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# ICHARM

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

## Message from Executive Director

### Resilience to Two Risks at Two Levels

Two years have passed since the COVID-19 pandemic broke out. Forced to respond to fearful impacts by the unknown virus under scientific uncertainty, each nation has been strengthening medical examinations and systems and transforming the society. These are literally ongoing efforts to improve national resilience. At the same time, the world has started realizing the urgent need to jointly establish transnational resilience to cope with attacks in waves by new variants and reduce vaccination coverage gaps associated with income inequality.



With the ICHARM students gathered around the statue of Prof. HIROI Isami, in Sagawa-cho, Kochi Prefecture, Japan, 16th December 2021.  
ICHARM 留学生と廣井勇先生の像を囲んで  
(2021年12月16日高知県佐川町)

Comparison among the outcome documents of three UN world conferences on disaster risk reduction, "Yokohama Strategy and Plan of Action for a Safer World," "Hyogo Framework for Action 2005-2015," and "Sendai Framework for Disaster Risk Reduction 2015-2030," suggests that the emphasis on resilience became stronger with each meeting. The IPCC Fifth Assessment Report defines climate-resilient pathways by combining mitigation and adaptation to realize the goal of sustainable development. While acknowledging that national governments have the primary responsibility for disaster risk reduction, the report particularly stresses that a joint effort by the international community is imperative to fight climate change and promote sustainable development.

When UN Secretary-General A. Guterres addressed the 76th Session of the UN General Assembly, he pointed out, "COVID and the climate crisis have exposed profound fragilities as societies and as a planet." The world has come to recognize both national and transnational vulnerabilities. The recognition, however, is only possible because of the global efforts that have been made incessantly. The world could not identify these two levels of vulnerability and cooperate in developing a framework of what should be done without historical efforts to establish the political vision of sustainable development based on critical discussions about development and environment since 1972 and approving the SDGs in 2015. International response to COVID-19 and climate change is the touchstone for improving resilience at the two levels and achieving sustainable development.

### 2つの危機に対する2つのレベルのレジリエンス

新型コロナウイルス感染症 (COVID-19) による災禍が勃発して2年が経過しました。科学的不確実性の下で、感染拡大の衝撃に対して、国を挙げて検査・医療体制を構築・強化しつつ、社会の変容 (トランスフォーメーション) による取り組みが続けられています。まさに実時間の国家のレジリエンス向上の挑戦と言えます。一方、各国のワクチン接種率に著しい所得格差が認められる中、新たな変異株の出現による波動的な脅威に対応するためには、国境を越え、世界が一体となってレジリエンス向上に取り組む (トランス・ナショナル・レジリエンス) 必要性も肌身で感じるようになってきました。

これまで開催された3回の国連防災世界会議の成果文書、『横浜戦略 (1994)』、『兵庫行動枠組 (2005)』、『仙台防災枠組 (2015)』を比較すると、回を追うごとにレジリエンスの向上が重視されてきた傾向を読み取ることができます。2014年のIPCCの第5次評価報告書では、持続可能な開発目標を実現するために緩和と適応を組み合わせて、開発のための気候レジリエンスの道筋が定義されています。防災分野では一義的な責任は国家にあるとされているのに対して、気候変動や持続可能な開発の分野は国際社会が一体となって取り組むべき点が強調されています。

A. グテーレス国連事務総長は第76回国連総会 (2021年9月) にて、「COVID-19と気候危機は、社会として、そして地球としての深刻な脆弱性を露呈させました」と述べています。COVID-19を通して、私たちは、国家としての脆弱性と、国境を超えた一体としての世界の脆弱性を再認識することになりました。一方で、1972年以降の環境と開発の関わりを踏まえて持続可能な開発の政治理念を確立し、その実行目標を定めてきた歴史がなければ、これら二つのレベルでの脆弱性を認識し、その改善のための枠組はどうあるべきかについてすら考えが及ばなかったとも言えます。COVID-19および気候変動への対応は、二つのレベルのレジリエンスの向上と、持続可能な開発目標達成のための試金石と言えます。

January 31, 2022

KOIKE Toshio

Executive Director of ICHARM

## International Flood Initiative (IFI)

3. E-learning & Workshops for Strengthening Water-related Disaster Resilience and Achieving Sustainable Development under Climate Change by ALL / インドネシアに対する e ラーニング・ワークショップ「気候変動下における水災害レジリエンスと持続可能な開発」
5. ICHARM hosted the AWCI Session prior to the 14th AOGEO Symposium / 第 14 回アジア・オセアニア地球観測に関する政府間会合 (AOGEO) アジア水循環イニシアティブ (AWCI) セッションの主催と AOGEO シンポジウム

## Research

6. ICHARM held the 67th R&D Seminar / 第 67 回 ICHARM R&D セミナー
7. HyDEPP-SATREPS Project Updates: Webinar and Joint Coordination Committee (JCC) / HyDEPP-SATREPS プロジェクト活動報告：一般公開ウェビナー & 合同調整会議
8. Introduction of ICHARM research projects / 研究紹介
  8. KAWAMOTO Takatoshi, Senior Researcher [Japan's strategies to expand its infrastructure systems and other technologies and expertise to overseas countries] / 河元隆利 主任研究員「インフラシステム海外展開戦略の紹介」
  10. TAMAKAWA Katsunori, Research Specialist [Investigation of dam operations for effective flood control and hydro power generation] / 玉川勝徳 専門研究員「発電ダムを対象とした洪水調節と発電効率向上のためのダム操作に関する検討」

## Training & Education

13. Educational program updates / 研修活動報告
15. Comments from new doctoral course students / 博士課程 新研修員からのコメント
16. Comments from new master's program students / 修士課程 新研修員からのコメント
18. Action Reports from ICHARM Graduates
  18. Robin Kumar Biswas, Superintending Engineer (Civil), Directorate of Planning-III, Bangladesh Water Development Board

## Information Networking

20. Typhoon Committee 10th meeting of Working Group on Hydrology and 16th Integrated Workshop / 台風委員会 第 10 回水文部会および第 16 回統合部会
21. "ICHARM Webinar 2021: Interaction with students and young researchers" was held / ICHARM Webinar 2021 - 学生・若手研究者との交流 -
22. Public symposium at National Conference for Promoting Disaster Risk Reduction 2021 / ぼうさいこくたい 2021 公開シンポジウム
22. Participation in the 28th UNESCO-IHP Regional Steering Committee Meeting for Asia and the Pacific / 第 28 回ユネスコ IHP アジア太平洋地域運営委員会への参加

## Coming Events

23. Follow-up Seminar for ICHARM Graduates
24. The ICFM9 website is now open / ICFM9 Website が開設されました

## Miscellaneous

24. New logo of ICHARM / ICHARM のロゴデザインを変更します
25. Awards / 受賞リスト
25. Publications / 発表論文リスト

## Editor's Note / 編集後記

### Request to participate in online survey on ICHARM Newsletter

#### ICHARMニュースレター購読者アンケートのお願い

ICHARM では、2006 年 3 月の設立以降、最新の動向をお知らせする「ICHARM ニュースレター」を、年 4 回発行しています。

このたび、一層の内容の充実を図るべく、読者の皆様にアンケートをさせて頂きたく存じます。

つきましては、以下のサイトにアクセス頂き、アンケートにお答え下さい。

<https://forms.gle/863TrKAjP5SBirik9>

回答期限：2022 年 4 月 27 日まで

回答時間 (目安)：5 分程度

Thank you for subscribing ICHARM Newsletter. ICHARM has been publishing the quarterly newsletter since its establishment in March 2006 to deliver the latest news about research, projects and other activities to readers around the world. As we are currently working on the improvement of the newsletter, we would be grateful if you could spare time to answer the following questions and let us hear your voices about our publication.

Survey posted at: <https://forms.gle/863TrKAjP5SBirik9>

Survey to be done by: 27 April 2022

Time required: about 5 minutes

# International Flood Initiative (IFI)

The International Flood Initiative (IFI) is a worldwide framework to promote collaboration in flood management among international organizations such as UNESCO, the World Meteorological Organization (WMO), the United Nations University (UNU), and the United Nations Office for Disaster Risk Reduction (UNDRR). ICHARM has been its secretariat since the establishment of IFI.

In October 2016, the Jakarta Statement towards an interdisciplinary and transdisciplinary partnership to consolidate flood risk reduction and sustainable development was adopted by the member organizations of IFI. Based on the statement, ICHARM has eagerly engaged in activities that contribute to integrated flood management in collaboration with various countries and related organizations.

This article reports the e-learning and workshops conducted as a recent effort by the Indonesia IFI platform and also an AWCI Session event, in which the IFI platform members participated prior to the 14th AOGEO Symposium.

国際洪水イニシアティブ (International Flood Initiative: IFI) はユネスコ (UNESCO)、世界気象機関 (WMO)、国連大学 (UNU)、国連防災機関 (UNDRR) などの国際機関が世界の洪水管理推進のために協力する枠組みで、ICHARM は、IFIの事務局を担当しています。

2016年10月に承認された「洪水リスク軽減と持続可能な開発を強固にするための学際的な協力に向けた宣言文 (ジャカルタ宣言)」を受け、各国および関係機関と協働しながら、統合洪水マネジメントに貢献する活動を進めています。

本号では、IFIの活動紹介として、インドネシアIFIプラットフォームにおけるeラーニング・ワークショップの取組と、IFIプラットフォームメンバー国が参加した第14回アジア・オセアニア地球観測に関する政府間会合 (AOGEO) アジア水循環イニシアティブ (AWCI) セッションについて報告します。

## E-learning & Workshops for Strengthening Water-related Disaster Resilience and Achieving Sustainable Development under Climate Change by ALL

インドネシアに対する e ラーニング・ワークショップ「気候変動下における水災害レジリエンスと持続可能な開発」

ICHARM recently provided e-learning and workshops for Indonesian government officers working to solve issues related to climate change. The training program lasted for a month from October 5 to November 5, 2021, in the framework of "Strengthening Water-related Disaster Resilience and Achieving Sustainable Development under Climate Change by ALL."

As an activity of the International Flood Initiative (IFI), for which ICHARM has served as the secretariat, Indonesia has organized the "Platform on Water Resilience and Disasters," consisting of the Ministry of Public Works and Housing (PUPR), the National Disaster Management Authority (BNPB), the Agency for Meteorology, Climatology, and Geophysics (BMKG), the Ministry of Environment and Forestry (KLHK), and the Ministry of Agriculture (KP). This e-learning opportunity was provided as part of this effort.

The aims of the e-learning and workshops were to provide capacity building training for government officers and strengthen the collaboration among water-related ministries to help local stakeholders increase water-related disaster resilience and achieve sustainable development under climate change. The participants were 35 government officers from six ministries, i.e., the five ministries of the platform and the National Institute of Aeronautics and Space (LAPAN).

The e-learning program had three courses: the participants learned about climate change in course-1, government actions in course-2, and operation and management in course-3. The lectures were produced and delivered through collaboration among Japanese government agencies and other organizations, such as the Secretariat of the Water Cycle Policy Headquarters of the Cabinet Secretariat, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Japan Meteorological Agency (JMA), the Japan Water Agency (JWA), the Japan Aerospace Exploration Agency (JAXA), Tohoku University, and ICHARM. The e-learning program was designed for trainees to study in their mother tongue as much as possible. The lecture materials were prepared with English text and Indonesian audio for self-learning. Assignments were given in English, but the participants were allowed to submit them in the local language. Also, three joint workshops using a web conference tool were held between Japanese instructors and local participants with Q&A and knowledge-sharing sessions using Indonesian-Japanese simultaneous interpretation.

The opening session was held on October 5 with 70 participants by ministries and other related agencies of the Japanese and Indonesian governments. At the session, H.E. Dr. Basuki Hadimuljono, the minister of PUPR, delivered a video message to celebrate the opening of the training event. Several representatives then delivered a speech,

ICHARM は、2021年10月5日から11月5日までの1か月間、インドネシアで気候変動に携わる行政担当者を対象とした e ラーニング・ワークショップ「気候変動下における水災害レジリエンスと持続可能な開発」を開催しました。

インドネシアでは、ICHARM が事務局を務める IFI (国際洪水イニシアティブ) の活動の一環として、公共事業・国民住宅省 (PUPR)、国家防災庁 (BNPB)、気象気候・地球物理庁 (BMKG)、環境・森林省 (KLHK)、農業省 (KP) が連携する「水のレジリエンスと災害に関するプラットフォーム」が設置されています。この e ラーニングの目的は、気候変動に適応した水災害のレジリエンスの確保や持続可能な開発のための担当者の人材育成及び関連行政機関間の連携強化であり、プラットフォーム参加機関に加え、国立航空宇宙研究所 (LAPAN) の計 6 機関から合計 35 名の行政担当者が参加しました。

内閣官房水循環政策本部事務局、国土交通省、気象庁、水資源機構、JAXA、東北大学、ICHARM という、我が国の行政、実務、教育、研究機関が協力して開発したこの e ラーニングは、「コース 1. 気候変動の科学」、「コース 2. 政府の取組」、「コース 3. 運営管理方法」の 3 つのコースで構成されています。今回の e ラーニングは母語での習得に配慮して、英語表記に加えてインドネシア語音声での解説を収録した教材が自習用に提供されるとともに、英語で示された課題の提出についてもインドネシア語で回答を受けました。また、コース毎に、Web 会議ツールを活用したインドネシア語・日本語の同時通訳を用いた協働ワークショップを開催し、講義解説やナレッジシェアリングが行われました。

10月5日に開会セッションが行

われ、日本・インドネシア両国政府・関係機関等から計70名が参加しました。同セッションでは、PUPRのバスキ大臣からビデオメッセージが寄せられ、続いて、PUPR水資源総局のエコ・イリアント局長、BNPB早期警報課のアフリエル・ロシャ課長、BMKG気候部のウリップ・ハヨコ副部長、KLHK流域管理計画評価局のプラボ副局長、KP農業灌漑局のリスダ・シナガ副局長から、eラーニングへの期待とICHARMへの感謝等が述べられました。日本からは内閣官房水循環政策本部事務局の三橋さゆり事務局長をはじめ、国土交通省の古市秀徳国際室長、気象庁の細見卓也センター長、水資源機構の鈴木俊朗国際監、JAXAの久保田拓志主幹、東北大学の木間香貴教授から、各機関を代表して挨拶を行いました。

「コース1.気候変動の科学」の協働ワークショップは10月12日に開催され、インドネシア側から33名、日本から15名の計48名が参加し、ソロ川流域の気候変動影響評価をケーススタディとして、気候変動解析モデルや解析結果の評価方法等について意見交換が行われました。「コース2.政府の取組」の協働ワークショップは10月19日に開催され、インドネシア側から34名、日本から16名の計50名が参加し、流域治水や健全な水循環に向けた日本政府の取組等を事例として、気候変動の適応策を検討する際の政府の役割や取り組むべきアクションについて意見交換が行われました。「コース3.運営管理方法」の協働ワークショップは10月26日に開催され、インドネシア側から30名、日本から6名の計36名が参加し、インドネシアのダム再生プロジェクトであるスタミダムやビリビリダムを事例として取り上げ、ダム等の施設の改良・管理計画の立案方法や運用の改善方法等について意見交換が行われました。

11月5日には閉会セッションが行われ、eラーニング参加者35名のうち32名が合格の基準を満たし、修了証明書が発出されました。これら受講者には、eラーニング・ワークショップを通じて学習した気象、水文、リスクマネジメント等の分野の科学的知見を踏まえ、持続可能性とレジリエンスを高める政策の立案と実行をリードするファシリテータとして活躍することが期待されています。また、閉会式ではインドネシア国参加各機関の代表から謝辞が述べられ、この包括的な内容を実務に活かすための次のステップに向けた協力への期待が表明されました。日本側機関との協働のもと、ICHARMは引き続き、インドネシア政府の能力開発を支援して参ります。

expressing their high expectations for the training, including Dr. Ir. Eko Winar Irianto, the director of the Directorate of Water Resources Technical Management of PUPR, Mr. Afrial Rosya, the director of the Early Warning Directorate of BNPB, Dr. Urip Haryoko, the deputy head for climatology of BMKG, Mr. Prabowo, the head of the sub directors of the Directorate of Planning and Evaluation of Watershed Management of KLHK, and Mrs. Risda Sinaga, the deputy director of the Agricultural Irrigation Directorate of KP. From the Japan side, six representatives also spoke to welcome and encourage the participants on behalf of each organization: Ms. MITSUHASHI Sayuri, the director-general of the Secretariat of the Water Cycle Policy Headquarters of the Cabinet Secretariat, Mr. FURUICHI Hidenori, the director of the International Affairs Office of the River Planning Division of the Water and Disaster Management Bureau of MLIT, Mr. HOSOMI Takuya, the head of the Tokyo Typhoon Center of JMA, Mr. SUZUKI Toshiro, the director general for international affairs of JWA, Dr. KUBOTA Takuji, a senior researcher of JAXA, and Prof. HOMMA Koki of Tohoku University.

Course-1 of the workshop was held on October 12. The participants were 33 Indonesians and 15 Japanese. In this course, by taking the project for the Solo River basin in Indonesia as a case study, four lectures about a climate change analysis model and a method to evaluate analysis results were delivered with a Q&A and knowledge-sharing session.

Course-2 was held on October 19 with 34 Indonesian and 16 Japanese participants. In this course, five lectures were delivered about the roles and actions that governments are expected to perform in planning and carrying out climate change adaptation measures while presenting cases of Japan's policies such as "River Basin Disaster Resilience and Sustainability by All" and "Water Cycle Management for Sustainable Water Cycle." The lectures accompanied by a Q&A and knowledge-sharing session were conducted.

Course-3 was held on October 26 with 30 Indonesian and 6 Japanese participants. In this course, four lectures were delivered about planning the improvement and management of dam functions and operations by citing the dam upgrading projects of the Sutami Dam and the Bili-Bili Dam in Indonesia as case studies. The lectures were conducted with a Q&A and knowledge-sharing session.

The closing session was held on November 5. Out of the 35 participants, 32 met all the required criteria and completed all three courses with a certificate issued by ICHARM. The successful participants are expected to play a leading role as facilitators in planning and implementing policies that ensure sustainable development and water-related disaster resilience, based on scientific knowledge in different fields, including meteorology, hydrology, and risk management, which is learned through e-learning and workshops. In addition, during the session, the representatives of the Indonesian organizations expressed words of appreciation and their expectations for cooperation toward the next step to put the comprehensive achievement into practice in the country. ICHARM will continue to support the Indonesian government in capacity building in cooperation with government agencies and other organizations in Japan.



Photo 1 Video message from the minister Basuki at the opening session  
写真1 開会セッションでのバスキ大臣からのビデオメッセージ

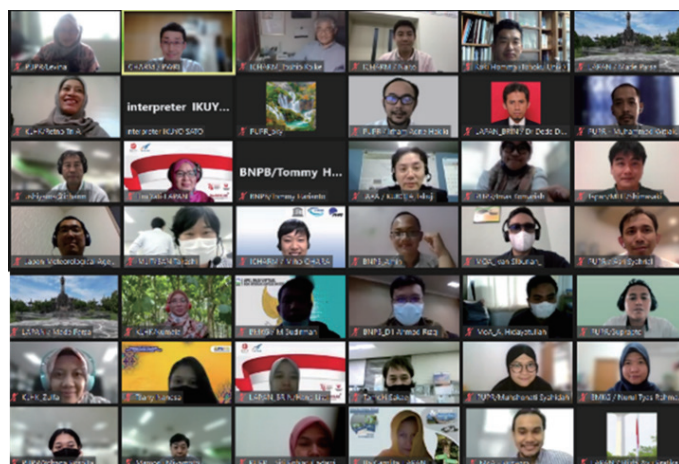


Photo 2 Participants in the e-learning & workshops  
写真2 eラーニング・ワークショップの参加者

(Written by KAWAMOTO Takatoshi)

## ICHARM hosted the AWCI Session prior to the 14th AOGEO Symposium

第14回アジア・オセアニア地球観測に関する政府間会合 (AOGEO)

アジア水循環イニシアティブ (AWCI) セッションの主催と AOGEO シンポジウム

The Asian Water Cycle Initiative (AWCI) Session was convened online on October 29, 2021, as a sectional meeting of the 14th Asia-Oceania Group on Earth Observations (AOGEO) Symposium. More than 50 people participated, including directors from related organizations in the Philippines, Sri Lanka, and Indonesia. In this session, among the activities of the IFI Platforms on Water Resilience and Disasters and SATREPS, each country reported on the development of the Online Synthesis System for Sustainability and Resilience (OSS-SR) and the implementation status and future plan of the facilitator training, which were agreed on at the 13th AOGEO meeting.

Country reports related to the activities of the Platforms on Water Resilience and Disasters were presented by the representatives of the Philippines, Sri Lanka, and Indonesia. The representatives of the Philippines delivered a presentation on fostering facilitators using an e-learning system in Davao and the activities of the project called the "Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines (HyDEPP)" and explained Typhoon Kompasu, which caused the severe damage to the Philippines. From Sri Lanka, the representatives delivered a presentation on the background of the platform in Sri Lanka, the introduction of an early warning system for the Mahaweli River, and plans for capacity development using an e-learning system. From Indonesia, the representatives delivered a presentation on a recent project, "E-learning & Workshops for Strengthening Water-related Disaster Resilience and Achieving Sustainable Development under Climate Change by ALL" and explained the activities of their ministries for climate change adaptation in Indonesia.

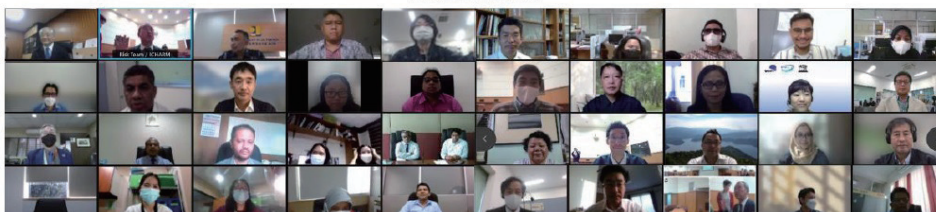
In addition, three experts in respective fields spoke about cutting-edge research and development: Prof. HOMMA Koki of Tohoku University on agriculture and food, climate change and water use, Associate Prof. YOSHIDA Takehito of the Research Institute for Humanity and Nature of the University of Tokyo on ecosystem-based disaster risk reduction, and Prof. KAWASAKI Akiyuki of the University of Tokyo on floods and poverty.

Based on these discussions, AWCI's implementation plan for 2022 and beyond was discussed. The participants agreed to further integrate OSS-SR as a key knowledge base in each Platform and accelerate fostering facilitators by making effective use of e-learning, and promote the Water Cycle Consilience in cooperation with various socio benefit areas related to the Quality of Life (QoL), such as water-related disaster risk reduction, urbanization, ecosystems, food, energy, poverty, health, education, and labor.

The discussion results in the AWCI session were reported at the 14th AOGEO Symposium (<https://aogeo.net/2021-14th/>), which was held online from November 10 to 12. The development of OSS-SR, the fostering of facilitators, and the promotion of the Water Cycle Consilience, all proposed in the AWCI session, were unanimously agreed and successfully reflected in the final statement of the symposium.

### AWCI ASIAN WATER CYCLE INITIATIVE (AWCI) Session Participants

October 29, 2021



The participants of the AWCI session  
AWCIセッションの参加者

(Written by KAWAMOTO Takatoshi)

2021年10月29日に第14回アジア・オセアニア地球観測に関する政府間会合 (AOGEO) の分科会としてアジア水循環イニシアティブ (AWCI) セッションをオンラインで開催し、フィリピン、スリランカ、インドネシアの関係機関から局長、課長級の代表を含む50名以上が参加しました。同セッションでは、国際洪水イニシアティブ (IFI) における「水のレジリエンスと災害に関するプラットフォーム」や SATREPS の活動の一環として、第13回 AOGEO 会合で合意されたオンライン知の統合システム (OSS-SR) の開発とファシリテータ育成の計画内容や実施状況が各国から報告されました。

水のレジリエンスと災害に関するプラットフォームについての国別報告において、フィリピンからは、eラーニングを用いたダバオ市のファシリテータ育成の取組と今後の展望、気候変動下での持続的な地域経済発展への政策立案のためのハイブリッド型水災害リスク評価の活用 (HyDEPP-SATREPS) プロジェクトの実施状況、フィリピンを襲った近年の台風被害 (KOMPASU) の状況が報告されました。スリランカからは、スリランカのプラットフォームの構築の経緯、マハウエリ川を対象とした早期警報システムの導入やeラーニング等を用いた人材育成に係る計画が紹介されました。インドネシアからは、eラーニング&ワークショップに関する取組状況が紹介された他、気候変動適応に向けた関係省庁のそれぞれの取組が紹介されました。

また、テーマ別プレゼンテーションにおいては、農業・食料と気候変動及び水利用、生態系を活用した防災・減災、そして洪水と貧困について、それぞれ東北大学の本間春貴教授、東京大学の吉田丈人准教授、東京大学の川崎昭如特任教授より最先端の研究開発内容が紹介されました。

これらを受けて、AWCIの将来計画を議論し、主要な知識ベースとして OSS-SR の IFI プラットフォームへの統合とeラーニングを有効活用したファシリテータ育成を加速化するとともに、水災害と都市化、生態系、食料、エネルギー、貧困・健康・教育・労働を含む生活の質 (QoL) との統合的な取り組みによって「水循環知の統合 (Water Cycle Consilience)」を推進することを記した WG 報告をとりまとめました。

これらの議論の結果は、11月10日から12日にオンラインで開催された第14回 AOGEO シンポジウム (<https://aogeo.net/2021-14th/>) において報告され、AWCIから発信された OSS-SR の構築やファシリテータの育成、水循環知の統合を推進することが合意され、ステートメントに反映されました。

# Research

## ICHARM held the 67th R&D Seminar 第 67 回 ICHARM R&D セミナー

ICHARM では、水災害分野に関する国内外の専門家を招聘し、最新の研究や知見について講演いただき、参加者の研鑽を深める機会として、「ICHARM R&D セミナー (ICHARM 研究開発セミナー)」を不定期に開催しています。

第 67 回を迎える今回は、慶応義塾大学経済学部名誉教授／金融庁金融研究センター長等を兼任される吉野直行氏を講師としてお招きし、2021 年 11 月 30 日に開催されました。「Private Financing in Infrastructure by Use of Spillover Tax Revenues and Its Application to the Estimates of Disaster Damage」と題された講演では、インフラ整備により地域経済が活性化し、もたらされる“過剰税収入”の考え方や、民間部門をインフラ整備に参画させ、生まれた余剰税収入を参画者に再分配することによりインフラ整備および地域経済発展を促進する研究について、海外での事例を交えてご講演頂きました。

経済分野は ICHARM にとっては比較的なじみの薄い分野でしたが、講演内容は国や国土交通省が推進する「流域治水」と親和性が高く、大変有意義な内容でした。「流域治水」は集水域から氾濫域にわたる流域に関わるあらゆる関係者が共同して水災害対策を行う考え方で、行政のみならず住民や民間部門の参画が欠かせません。講演では、余剰税収入再分配のコンセプトを民間部門の防災インフラ投資に適用することにより、レジリエンスの強化、さらに地域経済活性化につながる事が示唆されました。

ICHARM ではこれまで水災害や気候変動、リスクマネジメントの観点から研究を行い、流域治水の推進に取り組んできました。これに経済分野からの観点を付加することにより、さらに包括的に水災害対策やリスク評価ができると考えられます。

ICHARM では今後も様々な機会を捉え、幅広い分野から水災害・リスクマネジメントに関わる知見を広めるべく、セミナーを開催していく所存です。

ICHARM has been organizing R&D (Research and Development) Seminars on an irregular basis to provide researchers with opportunities for self-development and updating themselves with the latest research by inviting domestic and international experts in the field of risk management and water-related issues.

The 67th R&D Seminar was held on November 30, 2021, by inviting Dr. YOSHINO Naoyuki, an emeritus professor of Keio University and the executive director of the Financial Research Center, among other affiliations, as the speaker. In the lecture, which was titled “Private Financing in Infrastructure by Use of Spillover Tax Revenues and Its Application to the Estimates of Disaster Damage,” Dr. YOSHINO explained “spillover tax revenues,” which are an increased tax revenue due to infrastructure investments and enhanced economic activities. He also highlighted the importance of appropriate redistribution of spillover tax revenues to encourage the participation of the private sector in infrastructure investment, with example cases from overseas. This concept is highly in harmony with “River Basin Disaster Resilience and Sustainability by All,” Japan’s new policy for water-related disaster risk reduction. It views a watershed as an integrated space including the watershed and the floodplain area, and requires national and local governments, private companies, residents, and water users to take concerted actions to promote disaster resilience and sustainability. The lecture indicated that social systems should be organized in a way that the private sector can benefit from investing in disaster reduction infrastructure, which plays a critical role in increasing social resilience to water-related disasters.

ICHARM has been making efforts to the promotion of this new policy by conducting studies primarily on water-related hazards, such as flooding and climate change, and risk management. The seminar, however, provided new perspectives and taught the importance of considering the financial aspect in promoting and implementing such a policy, which requires the participation of both public and private sectors.

ICHARM members are determined to widen the research perspective to further contribute to water-related disaster reduction. ICHARM will continue organizing seminars at various opportunities in the future for further knowledge development on water-related issues from a wide range of perspectives.



Picture 1 A scene from the lecture  
写真 1 ご講演の 1 コマ



Picture 2 Group photo with audience  
写真 2 参加者との集合写真

(Written by NAITO Kensuke)

## HyDEPP-SATREPS Project Updates: Webinar and Joint Coordination Committee (JCC)

### HyDEPP-SATREPS プロジェクト活動報告：一般公開ウェビナー & 合同調整会議

The Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy under Climate Change in the Republic of the Philippines (HyDEPP-SATREPS) is a 5-year joint research project between Japan and the Philippines under the Science and Technology Research Partnership for Sustainable Development (SATREPS). Since the kick-off of the project in June 2021, ICHARM and collaborative institutions, both in Japan and the Philippines, have been conducting various activities.

An open webinar titled "HyDEPP-SATREPS Research Project on Experience of Typhoon Ulysses Disaster" was held on November 5, 2021, about a year after the typhoon hit the Luzon Island of the Philippines on November 12, 2020, causing catastrophic damage. This webinar was organized to mark one year after the disaster and share research achievements related to the disaster. Therefore, the webinar was open to the public, attended by a total of 243 people, including 186 non-project members.

In the webinar, researchers from both countries presented their studies on Typhoon Ulysses. ICHARM Research Specialist AIDA Kentaro was among them and spoke about an online system using Google Earth Engine, which can integrate flood damage information detected by satellites, such as inundation area, and municipal level's flood damage reported in a series of situational reports published by the National Disaster Risk Reduction and Management Council (Picture). The system was used to comprehensively compile the data and information on flood damage caused by Typhoon Ulysses. Dr. Patricia Sanchez, the project manager at the University of Philippines Los Baños, presented the preliminary results of the interview survey on the assessment of the damage caused by the disaster. The webinar was successfully closed with a panel discussion, where many questions and comments were made by the project members and the public.

On November 17, 2021, two weeks after the webinar, an online Joint Coordination Committee (JCC) meeting was held. The committee meets twice a year, gathering the representatives of the research organizations, collaborative institutions, and funding agencies (JICA and JST). In the online meeting, the leader of each research subgroup reported their progress after the kick-off meeting in June. For example, one group reported having integrated a hydrological model (WEB-RRI) and an agricultural crop growth model (WIMRIW) and proceeding to model validation in the Pampanga River basin, one of the target areas of the project. The meeting demonstrated that although the situation had been difficult and on-site studies limited, ICHARM and collaborative institutions in Japan and the Philippines were able to make good progress.

While this article was being written, the Philippines was hit by a super typhoon, Odette (a.k.a. Rai), which left devastating damage to the country. We at ICHARM would like to offer our deepest condolences to those who have lost their beloved people. We have renewed our determination to accelerate the research to achieve our project goals in order to build a resilient society.

(Written by NAITO Kensuke)

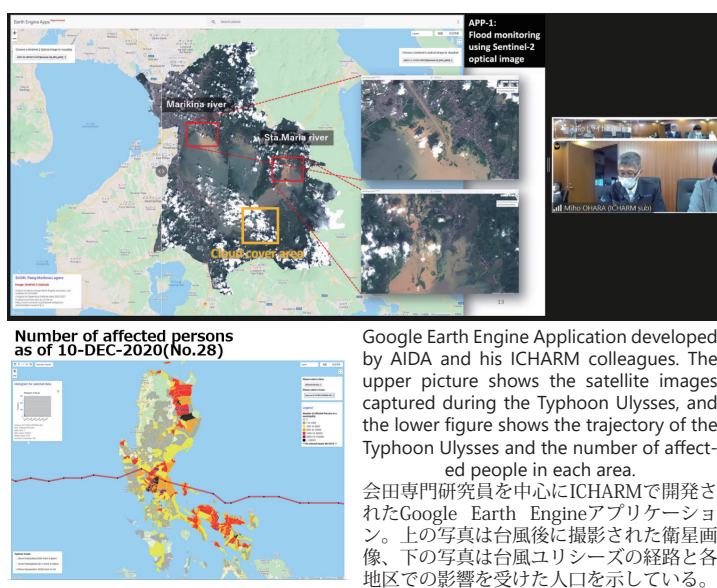
ICHARM は「地球規模課題対応国際科学技術協力プログラム (SATREPS)」に基づくフィリピンとの共同研究プロジェクト「気候変動下での持続的な地域経済発展への政策立案のためのハイブリッド型水災害リスク評価の活用 (略称: HyDEPP-SATREPS)」の日本側代表実施機関として、2021年6月のキックオフ会議より日比両国の共同研究機関とともに様々な活動を行なっています。

2021年11月5日には、研究プロジェクトの研究成果の周知のため、一般公開形式でのウェビナーを開催しました。ウェビナーは、2020年11月12日にフィリピンに甚大な被害を与えた台風ユリシーズから1年の節目となる時期に開催し、両国の研究者による台風ユリシーズに関連する研究成果の報告が行われました。一般参加者186人を含む計243人が参加しました。

研究成果報告として、会田健太郎専門研究員から、衛星画像から判読できる浸水域や被害報で報告されている市町村単位での被害状況を Google Earth Engines を用いて統合的に表示したオンラインシステムについて紹介されました(写真)。台風ユリシーズ時、ICHARM では実際に本システムを用いて被害状況の把握の支援活動を行いました。また、現地側のプロジェクトマネージャーであるパトリシア・サンチェス教授から、台風の被害状況に係るインタビュー調査の結果などが紹介されました。その後のパネルディスカッションでは、一般参加者を交えて活発な質疑応答が行われ、プロジェクトについての認知度が高まったと実感しています。

2週間後の11月17日には日比両国の各研究機関代表者による合同調整会議(JCC)がオンライン開催されました。本会議は年2回開催されることが規定されています。各研究グループより研究の進捗について報告があり、例えば、水文モデルと作物育成モデルの融合が完了し、パンパンガ川流域においてモデルの検証を開始する旨の報告がありました。現地での活動ができない状況下ではありますが、ICHARM・国内共同機関と相手国との連携活動が進んでいることが確認されました。

本記事を執筆中、台風22号オデット(ライ)がフィリピンを直撃し、甚大な被害をもたらしました。被害にあった方々に悔やみを申し上げます。また、このプロジェクトの重要性を再認識し、より強靱な社会構築に貢献すべく、研究活動に一層努力する所存です。



## Introduction of ICHARM research projects / 研究紹介

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、河元隆利主任研究員の「インフラシステム海外展開戦略の紹介」と玉川勝徳専門研究員の「発電ダムを対象とした洪水調節と発電効率向上のためのダム操作に関する検討」を紹介いたします。

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 two researchers as listed below:

**KAWAMOTO Takatoshi**, Senior Researcher

Japan's strategies to expand its infrastructure systems and other technologies and expertise to overseas countries

**TAMAKAWA Katsunori**, Research Specialist

Investigation of dam operations for effective flood control and hydro power generation



## Japan's strategies to expand its infrastructure systems and other technologies and expertise to overseas countries インフラシステム海外展開戦略の紹介

**KAWAMOTO Takatoshi**, Senior Researcher

河元隆利 主任研究員

私は2018年10月から2021年1月まで、内閣官房副長官補室（経協インフラ）に在籍しており、担当していたインフラシステムの海外展開に関する業務について紹介します。

まず、日本政府がインフラシステム海外展開に取り組む意義は主に以下のとおりです。

- ・新興国を中心とした世界のインフラ需要は膨大であり、急速な都市化と経済成長により、今後の更なる市場の拡大が見込まれる。このため、民間投資を喚起し持続的な成長を生み出すための我が国の成長戦略・国際展開戦略の一環として、日本の「強みのある技術・ノウハウ」を最大限に活かして、世界の膨大なインフラ需要を積極的に取り込むことにより、我が国の力強い経済成長につなげていく。

- ・日本政府は、SDGs実施指針（2019年12月20日一部改定）に基づき、質の高いインフラの整備等を通じてSociety5.0の推進を含む日本のSDGsモデルの確立に向けた取組を推進している。展開先のニーズに合致した質の高いインフラを継続的に提供していくことにより、展開国の社会課題解決・SDGs達成に貢献する。

一方、現実的には、日本企業が海外のインフラプロジェクトに参画するには、単に技術力を有するのみではグローバルな価格競争に勝ち残ることはできず、様々なハードルがあり、多くのリスクが伴います。インフラプロジェクトは、一般的に事業期間は長期となり、相手国政府機関・自治体をはじめ、地元企業等の多くのステークホルダーが関与することが特徴

Before joining ICHARM, I worked under an assistant chief cabinet secretary in economic cooperation and infrastructure at the Cabinet Secretariat of Japan from October 2018 to January 2021. I was assigned to coordinate projects to expand Japan's infrastructure systems overseas. In this article, I will explain Japan's efforts on this matter.

The government of Japan strives to expand the country's quality infrastructure systems overseas for the following objectives:

- The demand for infrastructure development around the world, especially in developing countries, is enormous, and further market expansion is expected in the future due to rapid urbanization and economic growth. In these circumstances, the government aims to capture this robust worldwide demand by utilizing Japan's technology and know-how in infrastructure development, thereby also leading the country to achieve strong economic growth. These aims are consistent with Japan's general growth strategy and international business promotion strategy, which are designed to stimulate private investment and attain sustainable growth.

- The government of Japan has adopted the SDGs Implementation Guidelines (partially revised on December 20, 2019) and has been promoting efforts to establish its own models to achieve the SDGs, including the realization of Society 5.0 by implementing high-quality infrastructure. The government plans to maximize this experience and support overseas countries in solving social issues and achieving the SDGs by continuously providing high-quality infrastructure tailored to their needs.

However, for Japanese companies to participate in overseas infrastructure projects, they must have technological capabilities and win global price competitions. Infrastructure projects generally have a long project period and involve many stakeholders such as the companies, government agencies, and local governments of the partner country. Risks include those related to business (e.g., demand estimation, toll collection, land expropriation, environmental and social considerations), foreign exchange, system changes (e.g., ones regarding the Public Private Partnership), and contract breaches committed by governments. In some cases, private companies



are forced to bear the risks that the partner government is supposed to bear. Many issues are often too complex for the private sector to solve by themselves. Thus, the public and private sectors need to work together, for example, by getting involved in projects from the early stages and improving the investment environment.

For these reasons, the Ministerial Meeting on Strategy for Infrastructure Export and Economic Cooperation (chair: Chief Cabinet Secretary) has formulated strategies for exporting infrastructure systems overseas to strengthen concerted efforts involving various public and private organizations, such as government ministries and agencies, the Japan International Cooperation Agency (JICA), the Japan Bank for International Cooperation (JBIC), the Japan External Trade Organization (JETRO), the Nippon Export and Investment Insurance (NEXI), and the Japan Overseas Infrastructure Investment Corporation for Transportation and Urban Development (JOIN), in addition to private corporations that undertake projects. Based on recent changes in the environment surrounding infrastructure, in December 2020, the ministerial meeting stepped up its effort and adopted the Infrastructure System Overseas Promotion Strategy 2025 (Figure 1) by including new themes such as response to the COVID-19 pandemic, contribution to carbon neutrality, and active use of digital technology. Under this strategy, cooperation among related ministries and agencies has been promoted.

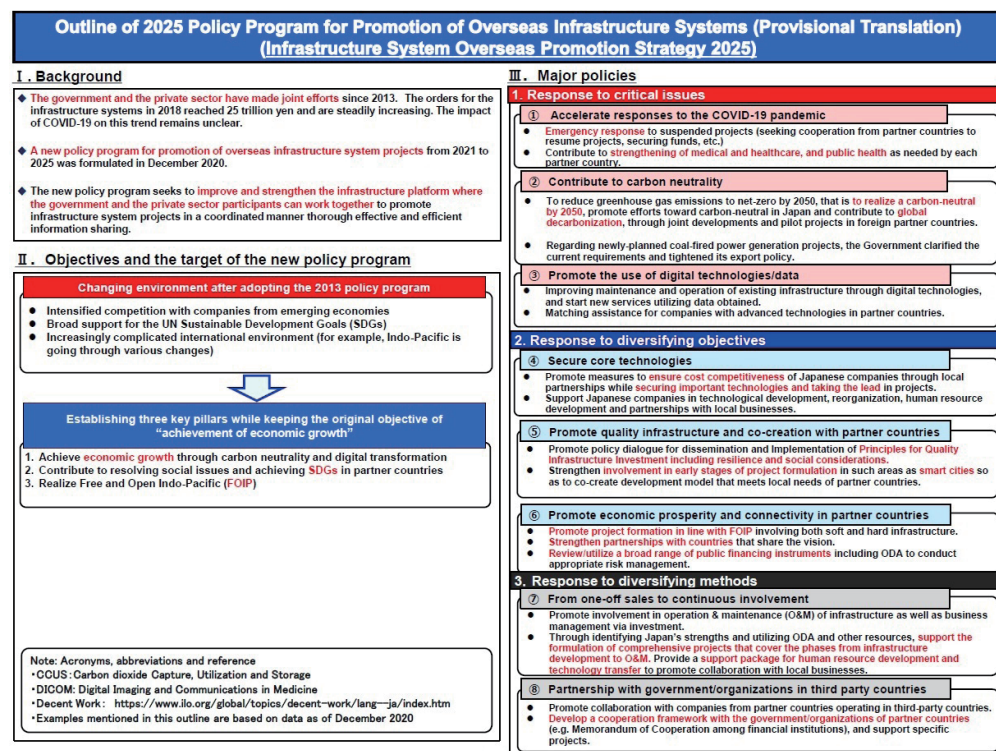


Figure 1 Outline of Infrastructure System Overseas Promotion Strategy 2025  
 図1 インフラシステム海外展開戦略 2025 の概要

The economic cooperation and infrastructure section also developed the Overseas Expansion Strategy in Disaster Risk Reduction as one of the overseas expansion strategies for major industries and fields. Experiencing so many disasters for so long, Japan has accumulated so much knowledge and developed advanced technologies to fight against disasters. Japan can help other countries establish a safe society and achieve stable economic development by offering practical viewpoints on disaster risk reduction and high-quality technologies for building quality infrastructure. In addition, the global disaster-related market is a promising one, for it is expected to continue expanding, as water-related disasters are likely to be more intense and frequent due to climate change.

In this strategy, the economic cooperation and infrastructure section created, in collaboration with the Disaster Management Bureau of the Cabinet Office, a catalog of technologies and know-how developed in Japan for disaster management (Figure 2). The catalog includes a list of preventive actions and measures that should be taken in different phases – pre-disaster, early warning and evacuation, emergency

です。リスクの中には、事業リスク(需要推計、料金徴収、土地収用、環境社会配慮等)、為替リスク、PPP制度等の制度変更リスク、政府による契約違反リスク等があります。また、本来相手国が負担すべきリスクを民間企業に負担させるケースもあり、民間企業のみでは解決の難しい課題も多く、官民一体となった上流段階からの関与や投資環境整備への働きかけを行う必要があります。

そのため、日本政府内の関係省庁に加え、国際協力機構(JICA)、国際協力銀行(JBIC)、日本貿易振興機構(JETRO)、日本貿易保険(NEXI)、海外交通・都市開発事業支援機構(JOIN)等の関係機関、及び活動の主体である民間企業とともに、官民が連携した取組を進めるため、経協インフラ戦略会議(議長:官房長官)において、インフラシステム輸出戦略が策定されています。2020年12月の経協インフラ戦略会議では、海外のインフラ市場を取り巻く環境の変化を踏まえ、COVID-19への対応、カーボンニュートラルへの貢献、デジタル技術の活用促進等の新たな課題に対応した「インフラシステム海外展開戦略 2025」(図1)を決定し、関係省庁・機関・民間企業が連携した取組を推進しています。

また、当方が在籍時には、主要産業分野別の海外展開戦略として、「防災分野の海外展開戦略」を策定しました。幾多の災害を経験して培ってきた日本の知見・技術を活かし、海外のインフラに防災・減災の視点、質の高い技術を組み込むことは、相手国の安全な社会の形成、安定した経済発展に寄与します。また、気候変動に伴う水関連災害の激甚化・頻発化等により、今後とも世界各地で防災対策が進められることはマーケットとして有望と見込まれます。同戦略では、内閣府防災担当との協働で、日本の防災技術・ノウハウを紹介する防災カタログ(図2)を作成しました。これは、予防、警戒避難、応急活動、復旧・復興のフェーズ毎に、防災・減災に向けて取り組むべき事項や日本が提供できる技術をまとめて紹介したものです。こうしたカタログをきっかけに、当該国での防災意識の向上と、防災関連のビジネスが始まるきっかけとなることを期待しています。こちらは、英語版のみならず、スペイン語版も作成しております。興味がある方は下記のHPリンクをご覧ください。

- Japanese  
[http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide\\_to\\_Japanese\\_tech\\_JP.pdf](http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide_to_Japanese_tech_JP.pdf)
- English  
[http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide\\_to\\_Japanese\\_tech\\_EN.pdf](http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide_to_Japanese_tech_EN.pdf)
- Spanish  
[http://www.bousai.go.jp/kokusai/pdf/Guide\\_to\\_Japanese\\_tech\\_ES.pdf](http://www.bousai.go.jp/kokusai/pdf/Guide_to_Japanese_tech_ES.pdf)

response, and restoration and reconstruction – in addition to other technologies that Japan can offer to overseas countries. Those sections involved in such projects hope that publications such as this can give other countries an opportunity to think about raising disaster awareness among their people, as well as lead to facilitate disaster-related businesses between Japan and other countries.

This guide describes experience and knowledge of Japan according to the process of disaster management, including preparedness, response, recovery and reconstruction, focusing on necessary actions for disaster risk reduction and possible technologies that Japan could provide. Please use this brochure for considering possible collaboration from Japan to enhance disaster management.

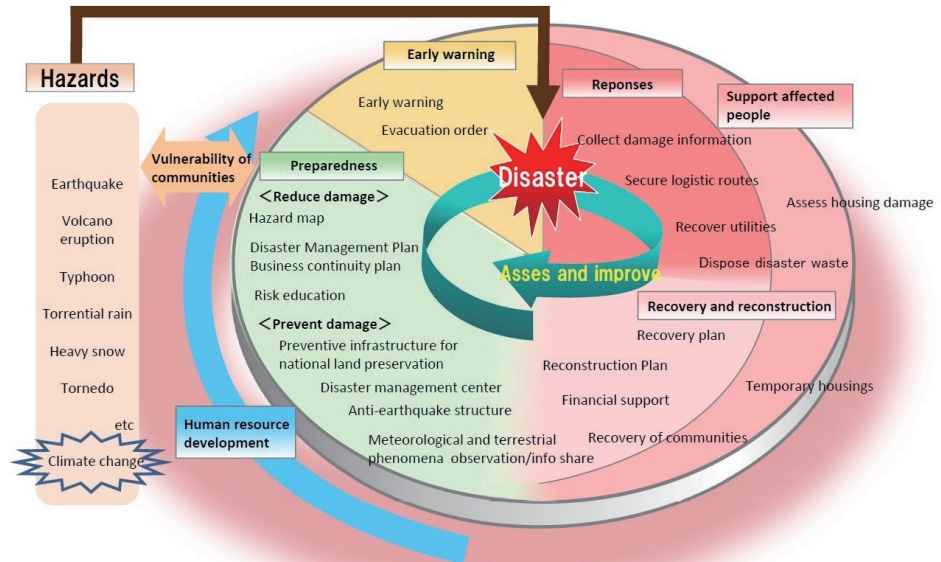


Figure 2 Catalog of technologies and know-how on disaster management measures in Japan  
 図2 日本の防災技術・ノウハウに関する防災カタログ

The catalog of disaster-related technologies is available in Japanese, English, and Spanish at the following websites:

- Japanese [http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide\\_to\\_Japanese\\_tech\\_JP.pdf](http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide_to_Japanese_tech_JP.pdf)
- English [http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide\\_to\\_Japanese\\_tech\\_EN.pdf](http://www.bousai.go.jp/kaigirep/catalog/pdf/Guide_to_Japanese_tech_EN.pdf)
- Spanish [http://www.bousai.go.jp/kokusai/pdf/Guide\\_to\\_Japanese\\_tech\\_ES.pdf](http://www.bousai.go.jp/kokusai/pdf/Guide_to_Japanese_tech_ES.pdf)



## Investigation of dam operations for effective flood control and hydro power generation

### 発電ダムを対象とした洪水調節と発電効率向上のためのダム操作に関する検討

**TAMAKAWA Katsunori**, Research Specialist  
 玉川勝徳 専門研究員

2018年7月の西日本豪雨や2019年10月の東日本台風(台風第19号)では AMeDAS 地点で観測史上1位を更新する降雨観測地点が多発し、広い範囲で河川の氾濫、浸水、土砂災害等が発生するなど甚大な被害をもたらされました。

2020年12月に公表された「日本の気候変動2020(文部科学省及び気象庁)」によると、今後気候変動により豪雨(日降水量200mm以上)の日数が増える一方で降雨日や降雪・融雪が減少することも指摘されています。また、2021年6月に策定された「2050年カーボンニュートラルに伴うグリーン成長戦略」の中で、未利用の水資源を活用した水力発電の向上が挙げられています。

Extreme rainfall events in western Japan in July 2018 and eastern Japan in October 2019 due to Typhoon Hagibis recorded the highest rainfall in history at many AMeDAS stations, causing severe flood and sediment disasters at many locations across the country.

“Climate Change in Japan 2020,” published by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Japan Meteorological Agency in December 2020, points out that the number of heavy rainfall days (over 200 mm/day) will increase, while the number of rainy days and the amount of snowfall and snowmelt will decrease, due to climate change.

In addition, “Green Growth Strategy Through Achieving Carbon Neutrality in 2050,” a new policy adopted by the Japanese government in June 2021, addresses the improvement of hydroelectric power generation utilizing unused water resources.

Under these circumstances, ICHARM has been studying a dam operation method to

achieve both flood risk reduction and effective use of water resources by applying dam water pre-releases based on inflow predictions. The research was conducted under a MEXT-led project, "The Program to Promote the Development of Earth Environmental Information Platform (Development of Water-related Application)," in collaboration with the University of Tokyo, Nippon Koei Co., Ltd., Chubu Electric Power Co., Ltd., and Tokyo Electric Power Renewable Power Co., Ltd.

In this report, I will present some of our achievements gained in the investigation conducted for the Hatanagi Daiichi Dam located upstream of the Oi River in Shizuoka Prefecture, Japan, by citing Koike et al. (2021)<sup>1)</sup> (hereafter, the paper). The paper proposed a dam operation method using ensemble inflow prediction and performed simulations to look into the practicality of the method. The results found that the proposed operation can work effectively in reducing flood risk and generating more electricity.

In order to investigate how well dam operations work to control flooding downstream of a dam while improving the effectiveness in power generation, it is necessary to employ a hydrological model that can seamlessly and quantitatively estimate the base flow, the peak flow, and snowfall and snowmelt runoff while reflecting the effect of dam operations at the same time. The paper used a model called "Water and Energy Budget based - Distributed Hydrological Model-4 component Snow (WEB-DHM-4cS)," for it can calculate the spatial distribution of the initial hydrological conditions (soil moisture, groundwater level, snow cover, snowmelt, etc.), which greatly affect the runoff prediction every hour. WEB-DHM-4cS has a considerable advantage in this respect for estimating the inflow with high accuracy.

After being calibrated for the period from October 2013 to September 2015, WEB-DHM-4cS was validated for the period from October 2015 to September 2017 using the dam inflow data provided by Chubu Electric Power Co., Ltd. The accuracy level of the model was evaluated to be a Nash-Sutcliffe coefficient of 0.71 for those four years.

The paper proposed the basic dam operation using a range width of 32 ensemble inflow predictions calculated by inputting the data acquired from ensemble rainfall forecasting (3-km spatial resolution, 1-hour temporal resolution up to 39 hours ahead, 32 ensembles). The proposed operation consisted of the following five steps: 1) Use the upper 25% ensemble time-series if the priority is flood control, or use the lower 25% ensemble time-series if the priority is securing water for more hydropower generation; 2) check whether the inflow exceeds the amount that can be safely discharged from the dam during the forecasting period when the dam is operated under the existing operating regulations; 3) check whether the accumulated inflow within the forecasting period exceeds the storage capacity at the forecasting start time; 4) If the inflow exceeds the designated amount in steps 2) and 3), the excess amount will be released evenly by prioritizing securing water for power generation within the forecasting period; and 5) If the inflow does not exceed the designated amount in steps 2) and 3), the average value of the predicted inflow up to 39 hours ahead will be applied as the amount of water to be used for power generation in the next hour.

The evaluation index of flood control was set to keep the dam water level below the full water level when the maximum flood release was set at 600 m<sup>3</sup>/s. The power generation was evaluated using the Power Generation Volume Index, which takes into account the effective head of the amount of water for power generation use.

Figure 1 shows the results of the simulations in which the proposed dam operation was applied continuously during the warm season of 2018 and 2019 (July to October). The flood events exceeding 600m<sup>3</sup>/s occurred twice during the two warm seasons from September 30 to October 1 in 2018 and from October 12 to 13 in 2019.

Figure 2 shows the details of the two flood events. The 2018 event is a typical case that may take place when the dam water level is high at the forecasting start time. In this event, the inflow was predicted while the dam water level was almost the same

ICHARM では文部科学省「地球環境情報プラットフォーム構築推進プログラム(水課題アプリケーションの開発)」のもと、東京大学、日本工営株式会社、中部電力株式会社、東京電力リニューアブルパワー株式会社との協働で、流入量予測に基づく事前放流を含む洪水リスクの低減と水資源の効果的利用を両立させるための技術検討を行いました。

今回、成果の一部として大井川上流域に位置する畑雑第一ダムを対象に、アンサンブル予測流入量を用いたダム操作の提案とシミュレーションを行い、洪水を適切に制御しつつ増電が可能となる事例を小池ら(2021)<sup>1)</sup>の論文(以下、「論文」とする)を引用し紹介します。

流域内に存在するダムを効率的に操作し、発電効率を上げながら下流の洪水調節等の検討をするためには、平常時の流量、洪水時のピーク流量、また、積雪・融雪による融雪出水を切れ目なく定量的に推定し、且つダム操作の効果を反映できる流出モデルが必要となります。論文では「積雪を考慮した地表面での水・エネルギー収支を考慮した分布型の流出モデル(WEB-DHM-4cS)」を使用しました。このモデルは、流出予測に大きく影響を及ぼす地表面の初期水文状態量(土壌水分、地下水位、積雪・融雪量等)の面的分布を時々刻々と計算することが可能です。そのため高精度で流量を推定可能な特徴を有しています。

中部電力より提供されたダムへの流入量データを用いて2水文年(2013年10月～2015年9月)で較正、続く2水文年(2015年10月～2017年9月)で検証し、この4水文年でNash-Sutcliffe係数が0.71という精度が得られました。

論文では、この流出モデルにアンサンブル降雨予測データ(3km空間解像度、39時間先まで1時間時間解像度、32アンサンブル)を入力し得られる32のアンサンブル予測流入量の幅を考慮し、1)洪水調節に重きを置く場合は上位25%程度を、増電のための水量確保に重きを置く場合は下位25%程度の流量時系列を用いること、2)既存の操作規定に従って運用した場合に予測期間中にダムから安全に放流できる流量を超えるかどうか、3)予測開始時点で予測時間内の流入量の積算値が貯留可能な容量を超えるかどうか、の各計算をし、4)超える場合は超過量を予測期間内で均等にダムから発電使用水量を優先し放流する、5)超えない場合は39時間先までの予測流入量の平均値を次の1時間の発電使用水量とする、という操作を設定しました。

洪水調節については、目標とする洪水時上限ゲート放流量を600m<sup>3</sup>/sとした場合、ダム湖の水位が常時満水位以下となるかどうか、発電については、発電使用水量に有効落差を考慮した「発電量指標」で評価しました。

2018年、2019年暖候期(7～10月)でダム操作を連続的に適用した結果を図1に示します。この2暖候期に600m<sup>3</sup>/sを超す出水は、2018

年 9 月 30 日～10 月 1 日と 2019 年 10 月 12～13 日の 2 回発生しました。両期間の詳細を図 2 に示します。

2018 年は予測開始時のダム湖の水位が高い場合の事例です。ダム湖の水位が予備放流水位とほぼ同等な状態で予測された流入量を洪水が起こる前日の 29 日の午前（ピンク色範囲）に事前放流を実施することで貯水位（グレーの点線）を適時に下げて、流入量（青の実線）ピーク時のゲート放流量（ピンク色範囲）を既定の 600m<sup>3</sup>/s 以下に抑えることに成功していることを示しています（なお、事前放流をしない場合、オレンジ色範囲のようにゲート放流量は 600m<sup>3</sup>/s を超えてしまいます）。2019 年は予測開始時のダム湖の水位が低い場合の事例です。貯水能力が見込める中で、常時満水位（赤の点線）まで効果的に事前に水を貯留し、ゲート放流量を 600m<sup>3</sup>/s 以下に抑えることに成功しています。なお、発電量指標では暖候期（7～10 月）平均で、2018 年は 12.8%、2019 年は 3.7% の増電を示すことができました。

今後は論文で設定したダム操作を他の出水事例にも適用し検討を重ね、安定的、確実な操作の確立を目指します。

1) 引用文献:

小池 俊雄, 中村 茂, Cho Thanda Nyunt, 牛山朋来, Rasmy Mohamed, 玉川勝徳, 伊藤弘之, 池内幸司, 生駒栄司, 喜連川優: 発電ダムの洪水調節と発電操作支援システム, 土木学会論文集 B1 (水工学) Vol.77, No.2, I\_79-I\_84, 2021.

as the pre-release water level, and pre-releases were performed on the morning of the 29th (pink range). As a result, the simulated dam water level (gray dotted line) decreased, and the simulated peak flow (pink range) was successfully controlled to remain below the 600 m<sup>3</sup>/s level when the inflow (solid blue line) peaked. If the pre-releases had not been performed, the gate discharge rate would have exceeded 600m<sup>3</sup>/s, as shown in the orange range.

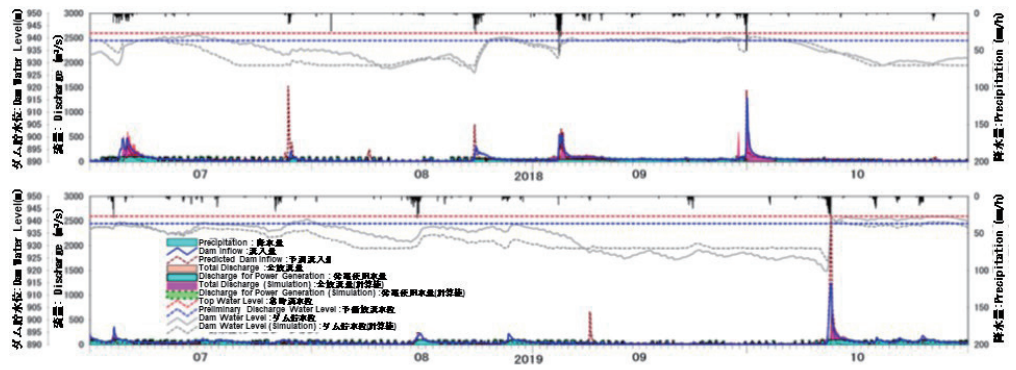


Figure 1 Results of continuous application of dam operations during the warm seasons (July-October) in 2018 (upper figure) and 2019 (lower figure)

図 1 2018 年（上図）と 2019 年（下図）暖候期（7～10 月）におけるダム操作を連続的に適用した結果

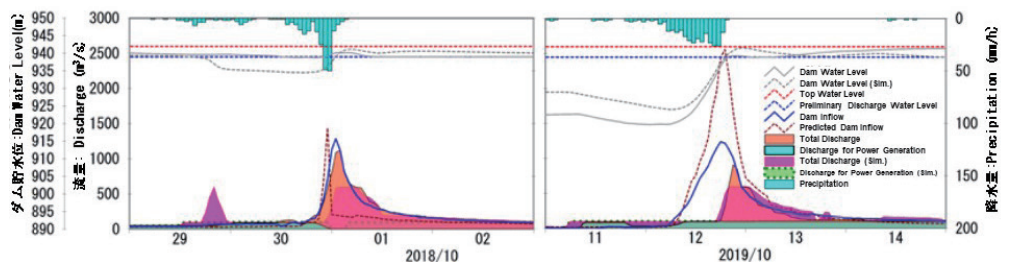


Figure 2 Details of flooding with a gate discharge exceeding 600m<sup>3</sup>/s from September 30 to October 1, 2018 (left), and from October 12-13, 2019 (right)

図 2 ゲート放流量が 600m<sup>3</sup>/s を超した出水の詳細（2018 年 9 月 30 日～10 月 1 日（左図）と 2019 年 10 月 12～13 日（右図））

The 2019 event is a typical case that may occur when the dam water level is low at the forecasting start time. With the water storage capacity still available, the inflow was stored effectively up to the full water level (red dotted line) in advance, and the gate discharge was successfully controlled to remain below 600 m<sup>3</sup>/s. According to the Power Generation Volume Index, the average power generation during the warm season (July to October) showed a 12.8% increase in 2018 and a 3.7% increase in 2019.

The basic dam operation introduced by the paper will be applied to other flood cases to establish stable and reliable dam operations for effective management of flood risk and hydro power generation.

Reference:

1) Toshio KOIKE, Shigeru NAKAMURA, Cho Thanda NYUNT, Tomoki USHIYAMA, Rasmy MOHAMED, Katsunori TAMAKAWA, Hiroyuki ITO, Koji IKEUCHI, Eiji IKOMA and Masaru KITSUREGAWA: An Operation Supporting System For Hydroelectric Dams To Improve Flood Control And Power Generation, The Journal of Japan Society of Civil Engineers B1(Hydraulic engineering) Vol.77, No.2, I\_79-I\_84, 2021.

# Training & Education

## Educational program updates

### 研修活動報告

Since 2007, ICHARM, in cooperation with the Japan International Cooperation Agency (JICA) and the National Graduate Institute for Policy Studies (GRIPS), has provided a one-year master's program, "Water-related Disaster Management Course, Disaster Management Policy Program (JICA Knowledge Co-Creation Program on "Flood Disaster Risk Reduction)." The program marked its 15th year in October 2021 and welcomed new 13 master's students.

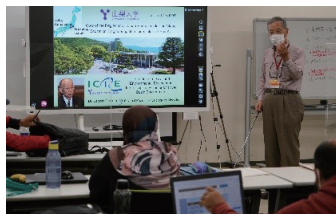
#### ● 15th opening ceremony hosted by JICA

The opening ceremony of the master's course for the academic year 2021 was held at the ICHARM auditorium on October 1. JICA Tsukuba Director General WATANABE Takeshi, GRIPS Professor SUGAHARA Masaru, PWRI President NISHIKAWA Kazuhiro, and other executives attended the ceremony and gave a warm welcome to the students. Ms. Siti Adabiyah Binti SULAIMAN gave a speech on behalf of the students.

#### ● Lectures

From October to November, lectures by ICHARM researchers were mainly delivered online. Then, after spending two weeks attending the GRIPS Intensive Course online in late November, all 13 students were able to start their studies at ICHARM from December 6.

During the week starting on December 6, Prof. Emeritus TAKEUCHI Kuniyoshi of the University of Yamanashi, and Mr. WATANABE Masayuki, the president of the Institute for International Social Development Cooperation, started a series of lectures entitled "Basic Concepts of Integrated Flood Risk Management (IFRM)." It was the first face-to-face lecture in two years for Prof. Emeritus Takeuchi, who had to give all lectures online last year due to the COVID-19 pandemic. He also gave a special lecture on NINOMIYA Sontoku, Japan's famous social reformer in the 19th century. The students learned how the spirit of Sontoku has been inherited in ICHARM's mission of "Localism and Empowerment."



Lecture by Prof. Emeritus TAKEUCHI Kuniyoshi of the University of Yamanashi  
竹内邦良山梨大学名誉教授による講義

Mr. WATANABE lectured under the title of "Application examples of IFRM overseas." The students were given an assignment in advance to read a book, "PROVIDENCE WAS WITH US," written by the late Mr. NAKAMURA Tetsu, who was a doctor and the leader of Afghanistan's green project but unfortunately shot in Afghanistan in 2019. The lecture was designed for the students to learn how to foster a "sense of my matter" in people regarding disasters by analyzing the situation in their country with reference to the purposes and effects of the green project.

#### ● Inception Report Presentation

On October 18, the students presented inception reports, explaining their organizations, the work they were in charge of, and the issues facing their countries. After their presentations, supervisors and other researchers at ICHARM gave presentations on their research topics and had discussions with the students about the topics they wanted to work on. It was an excellent opportunity for them to talk about the direction of their thesis research with experts at the beginning of the course.

#### ● Field trip

##### <December 8, 2021: Ninomiyasontoku Museum>

On the following day of the special lecture by Prof. Emeritus TAKEUCHI, the students visited the Ninomiyasontoku Museum in Moka City, Tochigi Prefecture. There, the students received explanations from museum staff and Prof. Emeritus TAKEUCHI, as well as leaflets and other documents, about the life of



Surrounding the statue of NINOMIYA Sontoku at Ninomiyasontoku Museum  
二宮尊徳資料館にて二宮尊徳像を囲んで

ICHARM では、2007 年以降、(独) 国際協力機構 (JICA) 及び政策研究大学院大学 (GRIPS) と連携して、約 1 年間で学位を取得できる修士課程「防災政策プログラム水災害リスクマネジメントコース」(JICA 研修「洪水防災」) を実施しています。今年度は第 15 年目を迎え、2021 年 10 月より新たに 13 名の修士学生が本コースに参加しております。

#### ● JICA 第 15 期研修 開講式

10 月 1 日に ICHARM 講堂において、2021 年度修士コース開講式を実施しました。本年度新たに入学した 13 名の修士学生は、COVID-19 の影響により、昨年度同様それぞれの母国からオンラインで出席しました。JICA 筑波からは渡邊健所長、GRIPS からは菅原賢教授、土木研究所から西川和廣理事長及び幹部職員が出席し、それぞれ歓迎の挨拶を述べました。また、学生を代表して、Ms. Siti Adabiyah Binti SULAIMAN が挨拶を行いました。

#### ● 講義

10 月から 11 月にかけては、ICHARM 講師を中心とした講義をオンラインにて実施しました。その後、11 月下旬から 2 週間の GRIPS のオンライン集中講義を受けた後、12 月 6 日より 13 名全員が ICHARM に通学することができました。

その週は、竹内邦良山梨大学名誉教授及び渡辺正幸国際社会開発協力研究所代表による「Basic Concepts of Integrated Flood Risk Management (IFRM)」の講義が始まりました。

特に竹内名誉教授においては、昨年度コースは COVID-19 の影響により、学生とはオンライン講義のみであったため、実に 2 年ぶりの対面講義となりました。また、二宮尊徳に関する特別講義においては、学生は、19 世紀の著名な社会改革者である二宮尊徳の精神が ICHARM の使命である「ローカリズムとエンパワーメント」にどのように受け継がれているかについて学びました。

渡辺代表の講義「Application examples of IFRM overseas」では、2019 年にアフガニスタンで銃撃された故中村哲氏の著書「PROVIDENCE WAS WITH US」を参照しつつ、アフガニスタンのグリーンプロジェクトの効果と目的について、自身の国の状況と照らし合わせながら、災害に対する「わがこと感」について学びました。

#### ● インセプションレポート発表

10 月 18 日に新生によるインセプションレポート発表会が実施され、各学生は自身の所属組織や担当業務、自国が抱える課題について説明するとともに、ICHARM において取り組みたい研究などを発表しました。その後、ICHARM 指導教員や研究員が自身の研究テーマについてのプレゼンテーションを行い、それらに基づいて、各学生が取り組みたい研究テーマにつ

いてのディスカッションを行いました。コース開始当初に自身の研究テーマの方向性について検討する貴重な機会となりました。

● 視察

< 12月8日 二宮尊徳資料館 >

前日の竹内名誉教授の特別講義を受け、栃木県真岡市にある二宮尊徳資料館に訪れました。そこでは、学生は、資料館の解説員及び竹内名誉教授から、その豊富な農業知識、土木の才能及び独特な管理力(「至誠」「勤労」「分度」「推譲」の四つの教え)により、洪水、飢饉等で荒廃した多くの町村を復興させた尊徳の生涯について、豊富な資料に基づいて説明を受けました。

< 12月15日～17日 四国河川流域視察 >

12月中旬、学生は、小池俊雄センター長、宮本守研究員同行のもと、3泊4日で本州の南西に位置する四国地方を訪れました。

1日目は、徳島県石井町にある石井防災ステーションにおいて、徳島河川国道事務所の職員及び四国防災エキスパートにより、水防災減災工法について説明を受けました。始めに高知県と徳島県を流れる一級水系で日本三大暴れ川の1つとして数えられる吉野川の概要説明を受け、月輪工法、シート張等の水防工法を見学した後、水防活動に不可欠なロープワークの実習を受けました。その後、香川県に移動し、香川県職員及び満濃池土地改良区事務局長より日本最大級のため池である満濃池の説明を受けました。

2日目は高知県に移動し、独立行政法人水資源機構の職員より、早明浦ダムについて説明を受けました。早明浦ダムは、吉野川総合開発計画に基づき昭和48年に完成し、多目的ダムとして西日本随一の規模を誇り、「四国の水がめ」として、多くの人々の暮らしや産業を支えるとともに、流域の洪水被害を軽減しております。その後、日高村にて仁淀川に架かる名越屋沈下橋、近代土木の礎を築いた廣井勇の生誕地で記念像がある佐川町を訪れた後、日高村にて高知河川国道事務所の職員による説明のもと、日下川新規放水路の工事現場を見学しました。日下川の河床勾配が約1/3,000と極めて緩いことから洪水時には仁淀川本川に流下しにくく浸水被害が頻発しております。これまで2本の放水路トンネルを整備しましたが、平成26年8月に立て続けに来襲した台風による甚大な浸水被害が発生しました。本工事は、国による3本目となる放水路工事であり、完成予定である来年度においては、総延長が約18.5kmと全国1位になる予定です。

3日目は、高知市内を一望できる五台山展望台にて、高知県職員より高知港(浦戸湾)の三重防護による地震・津波対策について説明を受けた後、高知新港及び高知海岸耐震補強現場を見学しました。

最後に、現地訪問にご対応頂いた関係者の皆様に深い感謝の意を表します。

Sontoku, who restored many towns and villages that had been devastated by floods and famines, using his rich knowledge and experience about agriculture and civil engineering. They also mentioned his unique management skills, which were embodied in his four teachings: "Act sincerely to others," "Work hard to repay for the virtue of others," "Keep the living standard within your income," and "Invest the residuals for the future."

< December 15-17: River basins in the Shikoku region >

In mid-December, accompanied by ICHARM Executive Director KOIKE Toshio and Researcher MIYAMOTO Mamoru, the students took a four-day study trip to Shikoku, a region located southwest of the mainland of Japan.

On the first day, at the Ishii Disaster Prevention Station in Ishii Town, Tokushima Prefecture, the students learned water disaster prevention and mitigation methods from Shikoku disaster prevention experts and the staff of the Tokushima River and Highway Office of the Ministry of Land, Infrastructure and Tourism (MLIT). First, they received an overview of the Yoshino River, a first-class river system that runs through Kochi and Tokushima prefectures and one of the three most violent rivers in Japan. After observing flood prevention methods, such as the sand-bag ringing method and the sheet-covering approach, they received practical training in rope work, which is essential for flood prevention activities. After that, the students moved to Kagawa Prefecture, where they received a brief explanation about Mannoike (Lake Manno), one of the largest reservoirs in Japan, by an official of Kagawa Prefecture and the secretary general of the Mannoike Land Improvement District.



Exercise on rope work at Ishii Disaster Prevention Station  
石井防災ステーションにてロープワーク実習

On the second day, the students moved to Kochi Prefecture and received an explanation about the Sameura Dam by an official of the Japan Water Agency. The Sameura Dam, completed in 1973 as part of the Yoshino River Comprehensive Development Plan, is the largest multi-purpose dam in western Japan. As the "water reservoir of Shikoku," it supports the lives and industries in the region and reduces flood damage in the basin.

The students then visited the Nagoya chinka-bashi ("submersible bridge") over the Niyodo River in Hidaka Village and a commemorative statue of HIROI Isami, who laid the foundation for modern civil engineering in Sagawa Town, his birthplace. After that, they went to the construction site of a new Kusaka River floodway and listened to an explanation by a staff of the Kochi River and Highway Office of MLIT in Hidaka Village. Since the slope of the riverbed of the Kusaka River is extremely gentle (about 1/3,000), floodwaters do not flow down easily to the mainstream of the Niyodo River, causing frequent inundation damage. Although two floodway tunnels have been constructed, they could not prevent the extensive flood damage caused by the typhoons that hit the area in August 2014, which led the government to build the third floodway. The construction is scheduled to end in the next fiscal year, with the total floodway length 18.5 km, the longest in Japan.

On the third day, at the Mt. Godai observation deck, which offers a panoramic view of Kochi City, the students received a brief explanation from officials of Kochi Prefecture on the triple earthquake and tsunami damage prevention measures at Kochi Port in Urado Bay and then visited new Kochi Port and the seismic reinforcement project site along the Kochi Coast.



Inside the Kusaka River New Floodway Construction  
日下川新規放水路の工事現場にて



Explanation of the triple earthquake and tsunami damage prevention measures at Mt. Godai observation deck  
五台山展望台にて三重防護の説明

Finally, ICHARM would like to express the deepest gratitude to all the staff and officials cooperated to the field trip.

(Written by MIYAZAKI Ryosuke)

## Comments from new doctoral course students

### 博士課程 新研修員からのコメント

Three students joined the 2021-2023 doctoral program in October. They would like to say a brief hello to the readers around the world.

2021年10月、2021-2023年度博士課程に3人の研修員が加わりました。彼らからのコメントをここに紹介いたします。



**Vicente G. Ballaran Jr.**

Supervisor: to be determined

My name is Vicente G. Ballaran Jr. from the Republic of the Philippines. I have been working as Assistant Professor in the University of the Philippines Los Baños at the College of Engineering and Agro-industrial Technology under the Agrometeorology, Biostructures and Environment Engineering Division of the Institute of Agricultural and Biosystems Engineering. I am an Agricultural and Biosystems Engineer by profession and have a Master's Degree in Agrometeorology. I am currently pursuing my PhD degree in Disaster Management at GRIPS through the support of ICHARM that will help me finance my studies by being employed as their Research Assistant.

Joining ICHARM is a perfect opportunity for me to further enhance my basic skills and knowledge in GIS and Remote Sensing as well as to strengthen my capabilities in terms of properly enforcing disaster-related policies that can help me become a more holistic person when it comes to Disaster Risk Reduction and Management. My research interests are 1.) Agricultural Vulnerability Assessment and Management and 2.) Flood Risk Management and Policy. I am planning to propose a Graduate Course on Disaster Risk Reduction and Management focused on Agricultural Sector in my University once I am successfully done with my PhD studies.



**Sanjeewa P.B. Illangasingha**

Supervisor: KOIKE Toshio

I am Sanjeewa Illangasingha from Sri Lanka. I have been working at Mahaweli Authority of Sri Lanka since 2008 as a Design Engineer and Deputy Director for water resources planning. I obtained my first master's in Water and Environmental Engineering from University of Peradeniya, Sri Lanka and I achieved my second master's in Hydraulic Engineering and River Basin Development from UNESCO-IHE, the Netherlands. Most of the water resources of the river basins in Sri Lanka are not being utilized. Flood and drought occurs frequently. Climate change adaptations are still not significantly incorporated with the water resources plans of Sri Lanka. There are technical gaps among the most of the organizations to address these issues in Sri Lanka.

Japan has a very high tech- technology to analyze hydrology systems. This is a great opportunity for me to do study and research at ICHARM, PWRI and GRIPS. I am so glad and happy to join the ICHARM family. My research interest is to study on utilization of water resources of river basins including the climate change adaptation and resilience strategies for optimizing benefits of the area. I plan to use, share and implement Japanese experience on DRR for serving the motherland.



**Narayan Prasad Subedi**

Supervisor: YOROZUYA Atsuhiko

I have been working as a Senior Divisional Engineer under Department of Water Resources and Irrigation, Ministry of Energy, Water Resource and Irrigation, Nepal. I have been working in the area of river flood management, reservoir construction, Concrete Face Rock Fill Dam (CFRD) construction, landslides and watershed as an Engineer and Project Chief for over a decade. I have completed master's degree in Water Resources Engineering in 2009 from Tribhuvan University, Nepal.

I am very glad to have opportunity to join very professional water management research institute ICHARM and Japan's leading policy research institute GRIPS as a Ph.D. student for the Disaster Risk Reduction (DRR) course. Japan has a long experience in different types of disaster and its successful mitigation measures to enhance the resilience. In the meantime, Nepal is also facing various types of disasters in the past and they are in increasing trends these days. My research work will be on quantitative assessment of flood risk and socio-economic impact under climate change scenario. After studying in Japan, one of the best destinations in terms of disaster risk reduction, I will be able to utilize the knowledge gained imparting high impacts within my department and in the country.

## Comments from new master's program students

### 修士課程 新研修員からのコメント



I am Md Shariful Alam from Bangladesh. My organization is Bangladesh Water Development Board (BWDB). I have been working with BWDB since 2014 after completing my BSc in Civil Engineering. My current position is Sub Divisional Engineer and I work in the Planning unit. ICHARM is a great place to pursue a Master's Degree in water related disaster and risk reduction. I am fortunate to have the chance to take lessons from the teachers and researchers here in ICHARM. After completion of course, I hope to apply the acquired knowledge and skills to my organization as well as my country.



I am Hasan Md Khairul. I work at Bangladesh Water Development Board (BWDB). My responsibility is designing hydraulic structures. Bangladesh is called to be one of the most vulnerable countries of the world in terms of natural hazards because it is a low-lying riverine, deltaic country covering an area of 147570 square kilometers. Heavy rainfall and floodwaters from neighboring countries caused terrible floods in Bangladesh. My dream is to maximize the benefits (soil fertility) of floods and reduce the damage caused by floods.

I am delighted to join ICHARM as a Master's student in the Disaster Management Policy course. I hope that from this course I will learn effective disaster management policies and implement them in my country to fulfill my dream.



Hello everyone. I am Megnath Neopaney from Bhutan. I have been working in the Department of Engineering Services under the Ministry of Works and Human Settlement since 2014 as a Deputy Executive Engineer. It is a great privilege for me to get an opportunity and want to express how honored I am to be part of the Disaster Management Program in ICHARM and GRIPS.

Studying in ICHARM is a great opportunity for me where I will be able to get lots of theoretical, practical and research knowledge, skills and ideas on water related disaster. The environment in ICHARM is conducive for learning with all the facilities and I will make best use of it. All the members of the ICHARM are very helpful and cooperative. I am looking forward to serving my nation with all the knowledge, scientific skills, experiences and good practices and implement them in a better way.



I am Abdul Hafizh from Indonesia, working as a GIS analyst at the Directorate of Disaster Risk Mapping and Evaluation of Badan Nasional Penanggulangan Bencana (BNPB). I am very grateful to be a part of the Flood Risk Reduction master's program at ICHARM. This is an opportunity for me to learn Japanese wisdom and technology in disaster management. I can learn directly from known experts in

the field of disaster, especially water-related disaster. I am also happy to meet and share experiences with colleagues from other countries. Looking forward to returning to my country and applying the valuable experience I got here to serve my country better.



I am Hanke Ndau, a Malawian, working for the Malawi Government in the Department of Disaster Management Affairs as a Mitigation Officer. It is a great privilege to be studying Water related disasters at Master's Degree level and learning from world renowned researchers in ICHARM. This is especially wonderful for me and my nation whose population is highly vulnerable and the land is exposed to climate related hazards, with increasing risk as a result of climate change. I consider this to be an opportunity for me to further understand and develop effective remedies to disasters in Malawi and southern Africa.



I am Raja Noraini Raja Yusof from Malaysia. I have been working as civil engineer at Public Works Department since 2009. My last posting before coming here was at Slope Engineering Branch.

In 2019, I attended a month training in Tokyo, on the Sediment-related Disaster Risk Reduction. It was great training as I had an opportunity to join field trip to Kyushu Islands with various experts. I truly impressed with working environment, prevention measures and how Japan handling the disaster. Since that, I decided to learn more about the disaster risk reduction.

Therefore, I am proud to be part of ICHARM family, gathered and surrounded by respected, experienced and expertise "sensei". Thank you so much for giving me this valuable opportunity.

I endeavor to gain as much as I could all the knowledge and best practices here and bring back to serve my country in better way.

Japan!!!!... will always like a home for me!



Hello everyone, my name is Siti Adabiyah binti Sulaiman from Malaysia. I have been working as civil engineer for 8 years and 6 years at Malaysia Public Works Department. My experience involves the road and slope maintenance management which includes repairing works after disaster. Studying in Japan has already been my dream since childhood to follow my brother's footsteps. Gratefully I have the opportunity to pursue my master in ICHARM and GRIPS. These institutes are very special because of their expertise related to the disaster which very much related to my working area. After all, I will enjoy Japan to the maximum and hopefully to conquer Mount Fuji.





I am Suresh Khadka from Nepal. I have been working with Department of Water Resources and Irrigation (DWRI) which is under Ministry of Energy, Water Resources, and Irrigation. My organization has mandate of Managing water induced disasters in my country. My educational background is Civil Engineering and I work for DWRI to design estimate and implement the mitigative measures for water related disaster.

It has been so happy moment for me that I am pursuing master's program in ICHARM. I am confident that this targeted course for us will be fruitful to me and my country. Learning from proven disaster management knowledge from Japan as well as other participants country will help us grow further in managing the disaster sector. ICHARM has provided us very sound and well-organized environment to learn with recognized professors. I am looking forward to making most of it.



I am Ailene Abelardo from the Republic of the Philippines. I finished my bachelor's degree in Meteorology at Central Luzon State University (CLSU), Philippines. I am a hydrometeorologist in the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) since 2017. My duty as a hydrometeorologist includes the formulation and dissemination of flood warning and information, general flood advisories for principal river basins, hydro-forecast for major river basins, and monitoring of daily dam operation. It is a great honor to be part of the 2021-2022 batch of master's degree program in Flood Disaster Risk Reduction organized by JICA, GRIPS and ICHARM, PWRI. This program offers a good opportunity to acquire knowledge from various experts here in this institution and gain new skills and experiences through field studies about water-related disaster management. I believe that through this program, my technical skills will be improved and will be beneficial when I return to my country.



I am Erwin Rafael D. Cabral from the Philippines. I have been working as an instructor/ faculty researcher in Civil Engineering Department, College of Engineering, Architecture and Fine Arts (CEAFA), Batangas State University – Alangilan. I am a Registered Civil Engineer and Master Plumber in the Philippines and have a degree of Master in Engineering Major in Civil Engineering.

I am sincerely honored to be accepted as one of the students of this Master's Program in Flood Disaster Risk Reduction. Thank you very much BatStateU, JICA, GRIPS, and ICHARM/PWRI for giving me this once-in-a-lifetime opportunity to gain more knowledge and experience in the field of Water-Related Studies here in Japan. This undertaking will improve my capacity to contribute more to the betterment of my country.



I am Ibra Lebbe Ziyaroun, from Sri Lanka. I was born in Kalmunai, eastern province of Sri Lanka. I am working as a Chief Engineer of Sri Lanka Land Development Corporation (SLLDC) under the Government of Sri Lanka. I was graduated in 2010 from University of Peradeniya Sri Lanka. I completed my Professional Review in 2015 in Institute of Engineers Sri Lanka (IESL) and become a Chartered Engineer.

I am glad to join ICHARM and GRIPS for studying Master Program in Flood Disaster Risk Reduction under the Disaster Management Policy Studies. Since my company's main activity is Urban Flood Control, This masters program is a great opportunity and useful not only for me but also for my company and people of Sri Lanka in so many ways especially in Disaster Management System.

This course gives me the chance to study natural disasters, how to handle natural hazards & vulnerability and to share knowledge about disaster management with several international students. I am lucky to study under such quality Professors & Lecturers, and I appreciate their guidance and kindness toward achieving our goal.



AYUBOWAN...! [wishing the recipient, a long life...!]. I'm Aruna from Sri Lanka. I have been working in Irrigation Department as an Irrigation Engineer since 2010. I worked in several parts of the country and gained novel experiences.

The behavior, attitude, and way of thinking toward life and works are positive in Japanese people. I am looking forward to strengthening bilateral relations with the Japanese culture which is known as one of the best cultures in the world.

Since childhood, I have been experiencing flood disasters hence my house in a flood-prone area. I am glad to join ICHARM and GRIPS to study a Master's Program on Disaster Management Policy. The output can apply directly to my home people and uplift their living standards. Ultimately, my findings will help to achieve the sustainable development goals of my country.



I, Sandrasegaram Nerojan, from the land of singing fish, Batticaloa in Sri Lanka, a Chartered Engineer currently attached to the Department of Irrigation as Chief Engineer. I have been directly involved in designing and implementing irrigation infrastructures and water resources management. I was attracted by ICHARM as my colleagues who underwent the master's degree program showed their performance in the field. I am excited to learn and expand my professional network. I am certain that the new technologies, skills, and experiences I am going to gain, will be an asset for my lifetime and I can contribute to my motherland to further develop and implement flood mitigation systems and infrastructure to minimize the disaster and ensure the peaceful living, uninterrupted farming and irrigation.

# 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2015年度（4期）博士課程を卒業し、2018年12月より2年間専門研究員としてICHARMに在籍したRobin Kumar Biswas氏（バンラデシュ）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. Robin Kumar Biswas (Bangladesh), who graduated from the doctoral program in 2016 and worked at ICHARM as a research specialist for two years from December 2018, has kindly contributed the following article to this issue.

## Robin Kumar Biswas

**Superintending Engineer (Civil), Directorate of Planning-III  
Bangladesh Water Development Board**



I spent seven stimulating years in Japan, starting from 2009. ICHARM is a place where I spent most of my time in Japan. ICHARM started its journey of an international education program in 2008. I became acquainted with ICHARM in 2009 when I joined the Disaster Management Program as a postgraduate student. After that, ICHARM became an important part of my professional development. No matter where I am, I always remember the numerous sweetest memories of ICHARM. I consider myself very fortunate that my research endeavors have been in parallel with ICHARM's success.

I joined ICHARM's Ph.D. program in 2013 and began to work with Prof. EGASHIRA Shinji. In Sanskrit, a teacher is called 'adhyāpaka,' whose sole business is not to teach, preach, instruct or advise but to guide, help or facilitate an aspirant to attain the true knowledge by transcending the limitations of instruments, as well as to enlighten them to seek the truth incessantly. Prof. EGASHIRA Shinji was more than a Ph.D. supervisor to me. I always feel proud to introduce myself as one of his students.

In the Ph.D. program, I studied the suspended sediment transport process, the morphodynamics of mega rivers, and numerical modeling. I learnt the fundamentals of channel changes in braided rivers and proposed a modification to the erosion rate term by including the lateral bed slope. I also proposed a bank erosion model capable of computing the bank shifting using coarse-sized grids. Afterward, I worked at ICHARM as a research specialist for two years from December 2018, studying river bed evolution and sediment sorting during a large flood event and how to assess their impacts on the stage-discharge relationship.

After returning to Bangladesh in December 2020, I joined the Bangladesh Water Development Board (BWDB) as an executive engineer (Civil). Since then, I have been working at BWDB. Last February, I was promoted to superintending engineer (Civil). Assuming the charge of the Directorate of Planning-3 of BWDB, my first mission was to complete the execution of the Dutch-aided Blue Gold Program (BGP). The BGP aimed to reduce poverty in the coastal area by enhancing the livelihood of the rural population through more efficient water resources management and also to increase the productivity of crops, fisheries, and livestock in the polders by empowering the communities to be the driving force. The execution of the BGP's activities started in 2013 and ended in December 2021. Recently, I made the final presentation on the BGP in the presence of the State Minister of the Ministry of Water Resources, Bangladesh, the Dutch Ambassador, and other high-level government officials. I also provided a lecture on Participatory Water Management in a workshop arranged by the General Economic Division of Bangladesh. The details of the BGP are



Presenting outcomes of the BGP in the presence of State Minister, Ministry of Water Resources

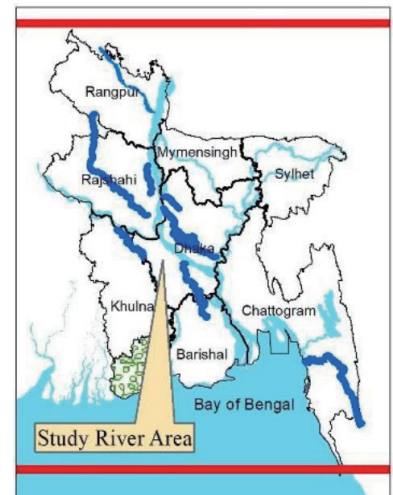
available at [www.bluegoldwiki.com](http://www.bluegoldwiki.com).

Bangladesh lies in the deltaic deposits of the Ganges-Brahmaputra-Meghna River system, which is more commonly known as the Bengal Delta, the second largest delta in the world. Every year, these rivers carry about one trillion cubic meters of water and one billion tons of sediment. The huge amount of sediment is the main driver behind the dynamic morphological nature of our rivers. The mega rivers in Bangladesh, such as the Ganges and the Brahmaputra, are very dynamic. It is difficult to manage such rivers without solid scientific research. Recently, I have initiated a research project aiming to conduct hydro-morphological analysis for identifying the dynamic behavior and erosion-accretion pattern of sandbars in the Jamuna River. The total cost of this research project is 4450 million Bangladeshi Taka. Under this project, attempts have been undertaken to prepare an inventory of the sandbars and identify the zones where the spatio-temporal changes of the sandbars are most frequent.

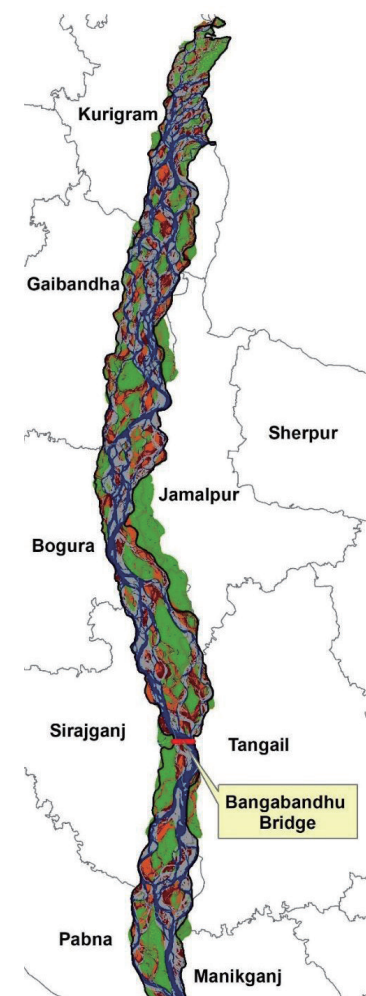
Bankline shifting and avulsion are frequent phenomena. The alluvial floodplains of the rivers are prone to erosion as they are composed of highly unconsolidated and erodible sediment. Monsoon floods associated with severe riverbank erosion occur across the country every year, affecting thousands of hectares of those floodplains. Erosion prediction for medium rivers holds crucial importance, just like it does for large ones. For this reason, I have also started a research project for riverbank erosion prediction and vulnerability assessment for the medium rivers of Bangladesh. Nine medium rivers have been selected for this study, including Teesta, Atrai, Ichamati, Pungli, Dhaleshwari, Arial Khan, Gorai, Kaliganga, and Sangu. The development of such a prediction system involves planform analysis using satellite images and mathematical modeling. I am also involved in research projects on integrated water management and climate resilient infrastructure and livelihood for the coastal population. The projects also include sediment management in a tidal river. It is worth mentioning that I have been nominated as a member of the ICID Asian Regional Working Group (ASRWG) by the Bangladesh National Committee of ICID (BANCID). ICID stands for the International Commission on Irrigation and Drainage.

At ICHARM, I had the privilege of meeting excellent mentors, supervisors, researchers, friends, and expert colleagues. The precious experience of working with an outstanding research group has enabled me to connect with researchers around the world and also contributed to easing my work in Bangladesh. I still miss after-lunch badminton at the entrance hall, smiling faces of the staff, thought-provoking discussions with experts' groups, the warm welcome of fellow researchers, and a lot of support from experts. I wish every day that I could join them again.

Currently, the whole world is facing the consequences of the COVID-19 pandemic. I am happy to learn that all the members of the ICHARM family are safe and healthy and have been able to continue their research endeavors. I look forward to working together again. My heartfelt thanks to ICHARM's education and capacity building program.



Selected medium rivers for erosion forecasting in Bangladesh



Study area for sandbar dynamics in Jamuna River

# Information Networking

## Typhoon Committee 10th meeting of Working Group on Hydrology and 16th Integrated Workshop 台風委員会第10回水文部会および第16回統合部会

2021年10月22日に台風委員会水文部会の第10回年次会合が国土交通省の主催によりオンラインで開催されました。会議には11のメンバー国・地域(中国、香港、日本、ラオス、マレーシア、フィリピン、韓国、シンガポール、タイ、ベトナム、アメリカ)と台風委員会事務局から約30名が参加しました。日本からは国土交通省水管理・国土保全局国際室、気象庁アジア太平洋気象防災センター、一般社団法人国際建設技術協会から参加があり、ICHARMからは河元隆利主任研究員と宮本守研究員(水文部会議長)が参加しました。今年の会合のテーマは「流域治水-COVID-19後の世界における統合管理への挑戦-」とされ、各メンバー国・地域の報告では、近年の台風の発生や被害に関する報告に加え、水災害に対するレジリエンスと持続可能性の観点から活動報告や議論がなされました。水文部会の年次実行計画(AOPs)については、COVID-19感染症拡大の影響を受けつつも実施可能な方法によって得られた成果を共有し今後の計画について議論が交わされました。

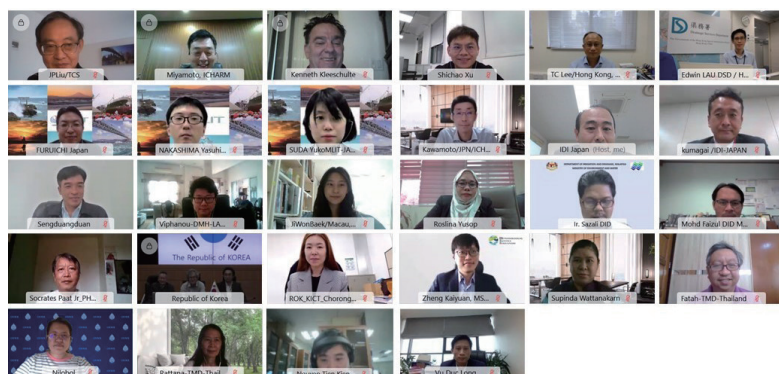
12月2日および3日には、台風委員会第16回統合部会が国連アジア太平洋経済社会委員会(UNESCAP)と台風委員会事務局の主催でオンライン開催されました。初日午前の全体会合では、今年のテーマである「台風関連災害のリスク軽減能力向上のためのインパクトベース予測強化」について7件の発表が行われ、その後2022年から2026年までの新たな戦略計画について議論が交わされました。午後には部会別セッションが開催され、宮本研究員が議長を務めた水文部会セッションでは国土交通省国際室から流域治水政策の詳細や実践例について興味深い発表が行われ参加者の間で活発な議論が交わされました。さらに、これまでのAOPsのレビューや来年度からの新たなAOPsの提案、2022年から2026年までの新たな戦略計画の水文に関する優先行動など多くの議題も話し合われました。2日目には宮本研究員から水文部会の年次会合と統合部会の水文部会セッションでの議論や成果が全体会合において報告されました。

ICHARMでは、台風委員会を水災害リスク軽減のための最も重要な国際的枠組みの1つと位置づけ、引き続き地域間協力の強化のために貢献していく予定です。

The 10th meeting of the Working Group on Hydrology (WGH) of the Typhoon Committee (TC) was held online on October 22, 2021, by the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT). The meeting was attended by about 30 participants from 11 Members (China, Hong Kong, Japan, Lao PDR, Malaysia, the Philippines, Republic of Korea, Singapore, Thailand, Vietnam, and the United States of America) and the TC secretariat. The participants from Japan included those from the International Affairs Office of the Water and Disaster Management Bureau of MLIT, the Asia Pacific Meteorological Disaster Prevention Center of the Japan Meteorological Agency, the Infrastructure Development Institute, and ICHARM. Two researchers attended from ICHARM: Senior Researcher KAWAMOTO Takatoshi and Researcher MIYAMOTO Mamoru, who presently serves as the chair of WGH. The participants reported and discussed their activities in terms of resilience and sustainability against water-related disasters, in addition to regular reports on typhoons and damage caused by them, in line with the meeting's theme, "River Basin Disaster Resilience and Sustainability by All -Challenges for Integrated Management in the Post-COVID-19 World-." Regarding the Annual Operation Plans (AOPs) of WGH, the meeting shared achievements gained through activities that were carried out despite the restrictions in place to prevent the further spread of COVID-19 and also discussed future plans of AOPs.

The Economic and Social Commission for Asia and the Pacific (UNESCAP) and the TC secretariat co-hosted the 16th Integrated Workshop (IWS) online on December 2-3. At the plenary session on the morning of the first day, seven experts and officers delivered a presentation on this year's theme, "Strengthening Impact-based Forecasting for Improving the Capacity of Typhoon-related Disaster Risk Reduction." After that, the participants had discussions on TC's next strategic plan from 2022 to 2026. In the afternoon, parallel sessions were held for each working group. At the WGH session, chaired by Dr. MIYAMOTO, an officer of the International Affairs Office in the Water and Disaster Management Bureau, MLIT, gave an interesting presentation on the details and practical examples of Japan's new flood management policy, "River Basin Disaster Resilience and Sustainability by All." His presentation led the participants to have lively discussions on the topic. Furthermore, the participants discussed many other agenda items, including reviews of AOPs activities to date, proposals of new AOPs starting from the next year, and hydrological priorities in the new strategic plan from 2022 to 2026. On the second day, Dr. MIYAMOTO reported the discussions and results of the WGH meeting and the parallel session in IWS at the plenary session.

ICHARM identifies the Typhoon Committee as one of the most important international frameworks for the risk reduction of water-related disasters and continuously contributes to strengthening interregional cooperation to achieve the goal.



Participants in the meeting of Working Group on Hydrology  
水文部会年次会合の参加者

(Written by MIYAMOTO Mamoru)

## “ICHARM Webinar 2021: Interaction with students and young researchers” was held

### ICHARM Webinar 2021 - 学生・若手研究者との交流 -

ICHARM held an online event, “ICHARM Webinar 2021: Interaction with students and young researchers,” on December 13, 2021. The event was organized with the aim of sharing research activities at ICHARM with those interested, particularly students and young researchers.

Although face-to-face events are restricted due to the COVID-19 situation, taking advantage of the event being online, the invitation was extended overseas through the ICHARM homepage and newsletters. The event was attended by a total of 24 national and international participants.

The webinar was composed of two main sessions: Plenary Session and Thematic Parallel Session. In the Plenary Session, Executive Director KOIKE Toshio delivered opening remarks, and Deputy Director ITO Hiroyuki outlined the activities of ICHARM, including its three pillars of innovative research, effective capacity building, and efficient information networking. This was followed by a short message from a young researcher of ICHARM, NAITO Kensuke, and a brief introduction of the main research areas covered by ICHARM: hydrology, meteorology, sediment transport and channel changes, and disaster risk reduction. The Plenary Session was closed with a group photo session.

In the Thematic Parallel Session, the participants were divided into three parallel sessions: a) Hydrology and Meteorology, b) Sediment Transport and Channel Changes, and c) Disaster Risk Reduction. The Thematic Parallel Session was repeated twice, so that the participants learned about at least two main research areas. During the parallel sessions, the participants asked many questions regarding the research topic and ICHARM’s activities such as “Which of a linear rainband and a typhoon is easier to predict?” and “How can machine learning techniques and AI can be used in the area of the sediment transport?”. They also engaged in active discussions with ICHARM researchers.

ICHARM hopes that the participants will become more interested in its activities and collaborate in any form with ICHARM in the future.



Group Photo with participants  
参加者と記念撮影

(Written by NAITO Kensuke)

ICHARM はオンラインイベント「ICHARM Webinar 2021 - 学生・若手研究者との交流」を2021年12月13日に開催しました。本イベントは主に大学・研究機関に在籍する学生および若手研究者を対象に、ICHARMの研究活動について広く情報発信をすることを目的として開催されました。

新型コロナウイルスに関わる状況から対面での開催は難しいものの、オンラインの強みを活かし、対象者を日本国内のみならず海外にも広げ、ICHARM ホームページや ICHARM ニュースレターを通じて広く周知を行いました。イベント当日は国内外より計24名にご参加いただきました。

ウェビナーは大きく分けて全体会議とテーマ別分科会の2つのセッションから構成されました。全体会議では小池俊雄センター長による開会あいさつ、伊藤弘之グループ長による ICHARM の活動紹介、内藤健介研究員による若手研究者からのメッセージ、そして ICHARM のメイン研究テーマである水文学、気象学、流砂・流路変動、防災についての紹介が行われ、最後に参加者と記念撮影を行いました。

その後のテーマ別分科会では、参加者は3つの分科会：a) 気象・水文、b) 流砂・流路変動、c) 防災に別れ、グループごとに ICHARM 研究者と質疑応答、意見交換および交流が行われました。テーマ別分科会は2回行われ、参加者は少なくとも2つの ICHARM 研究分野について知ることができるよう構成されました。分科会では「線状降水帯と台風のどちらが予測しやすいか？」や、「土砂水理分野において、機械学習や AI はどのように利用され得るか？」などの質問があり、参加者の高い関心が伺われました。

本イベントを通じて、参加者の ICHARM への理解が深まったことを期待すると同時に、将来何らかの形で参加者の皆さんとお仕事ができることを楽しみにいたしております。

## Public symposium at National Conference for Promoting Disaster Risk Reduction 2021 ぼうさいこくたい 2021 公開シンポジウム

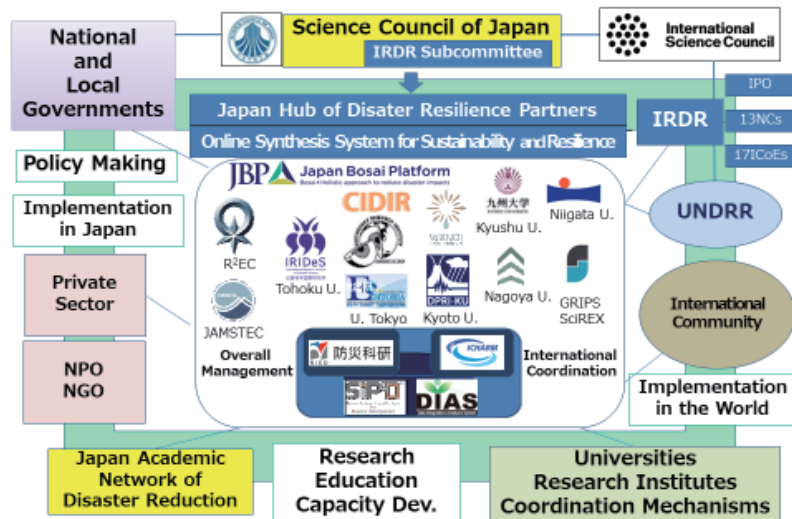
2021年11月6日、「ぼうさいこくたい 2021 公開シンポジウム：21世紀の国難災害を乗り越えるレジリエンスとは～防災統合知の構築戦略～」がオンラインにより開催されました。本シンポジウムは、防災減災連携研究ハブ (JHoP) 及び日本学術会議土木工学・建築学委員会 IRDR 分科会が主催しました。このうち JHoP は科学知に基づく災害に強い社会の構築を目指すため、ICHARM を含め、日本を代表する 15 の防災に関する大学や研究機関等によって構成されています。

シンポジウムでは宮本守研究員により IFI の水のレジリエンスと災害に関するプラットフォーム活動の一環としてフィリピン・ダバオ市とともに実施した e-learning ワークショップについて発表を行うとともに、そうした e-learning を通じてファシリテーターの育成、オンライン・シンセシス・システムの作成について紹介されました。また小池俊雄センター長からは閉会の挨拶として、南海トラフ地震、首都直下地震といった国難災害に対して統合知を作成して活用していくことが重要であると述べられました。  
URL : <https://bosai-kokutai.jp/S40/>

On November 6, 2021, a public symposium was held online at the National Conference for Promoting Disaster Risk Reduction 2021 under the title of “What is resilience to overcome the national catastrophes for Japan in the 21st century - Strategy for establishing consilience of knowledge on disaster risk reduction”. This symposium was organized by the Japan Hub of Disaster Resilience Partners (JHoP) and the Subcommittee for Integrated Research on Disaster Risk (IRDR) of the Committee for Civil Engineering and Architecture, which is part of the Science Council of Japan. JHoP is composed of 15 prominent universities and research institutions in Japan, including ICHARM, involved in disaster resilience research aiming to contribute to the creation of science-knowledge-based disaster resilient societies.

At the symposium, Researcher MIYAMOTO Mamoru presented an e-learning workshop organized with Davao City, the Philippines, as a part of the activities of the Platform on Water Resilience and Disasters under IFI. He also spoke about fostering facilitators to bridge the gap between experts and citizens and developing an online synthesis system for sustainability and resilience through this e-learning. In closing remarks, Executive Director KOIKE Toshio emphasized the importance of creating and utilizing the consilience of knowledge to overcome the future national catastrophes for Japan, such as the Nankai Trough Earthquake and Tsunami Disasters and the Tokyo Metropolitan Earthquake.

URL: <https://bosai-kokutai.jp/S40/>



Concept of JHoP structure  
JHoP 組織概念図

(Written by IKEDA Tetsuya)

## Participation in the 28th UNESCO-IHP Regional Steering Committee Meeting for Asia and the Pacific 第 28 回ユネスコ IHP アジア太平洋地域運営委員会への参加

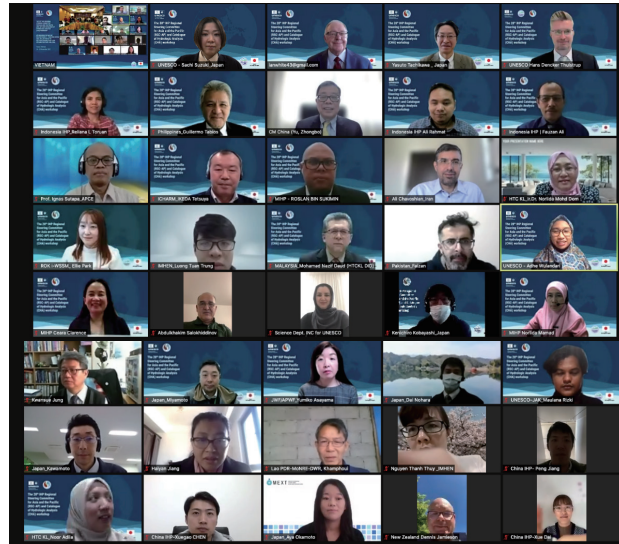
2021年11月24日、COVID-19 感染症拡大による昨年からの延期を受けて UNESCO-IHP アジア太平洋地域運営委員会の第 28 回会合がベトナム気象・水文・気候変動研究所 (IMHEN) の主催によりオンラインで開催されました。会合では IHP 政府間理事会における IHP 9 期計画 (2022～2029 年) に関する議論の動向や来年 4 月に予定されている第 4 回アジア太平洋水サミットの準備状況等が報告されるとともに、アジア太平洋地域の IHP 国内委員会代表からそれぞれ活動報告が行われまし

On November 24, 2021, the 28th meeting of the UNESCO-IHP Regional Steering Committee for Asia and the Pacific was held online. It was organized by the Vietnam Institute of Meteorology, Hydrology and Climate Change (IMHEN) after a one-year postponement due to the COVID-19 pandemic. At the meeting, several topics were reported, including the recent discussion on the IHP Phase IX (2022-2029) at the IHP Intergovernmental Council and the preparation for the 4th Asia Pacific Water Summit, scheduled for next April. Country presentations followed by the representatives of the IHP National Committee of Asia and the Pacific.

On behalf of ICHARM, as one of the UNESCO Category 2 Water Centres, Director for Special Research IKEDA Tetsuya presented its recent activities on research, training,

and networking. Subsequently, Researcher MIYAMOTO Mamoru and Senior Researcher KAWAMOTO Takatoshi spoke about an e-learning for Davao City, the Philippines, and for Indonesia, respectively.

On the next day, November 25, a "Catalogue of Hydrologic Analysis (CHA)" workshop was held, where CHA volume 2, "Dam reservoir operation for addressing water-related disasters, water scarcity and quality," was introduced. At the end of the workshop, the participants discussed the next edition (CHA volume 3).



Group photo of the participants  
参加者集合写真

(Written by IKEDA Tetsuya)

た。

水関連ユネスコカテゴリー2センターからは、ICHARMを代表して池田鉄哉特別研究監が研究・研修・ネットワークに関する最近の活動について発表を行い、宮本守研究員からはフィリピン・ダバオ市について、また河元隆利主任研究員からはインドネシアについてのe-learningがそれぞれ紹介されました。

翌11月25日には水文解析カタログ(CHA)のワークショップが開催され、CHA第2編「水災害と水不足・水質管理のためのダム貯水池操作」が紹介されました。そしてワークショップの最後には次のCHA第3編に関する議論が行われました。

## Coming Events

### Follow-up Seminar for ICHARM Graduates

ICHARM has been operating master's and doctoral programs in collaboration with GRIPS and JICA and produced 157 master's degree holders and 15 doctoral degree holders from 37 countries. Our programs have been steadily improved as we have accepted more students from around the world and given feedback from them. In order to share experiences, scientific knowledge, and technical issues to be overcome, as well as to deepen the collaboration among graduates and between graduates and ICHARM, we are pleased to inform you that a follow-up seminar will be held online on February 25, 2022, from 5:00 p.m. to 8:30 p.m. in JST.

We are hoping to see as many graduates as possible in this seminar. Please tell your fellow graduates about this coming event and encourage them to be there.

#### Design of the seminar

##### 1. Opening

##### 2. Special Lectures (60 minutes) (3 guests x 20 minutes)

##### 3. Focus group discussions

##### Session 1 (50 minutes):

The participants discuss topics of their interest in groups. They will have been divided into several groups prior to the seminar, based on the topics of their interest described on the registration sheets.

##### Session 2 (50 minutes):

ICHARM is always eager to provide better educational and research environments for students. In this session, the participants will be expected to share their thoughts and ideas to help ICHARM further improve how it operates training, education, and research. After being divided into several groups (for example, by region), the participants will discuss issues concerning 1) education at ICHARM and 2) desired systems or programs that may help graduates strengthen their capacities.

##### 4. Summary on focus group discussions (25 minutes)

-Each facilitator briefly summarizes their group's discussions in Sessions 1 and 2.

##### 5. Closing

#### Number of Annual Graduates

	MS	PhD
2008	10	
2009	7	
2010	12	
2011	12	
2012	19	
2013	12	1
2014	12	1
2015	13	2
2016	13	3
2017	8	
2018	14	2
2019	7	2
2020	11	1
2021	7	3

(Written by EGASHIRA Shinji)

## The ICFM9 website is now open

ICFM9 Website が開設されました

第9回洪水管理国際会議 (ICFM9) が2023年2月18日から22日まで、茨城県つくば市で開催されます。会議の全体テーマは、「流域治水ーポストコロナ下における統合型洪水管理」であり、ポストコロナ下における気候変動への適用も含めた流域治水等に関して、学識経験者、政策立案者、技術者、現場実務者などが、科学的、技術的、社会的、経済的観点から、関連する幅広い問題について包括的に議論することを予定しています。全体テーマに合わせて、4つの全体会合と10の平行セッション及びポスターセッションが予定されています。トピックスは、水災害・土砂災害管理、データ統合・モデリング・予測及び警報技術等の自然科学、ファイナンス・水災害マネジメントに関する教育等の社会科学、水災害・土砂災害への強靱化とSDGsの融合、これらを支える体系的アプローチ等、多岐にわたるトピックスをテーマとしています。主要日程は、2022年2月28日にアブストラクト提出のメー、受理通知が2022年5月31日、参加登録のメーが2022年12月31日です。ICFM9の詳細に関しては、WEBサイトの参照をお願いいたします。皆様の積極的な参加をお待ちしております。

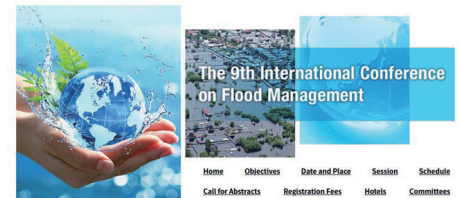
<https://icfm9.jp/index.html>

The 9th International Conference on Flood Management (ICFM9) will be held in Tsukuba, Japan, from February 18 to 22, 2023. The overarching theme of the conference is "River Basin Disaster Resilience and Sustainability by All: Integrated Flood Management in the Post COVID-19 Era." Researchers, policymakers, engineers, and field practitioners will get together and have comprehensive discussions on a wide range of issues related to integrated flood management under and after the COVID-19 pandemic, including climate change adaptation, and "River Basin Disaster Resilience and Sustainability by All" from scientific, technical, social and economic perspectives.

Four plenary sessions, as well as poster and parallel sessions on ten different topics, will take place during the conference. The topics will cover issues in natural science, such as flood and sediment disasters, data integration, modeling, forecasting, and early warning, and issues in social science, such as finance and education on flood management. They also include issues regarding the enhancement of flood disaster resilience and its integration with SDGs and system approaches to support such efforts.

The preparation has already begun. The abstract submission is currently in process and will be open until February 28, 2022. Abstract acceptance notifications will be sent to those accepted by May 31, 2022. The online registration will be open and continue to be so until December 31, 2022. Detailed information on the conference is available on the ICFM9 website. ICFM9 looks forward to your active participation.

<https://icfm9.jp/index.html>



River Basin Disaster Resilience and Sustainability by All - Integrated Flood Management in the Post COVID-19 Era

### Welcome

We are pleased to invite you to the 9th International Conference on Flood Management (ICFM9), held in Tsukuba, Japan, on February 18-22, 2023.

ICFM provides a unique opportunity for various experts and policymakers around the world to discuss and exchange ideas and experiences about a broad range of flood-related issues.

### Topics

We are now accepting abstracts. Authors should submit their abstract (up to 1,000 characters) by February 28, 2022. Please go to Call for Abstracts for detailed instruction and abstract submission.

### Important dates

Abstract Submission Deadline: by February 28, 2022 (starts Nov.30, 2021)

Acceptance Notification: May 31, 2022

Extended Abstract submission: by October 31, 2022

On-line Registration: Starts from April 1, 2022

On-line Registration (Early Bird): By October 31, 2022

On-line Registration: by December 31, 2022



Venue:  
Epochal Tsukuba International Congress Center, Tsukuba, Japan



URL: <https://icfm9.jp/index.html>



The ICFM9 website with conference venue information  
ICFM9のウェブサイトと会場

(Written by DENDA Masatoshi)

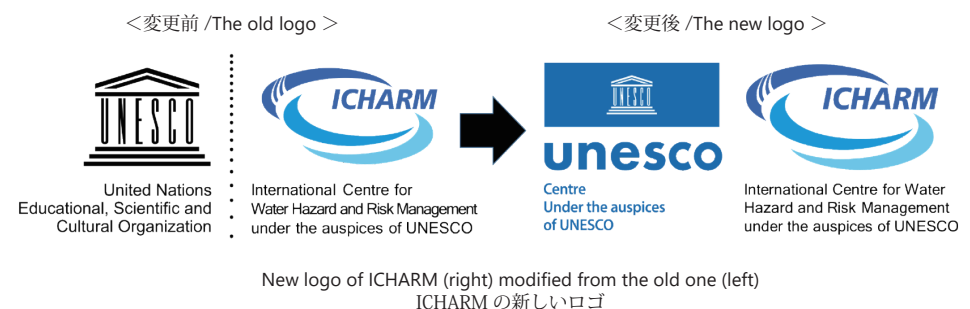
## Miscellaneous

### New logo of ICHARM

ICHARM のロゴデザインを変更します

UNESCO ではデジタルでインタラクティブなコミュニケーション環境での視認性向上のためにロゴデザインが変更されることとなりました。UNESCO カテゴリー2センターである ICHARM のロゴについても、デザインの一部が変更となります (ICHARM 自体のロゴデザインについての変更はありません)。

The UNESCO logo design will be changed to improve its visibility in digital, interactive communication environments. Accordingly, as a Category 2 Centre, ICHARM will change its logo as follows (though there is no change in the ICHARM logo itself):



(Written by KAWAMOTO Takatoshi)

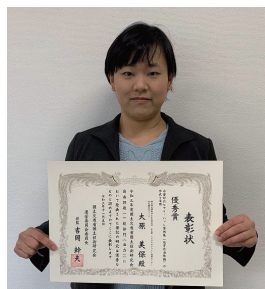


## Awards / 受賞リスト

\* October - December 2021

- Senior Researcher OHARA Miho and Chief Researcher FUJIKANE Masakazu were awarded Outstanding Research Award presented by the Research Group for National Land and Infrastructure Technology of the Ministry of Land, Infrastructure, Transport and Tourism

Award winning paper:  
Publication and Use of "Collection of Critical Situations during Flood Emergency Response for Local Governments"



大原美保主任研究員、藤兼雅和上席研究員が国土交通省国土技術研究会自由課題（一般部門（活力））にて優秀賞を受賞しました。

受賞論文：  
水害対応ヒヤリ・ハット事例集（地方自治体編及び別冊：新型コロナウイルス感染症への対応編）の作成と活用

## Publications / 発表論文リスト

\* October - December 2021

## 1. Journals, etc. / 学術雑誌（論文誌、ジャーナル）

- Hiroyuki Tsutsui, Yohei Sawada, Katsuyoshi Onuma, Hiroyuki Ito and Toshio Koike, Drought Monitoring over West Africa Based on an Ecohydrological Simulation (2003-2018), *Hydrology*, 2021, October, Vol.8, 155, pp.1-16

## 2. Oral Presentations (Including invited lectures) / 口頭発表（招待講演含む）

- 大原美保、南雲直子、藤兼雅和、岩手県岩泉町における平成28年台風第10号災害からの回復力の分析、第40回日本自然災害学会学術講演会梗概集、第40回日本自然災害学会学術講演会 (Online)、2021年9月、pp.119-120、日本自然災害学会、2021年9月12日
- 小池俊雄、治水ルネッサンス 一持続可能でレジリエントな社会を目指してー、SDGs AICH EXPO 2021 「コロナ禍における水災害対策に関する国際シンポジウム」、国際連合地域開発センター、愛知県国際展示場 (Aich Sky Expo)、2021年10月22日
- 大原美保、藤兼雅和、水害対応ヒヤリ・ハット事例集（地方自治体編）の作成と活用、発表課題論文集、2021年11月、令和3年度国土交通省国土技術研究会 (Online)、国土交通省、2021年11月4日～5日
- Toshio Koike, Roles of science and technology in enhancing disaster resilience and sustainability under climate change by all, 31st NATIONAL CONGRESS OF CIVIL ENGINEERING - MEXICO "Infrastructure for a sustainable future" (Online), メキシコ土木工科大学(CICM), メキシコ, November 24, 2021
- 小池俊雄、「変化を乗り越え、誇りある流域づくり」、吉田川流域治水シンポジウム、大崎市、鎌田記念ホール、2021年11月28日
- 小池俊雄、気候変動の将来予測情報の行政施策（治水計画）への実装、令和3年度第3回気候変動適応セミナー (Online)、国立研究開発法人国立環境研究所、2021年12月1日
- Shrestha B.B., Kawasaki A., Inoue T., Matsumoto J. and Shiroyama T., Impact of Rainfall Variability on Rice Yield in Burma during Historical Colonial Period, Annual Conference on Asian Network for GIS-based Historical Studies 2021 (ANGIS Tokyo 2021), 2021 December, Asian Network for GIS-based Historical Studies (ANGIS) (Online), December 4-5, 2021
- 小池俊雄、中村茂、Cho Thanda Nyunt、牛山朋来、Mohamed Rasmy、発電ダムの洪水調節と発電操作支援システム、第66回水工学講演会・水工学論文集、第66回水工学講演会 (Online)、土木学会、2021年12月8日
- 玉川勝徳、MOHAMED Rasmy, NASEER Asif, 牛山朋来、中村茂、犀川流域におけるダム流入量のアンサンブル予測手法の検討、土木学会論文集B1 (水工学)、2021年10月、Vol.77, No.2, pp.1\_61-1\_66、第66回水工学講演会 (Online)、土木学会、2021年12月8日～10日
- 原田大輔、江頭進治、中山間地河川における豪雨時の土砂流出評価法、土木学会論文集B1 (水工学)、2021年、Vol.77, No.2, pp.1\_601-1\_606、第66回水工学講演会 (Online)、土木学会、2021年12月8日～10日
- 大原美保、南雲直子、藤兼雅和、平成30年7月豪雨災害による被災事業所の直接被害・間接被害の実態分析、土木学会論文集B1 (水工学)、2021年12月、Vol.77, No.2, pp.1\_1387-1\_1392、第66回水工学講演会 (Online)、土木学会、2021年12月8日～10日
- 小池俊雄、治水ルネッサンス 気候変動下で持続的にレジリエントな流域づくりを目指して、阿賀川直轄改修100周年記念「気候変動のもとこれからの治水対策について考える」シンポジウム、国土交通省北陸地方整備局 阿賀川河川事務所長、会津若松市生涯学習総合センター、2021年12月12日

## 3. Poster Presentations / ポスター発表

- Daisuke Harada and Shinji Egashira, Method to Predict Sediment Runoffs Resulting from Heavy Rainfalls in Mountainous Drainage Basins, AGU Fall Meeting 2021 (Online), EP45B-1526, American Geophysical Union, New Orleans, LA, December 13-17, 2021
- Menglu Qin, Daisuke Harada and Shinji Egashira, A new approach to evaluate the basin-scale sediment discharge, AGU Fall Meeting 2021 (Online), American Geophysical Union, New Orleans, LA, December 13-17, 2021

## 4. Magazines, Articles / 雑誌、記事（土技資含む）

- 小池俊雄、追悼文恩師、高橋裕先生のご功績を偲んで、土木施工、2021年10月号、Vol.62, NO.10, pp.31
- 小池俊雄、巻頭言 気候変動下、排水ポンプの革新的発展に期待する、ぼんぷ、2021年10月、No. 66, pp.2-3
- 小池俊雄、雪国は明るい、水の文化、2021年11月、No.69, pp.35

## 5. PWRI Publications / 土研刊行物（土研資料等）

None / 該当者無し

## 6. Other/ その他

None / 該当者無し

## Editor's Note

### 編集後記

新年あけましておめでとうございます。

皆様にとって2021年はどのような年でしたでしょうか。日本では新型コロナウイルス感染症の拡大に伴って緊急事態宣言が年初より発出されており、出口の見えない状況が続きました。そのような中ではありましたが、1年延期された東京オリンピック・パラリンピックが7-8月に開催され、大きな希望を与えてもらいました。年末に向かっては、新たな変異株の出現に警戒しつつも、感染者数の急増には至っておらず、徐々に日常生活が取り戻されつつある、そんな1年でした。ICHARMにおいても、新規修士学生全員が無事入国し、対面での授業をスタートしました。

しかしながら、コロナ禍においても災害は起こります。静岡県では7月に集中豪雨を原因とした盛土の崩壊によって、また、九州地方では8月に発生した集中豪雨によって甚大な被害がもたらされました。世界に目を向けても、ドイツやベルギーでは7月に発生した豪雨により、大規模な洪水が発生しました。

2022年はこのような大災害がないことを願う一方で、将来起こり得る災害に対してICHARMでは防災・減災に向けた研究を行うべく、さらに精進する一年としたいと決意を新たにしています。

本年もみなさまのご支援ご鞭撻のほど、どうぞよろしく願いいたします。

ICHARM ニュースレター  
編集委員会  
内藤 健介

Happy New Year!

I hope that all readers had a nice 2021. From the beginning of 2021, Japan was under a state of emergency in response to COVID-19 wildly spreading across the country. Despite such a situation, the Tokyo Olympic and Paralympic Games took place in July and August after one year of postponement, and the world was moved by the performance of athletes. Luckily, the country did not see a drastic increase in infections toward the end of the year. While still highly alerted about a new variant spreading around the world, people in Japan were finally able to start getting back to normal life after a long, depressing time, though very slowly. ICHARM welcomed all new master's students and began classes in person, largely as scheduled.

Though much attention currently tends to be paid to COVID-19, disasters did occur during 2021 just like they had in the past. In Japan, a massive debris flow occurred in Shizuoka Prefecture after heavy rain in July. An extreme rainfall event brought about tremendous damage in the Kyushu area in August. There were many disasters worldwide, too. In July, for example, extremely severe floods hit Germany and Belgium. I truly hope that the world will not see such catastrophes in 2022. In the meantime, ICHARM will work hard to continue making progress in our research and other activities to contribute to disaster risk reduction around the globe.

May this year be filled with happiness and hope for all people around the world. ICHARM is looking forward to expanding further collaboration with you!

ICHARM Newsletter Editorial Committee  
NAITO Kensuke

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