint assessment and more on the website http://www.ayhoekstra.nl/.

Currently the whole world is facing the consequences of the COVID-19 pandemic. We are very lucky to have been able to continue our educational and research activities at the University of Twente as much as possible through online means. I am well aware this is not the case everywhere, and many people are confronted with increasingly dire circumstances when having to deal with lockdown measures on top of already difficult livelihoods. How we as a global society can reach the Sustainable Development Goals is on my mind daily. I feel fortunate that technology allows us to connect and discuss new ideas for incremental improvements and sustainable transformations. I therefore encourage you to stay actively connected to your fellow students and colleagues through ICHARM, and to join more existing networks that promote sustainable change, such as Future Earth. I have learned that focusing only on water is not enough if we want to reach our water related targets. We must consider related SDGs and issues not yet covered by the SDGs, whether they contribute to reaching water goals or lead to drawbacks, and how we can make sure all involved stakeholders are heard and helped. I look forward to working together with experts in an ever expanding network thanks to ICHARM's education and institutional capacity.

ICHARM provided e-learning lectures to Indonesia Defense University
インドネシア防衛大学へ e-learning 講義を行いました

6月16日、ICHARMでは昨年に引き続いてインドネシア防衛大学の訪日研修の一環として「水関連災害とリスクマネジメント手法」に関する講義を行いました。今年はCOVID-19の影響によりインドネシア防衛大学側が訪日を見合わせたため、ウェブによるe-learning講義を行いました。講義に先立ち、インドネシア防衛大学を代表してDr. Amarulla Octavian中将からご挨拶と研修の位置づけ等の説明を頂きました。その後、伊藤弘之グループ長からICHARMの活動概要を紹介するとともに、牛山朋來主任研究員、傳田正利主任研究員、大原美保主任研究員からそれぞれ専門的な研究テーマについて講義を行いました。講義にはインドネシア防衛大学関係者18名と学生30名の計48名が参加しました。Dr. Christine Sri Marmaniの円滑なコーディネートの下で進められ、参加者から多くの質問が寄せられるなど、活発な議論が行われました。

On June 16, 2020, ICHARM provided a series of lectures on "Water Related Hazard and Risk Management Measures" for students and faculty members of Indonesia Defense University, following the ones that were delivered last year. Since they were restrained from visiting Japan due to the COVID-19 pandemic, the lectures were conducted in an e-learning style this year. At the beginning, Vice Admiral Dr. Amarulla Octavian gave greetings and explained the objectives of the training as a representative of the university. Then, Deputy Director ITO Hiroyuki outlined ICHARM's activities, and Senior Researchers USHIYAMA Tomoki, DENDA Masatoshi, and OHARA Miho gave lectures on their research topics. A total of 48 participants, consisting of 18 faculty members and 30 students, joined the e-learning lectures. Thanks to the smooth coordination by Dr. Christine Sri Marmani, all the participants actively joined discussions, asking many questions.



Participants in the e-learning lectures
e-learning 講義の参加者

(Written by IKEDA Tetsuya and TOMIZAWA Yosuke)

Others

Publications / 発表論文リスト

* April - June 2020

1. Journal, etc / 学術雑誌（論文誌、ジャーナル）

- *原田大輔、江頭進治、柿沼太貴、南雲直子、伊藤弘之、2019年台風19号による阿武隈川水系五福谷川における多量の土砂を含む洪水流の特徴、河川技術論文集、No.26、pp.609-614、河川技術シンポジウム（大会開催はキャンセル）、2020年6月*
- *柿沼太貴, 中村要介, 伊藤弘之, 池内幸司, 複数洪水イベントの組み合わせによる洪水予測に適したRRIモデルパラメータの最適化手法に関する検討, 河川技術論文集、No.26、pp.199-204、河川技術シンポジウム（大会開催はキャンセル）、2020年6月*

2. Oral Presentation (Including invited lecture) / 口頭発表（招待講演含む）

- *HARADA Daisuke, EGASHIRA Shinji and ITO Hiroyuki, Characteristics of active sediment transport processes in extreme flood hazards, Proceedings of River Flow 2020, River Flow 2020 (Online), July 6-10, 2020*

3. Poster Presentation / ポスター発表

None / 該当者無し

4. Magazine, Article / 雑誌、記事（土技資含む）

None / 該当者無し

5. PWRI Publication / 土研刊行物（土研資料等）

None / 該当者無し

6. Others/ その他

- *牛山朋來、小池俊雄、利根川流域を対象とした気象庁1か月アンサンブル予報のダウンスケーリング、日本気象学会2020年度春季大会講演予稿集、p.177、日本気象学会（大会開催はキャンセル）*

Thank you very much for reading ICHARM Newsletter No.57.

The worldwide infection of COVID-19 is still spreading and is not expected to end anytime soon. In Japan, too, the situation remains unpredictable, though the state of emergency, issued across the country in early April, had been lifted a while before. Because of that, I think it is important for each individual to continue to take whatever measures they can.

On the other hand, a large-scale flood disaster occurred just this month, July 2020, and caused serious damage especially to the Kyusyu region in southern Japan, leaving 85 people dead or missing. Experts have warned people that when a disaster occurs amid the COVID-19 crisis, the situation will require flood disaster response that the nation has never imagined before, and they have just learned it by experience.

This issue features special contributions on flood disasters due to Typhoon Hagibis in 2019, which induced severe damage particularly to eastern Japan. It also shares with readers ICHARM's efforts for addressing flood disasters considering the prevention of COVID-19 infection. We at ICHARM hope that the information presented in this newsletter will be of any assistance for readers to effectively implement flood disaster management in an unprecedented situation that they may face in the future.

ICHARM Newsletter Editorial Committee
MOROOKA Yoshimasa

ICHARM ニュースレター第 57 号をご覧いただき、ありがとうございます。

新型コロナウイルス感染症 (COVID-19) の世界的な感染拡大は依然として収束が見込めず、日本でも 4 月初めに発出された緊急事態宣言は既に解除されたものの、未だ予断を許さない状況です。引き続き、一人一人ができる対策を講じていくことが重要だと思います。

一方で、令和 2 年 7 月豪雨によって大規模な水害が発生し、全国の死者・行方不明者が 85 名に達するなど、COVID-19 災禍においてこれまで経験したことがないような水害対応が必要となっています。

今号では、特に東日本で甚大な被害がもたらされた 2019 年東日本台風による洪水についての特別寄稿と、COVID-19 の感染防止を考慮した洪水災害に向けた ICHARM の取り組みを紹介しました。これらの記事でご紹介した内容が、これから起こりうる未曾有の状況下での水害対策の一助となれば幸いです。

ICHARM ニュースレター
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