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

Message from Executive Director

Shifting the world onto a sustainable and resilient path

Speech at the Closing Ceremony of JICA Knowledge Co-Creation Program on "Flood Disaster Risk Reduction" 2020 on September 14, 2021
2020 年度 JICA 課題別研修「洪水防災」閉講式でのスピーチ（ICHARM にて 2021 年 9 月 14 日）

The 2030 Agenda, adopted at the United Nations Sustainable Development Summit in September 2015, states: "We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path."

To solve the confrontation between the North and the South in discussions on the environment and development, a new concept, "sustainable development," was introduced by the UN World Commission on Environment and Development, commonly known as the Brundtland Commission, in 1987. They defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Based on the discussions for a quarter of a century after the definition, the seventeen goals and indicators have been identified.

In the 1970s, psychology paid first attention to "resilience" as a concept to understand patients who are somehow able to lead an ordinary life even though they have serious mental disorders and have to face severe adversities. In disaster-related fields, resilience is defined as "the ability to prepare and plan for, absorb, recover from or more successfully adapt to actual or potential adverse events." Methods to evaluate communities' resilience level are proposed by quantifying their abilities to absorb the impact, adapt to changes, and transform themselves according to changes or by integrating the temporal change of lost functions during the recovery process of social functions lost in a disaster.

With regards to the relationship between resilience and sustainability, there is a viewpoint that sustainability focuses on future outcomes in the long term, while resilience focuses on the process of coping with events that one faces right at the moment. Vulnerability, inclusiveness and transformability can be seen commonly in both concepts. To make a design of the path for the world to take, it is essential to understand the interactions between sustainablity and resilience.

October 29, 2021
KOIKE Toshio
Executive Director of ICHARM

持続可能でレジリエントな道筋への移行

2015 年 9 月の国連持続可能な開発サミットにおいて合意された 2030 アジェンダの前文では、「我々は、世界を持続可能でレジリエントな道筋に移行させるために緊急必要な，大胆かつ変革的な手段をとることに決意している。」と記されている。

環境と開発に関わる南北問題対立の解決の糸口を見出すために、「持続可能な開発」という新しい概念が、1987 年に国連環境と開発に関する世界委員会（通称、ブルントラント委員会）によって提示された。これは、「将来の世代のニーズを満たす能力を損なうことなく、今日の世代のニーズを満たすような開発」と定義され、その後の四半世紀の議論を経て、17 の目標と達成状況の指標が定められるに至った。

重篤な精神障害で厳しい逆境に直面しながらも適応的に生活できる患者を理解する概念として、心理学の分野で「レジリエンス」が注目され始めたのは 1970 年代であった。災害分野では、「困難な事態に対して備え・計画し、影響を緩衝し、回復・適応する能力」と定義されている。レジリエンスを計量する手法としては、衝撃の吸収力、変化への適応力、状況の変化に対して自己変革する能力や、災害によって失われた社会の機能を回復していく過程で、その失われた機能を時間的に積分した値の定量化が提案されている。

持続可能性とレジリエンスの関連性については、持続可能性が比較的時間軸を長くとって将来の成果に重点を置いているのに対し、レジリエンスは直面している事象を対象としてその取り組み過程に重点を置いているという見方がある。一方、脆弱性、包摂性、変容可能性等、両者に共通して見られる特徴もある。移行すべき道筋の設計とその実施において、持続可能性とレジリエンスの相互関連性の本質的理解が求められる。

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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/WpAi3bNxCHxUmFT46

回答期限：2022 年 1 月 28 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/WpAi3bNxCHxUmFT46
Survey to be done by: 28 January 2022
Time required: about 5 minutes

Special Topics

ICHARM signed an MoU on joint research with WRRDC, Nepal
ネパールの水資源研究開発センター（WRRDC）との協定書の締結について

ICHARM concluded a memorandum of understanding (MoU) regarding joint research on water resilience and disasters with the Water Resources Research and Development Centre (WRRDC) of Nepal. A kick-off meeting was held online on August 3, 2021.

WRRDC is an institute under the Ministry of Energy, Water Resources and Irrigation of Nepal. The institute was established in 2015 with the aim of conducting research and development in the water resource sector and providing job-related training for ministry officials. Its research covers river management, landslides, irrigation, water-related disaster risk reduction, and so on.

The objective of this MoU is to promote collaborative research on water resilience and disasters on the following cooperative themes:

1. Water-related disaster data archiving, sharing and statistics (Online Synthesis System (OSS) for water-related SDGs and disaster resilience)
2. Observing, modeling, predicting and reducing water-related disaster risks (Floods and droughts, Sediment disasters)
3. Monitoring and assessing water-related disaster risk changes (Climate change, Society change)
4. Support for policymaking and community of practice (Disaster alarming, Hazard mapping and contingency planning, Standardizing operation procedures)
5. Education and training (Expert training, Facilitator training)

At the kick-off meeting on August 3, the executive directors of WRRDC and ICHARM signed the MoU and delivered a speech. Dr. Shrestha, the executive director of WRRDC, expressed hope that this collaboration would support the achievement of their goals related to the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction. Indicating that the linkage between science and policy is the final goal, he also hoped that the collaboration will lead to reducing water-related disaster risks and building a water-resilient society.

Executive Director KOIKE Toshio of ICHARM pointed out in his speech that the full use of information technology would make it possible to integrate data and models, exchange scientific ideas and knowledge, and communicate deeply beyond various disciplines. He therefore proposed "end-to-end science," in which advanced two-way communication between the science community and society should be materialized so that science can act beyond its territory and interact with society. Following the executive directors' speeches, the meeting participants introduced themselves.

Since the MoU encompasses wide-ranging themes such as data sharing, ICHARM hopes that this joint research will proceed so that we can support the promotion of "end-to-end science" and contribute to enhancing disaster resilience and achieving sustainable development.

Participants in the online kick-off meeting.
キックオフ会議の参加者

(Written by ONUMA Katsuhiro)

ICHARMは、ネパール国水資源研究開発センター（Water Resources Research and Development Center、以下「WRRDC」）と水のレジリエンスと災害に関する共同研究の協定書を締結し、2021年8月3日にキックオフ会議をオンラインで行いました。

WRRDCは、ネパール国のエネルギー・水資源・灌漑省の下にあり、水資源分野の研究開発や省の職員に対する職務に関連するトレーニングを行なうことを目的として、2015年に設立されました。研究に関しては、河川管理、地滑り、灌漑、水災害リスク軽減等を対象としています。

協定書は、水のレジリエンスと災害に関する共同研究の促進を目的としており、協力分野のテーマは以下のとおりです。

1. 水関連の災害データのアーカイブ、共有、統計（水関連のSDGsと災害レジリエンスのためのオンライン統合システム（OSS））
2. 水関連の災害リスクの観測、モデル化、予測、及び削減（洪水と干ばつ、土砂災害）
3. 水関連の災害リスクの変化の監視と評価（気候変動、社会の変化）
4. 政策立案とコミュニティの実践支援（災害警報、ハザードマップ作成と緊急時対応計画、運用の標準化）
5. 教育研修（専門家研修、ファシリテーター研修）

8月3日のキックオフ会議では、両センター長が協定書に署名した後、それぞれ挨拶が行われました。WRRDCのShrestha センター長からは、この協力関係が持続可能な開発目標や仙台防災枠組みの達成につながることを期待しており、科学を政策に結び付けることが最終目標であり、協力関係が、水災害軽減や水災害に対するレジリエントな社会の創造につながることを願っているとのお話がありました。ICHARMの小池俊雄センター長からは、情報科学技術を駆使することで、データやモデルを統合し科学的なアイディアや知識を交換し、分野を越えた深いコミュニケーションが可能となる。このため科学コミュニティと社会の間の高度な双方向コミュニケーションを実現させ、科学がその領域を越えて行動し、社会と相互に影響しあう、「End to End Science（一気通貫の科学）」を提案したいとのお話がありました。両センター長の挨拶の後、会議参加者による自己紹介が行われました。

今回締結された協定書ではデータ共有等テーマも多岐にわたっていることから、この共同研究を進めることにより「End to End Science」の推進を支援し、社会の災害への耐性強化と持続可能な開発の実現に貢献できればと思います。

Research

Cooperation agreement on the improvement of IDRIS between Tsuruoka City and ICHARM
山形県鶴岡市との IDRIS に関する研究協力協定の締結

ICHARMは、近年、激甚化・頻発化する水災害に鑑み、水防災に関する情報の一元化を図り、地方自治体の防災担当者や住民間の水災害リスクコミュニケーション、防災・減災活動を支援する「ICHARM災害情報共有システム（ICHARM Disaster Risk Information System：IDRIS、イドリス）」を開発・改良してきました。研究協定を結んでいる新潟県阿賀町及び岩手県岩泉町の協力を得ながら改良を進め、スマートフォンでも閲覧しやすいIDRISも完成に近づいています。ただ、現在のIDRISは水災害に特化したサイトであり、一般市民が日常生活で閲覧する自治体からの情報サイトとは異なります。そのため、一般市民がIDRISの存在を知り、アクセスする可能性は低いと考えられました。そこで、一般市民が日常生活でサイトを閲覧した際、自然にIDRISが目に留まることが望ましいと考え、日常生活で用いられるアプリの一部にIDRISを埋め込む検討を進めていました。

その検討の過程で、山形県鶴岡市からIDRISのデジタル化による構造改革事業への参加の打診をいただきました。鶴岡市は、2020年度「SDGs 未来都市」に選定され、持続可能なまちづくりに向けた産官学連携による「デジタル化による構造改革事業（スマートシティ推進及びデジタルガバメント構築）」を進めています。中山間地を中心に激甚化・頻発化する災害の実情を受け、平時の防災意識の向上および有事の的確な状況把握・避難行動促進を実現するための防災・減災システムの構築は最重要課題の一つとして挙げられています。鶴岡市の求める防災分野のデジタル化に関するニーズとIDRISの技術シーズが合致したため、鶴岡市が進めるスマートシティ推進、及び、デジタルガバメント構築の防災・減災部分への協力の打診がありました。

上記のような経緯から、ICHARMと鶴岡市は、2021年8月6日に「災害情報共有システムに係る技術開発に関する連携・協力協定」を締結し、IDRISの実装研究を行うこととしました(図)。IDRISは、鶴岡市に関する様々な災害に関する情報や現地の状況を1つのホームページにまとめる「災害情報ポータルサイト」になると同時に、鶴岡市民が日常生活で利用するWEBサイトと親和性の高いサイトへ発展する予定です。

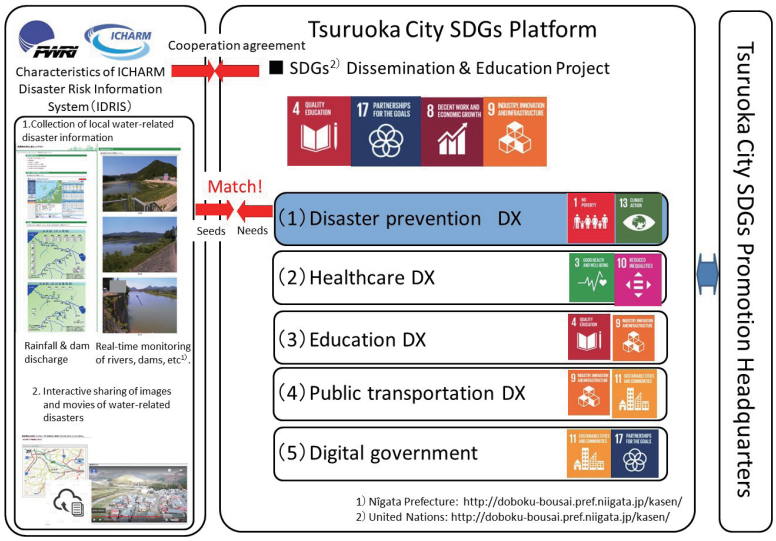
ICHARM has developed and been improving the ICHARM Disaster Risk Information System (IDRIS), aiming to integrate various types of information on flood disasters, which have become increasingly more frequent and intense in recent years, and also support local governments and residents in improving risk communication between them and promoting other efforts in disaster management. ICAHRM has been working on IDRIS in research collaboration with Aga Town, Niigata Prefecture, and Iwaizumi Town, Iwate Prefecture, and is finally approaching the completion of the system, increasing accessibility for smartphone users.

However, because IDRIS specializes in flood disaster information, different from other websites and applications attracting the general public for daily use, not many people were expected to come to know about IDRIS and visit the site. Thinking that some kind of scheme was necessary to draw people's attention, the development team came up with one possibility: embedding IDRIS in popular smartphone applications.

Tsuruoka City, Yamagata Prefecture, asked ICHARM to participate in its ongoing project around that time. The city was selected as one of the "SDGs Future Cities" in FY2020 and has since been promoting the structural reform project through digital transformation, including a smart city and a digital government, for creating a sustainable community through industry-government-academia collaboration.

Since many reports have pointed out that disasters will occur more frequently and become more intensified in mountainous areas, Tsuruoka City prioritizes increasing public awareness of disaster prevention in normal times and installing disaster management systems to help residents get better informed about the situation and take proper action for safe evacuation. ICHARM realized that its research and technological development could fulfill the needs of the city, which was looking for ways to promote the digitalization of disaster management, and decided to accept the city's request to join their effort.

For these reasons, ICHARM and Tsuruoka City concluded a research cooperation agreement on developing a disaster information sharing system on August 6, 2021 (Figure). IDRIS will not only be a portal website providing various types of disaster information and field conditions from different sources but also have a high affinity with websites frequently accessed by residents in Tsuruoka City.



Overview of a research cooperation agreement on developing a disaster information sharing system
災害情報共有システムに係る技術開発に関する連携・協力協定の概要

(Written by DENDA Masatoshi)

Program of e-learning courses of HyDEPP-SATREPS
フィリピン共和国 HyDEPP-SATREPS プロジェクトにおいてeラーニングを実施しました

ICHARM is currently leading "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)" under the Science and Technology Research Partnership for Sustainable Development (SATREPS), which started on June 3, 2021, in the Philippines. As part of the project, ICHARM conducted an e-learning program from July 14 to August 26, 2021. This e-learning program aimed to share the knowledge and skills necessary to carry out the 5-year long HyDEPP-SATREPS project. The participants were primarily the researchers and students of cooperative universities such as the University of Philippines (UP) Los Baños, UP Diliman, UP Mindanao, and Nagoya University.

The participants downloaded course materials and took exams on the "Online Synthesis System for Sustainability and Resilience (OSS-SR)," an online system developed on the Data Integration and Analysis System (DIAS). The e-learning program consisted of three courses: 1) basic lectures, including ones on hydrology, climate change, and flood hazard and disaster risk reduction (DRR) in Japan; 2) tutorials on flood hazard mapping and risk assessment, including ones on flood simulation using the rainfall-runoff-inundation (RRI) model, data management on DIAS, 2D/3D flood hazard mapping using QGIS and Google Earth, and hazard and risk assessment of community; and 3) lectures and tutorials on hydro-agriculture-economic models, including lectures on an advanced hydrological model (the WEB-RRI model), an agricultural model, and an economic model, and a tutorial on satellite image analysis (see Table for more details).

Details of e-learning courses and lecturers
eラーニング各コースの内容

Course-1: Basic lectures [Started on July 14, 2021]		
BL-1	Lecture on the HyDEPP-SATREPS Project	*Prof. Patricia Ann J. Sanchez (UPLB)*
BL-2	Lecture on the integrated approach for climate change and flood disaster risk reduction in the Philippines	*Prof. Toshio Koike (ICHARM)*
BL-3	Lecture on the basics of hydrological models and the Rainfall-Runoff-Inundation model (RRI Model)	*Assoc. Prof. Mamoru Miyamoto (ICHARM)*
BL-4	Lecture on the use of hazard/risk information for flood disaster risk reduction in Japan	*Prof. Miho Ohara (ICHARM)*
BL-5	Lecture on 3D flood hazard mapping for disaster risk reduction	*Dr. Takuya Inoue (Former, CERI, PWRI)*
Course-2: Flood hazard mapping and risk assessment (Tutorial) [Started on July 21, 2021]		
F-1	Tutorial on flood simulation using Rainfall-Runoff-Inundation (RRI) model	*Dr. Shrestha Badri Bhakta (ICHARM)*
F-2	Tutorial on data management on DIAS (Data Integration and Analysis System)	*Dr. Masaki Yasukawa (Univ. of Tokyo) and Dr. Katsunori Tamakawa (ICHARM)*
F-3	Tutorial on 2D flood hazard mapping	*Dr. Kensuke Naito (ICHARM)*
F-4	Tutorial on 3D flood hazard mapping	*Dr. Naoko Nagumo (ICHARM)*
F-5	Tutorial on hazard/risk assessment for Barangay	*Prof. Miho Ohara (ICHARM)*
Course-3: Hydro-Agriculture-Economic Models (Lectures and Tutorial) [Started on August 2, 2021]		
M-1	Lecture on the Water and Energy Budget RRI model (WEB-RRI model)	*Prof. Abdul Wahid Mohamed RASMY (ICHARM)*
M-2	Lecture on the Crop Growth Simulation Model (SIMRIW)	*Prof. Koki Homma (Tohoku University)*
M-3	Lecture on economic development scenario prediction	*Assoc. Prof. Muneta Yokomatsu (Kyoto University)*
M-4	Tutorial on satellite image analysis	*Dr. Kentaro AIDA (ICHARM)*

ICHARMは、JICA・JSTの「地球規模課題対応国際科学技術協力プログラム（SATREPS）」の研究プロジェクト「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）」を実施しています。本プロジェクトは、今年6月3日に5か年プロジェクトとして対象国であるフィリピン共和国内で開始されており、プロジェクト推進に向けた知見の共有を目的として、7月14日から8月27日にかけてeラーニングを実施しました。受講者は、現地側のプロジェクト参画機関であるフィリピン大学ロスバニョス校（UPLB）、フィリピン大学ディリマン校（UP Diliman）、フィリピン大学ミンダナオ校（UP Mindanao）、名古屋大学の研究者や学生などです。

受講者は、DIAS（Data Integration and Analysis System）上で開発したOSS-SRシステム（Online Synthesis System for Sustainability and Resilience）を用いて、日本側プロジェクトメンバーが作成した教材のダウンロードや学習、試験の受験を行いました。eラーニングは大きく分けて3つのコースから成り、それぞれ次のような構成となっています。1つ目は 基礎的なレクチャーであり、水文学や気候変動、そして日本における防災・減災の取り組みについて網羅しました。2つ目は洪水ハザードマッピングとリスクアセスメントの演習で、RRIモデルを用いた洪水氾濫解析、QGISシステムを用いた2次元ハザードマップ作成、Google Earthを用いた3次元ハザードマップ作成、それらを活用したコミュニティーのリスクアセスメント、さらにはDIAS上でのデータマネジメントを学びました。そして3つ目は水文-農業-経済モデルのレクチャーおよびチュートリアルで、水・エネルギー収支降雨流出氾濫モデル（WEB-RRIモデル）や作物生育シミュレーションモデル（SIMRIW）、そして経済成長予測モデルについての基礎を学び、加えてGoogle Earth Engineを用いた衛星画像解析のチュートリアルも行いました（表）。

eラーニング実施期間中には全6回のオンラインセッションが開催されました。1回目は7月14日にオープニングセッションとして全89名の参加のもと開催され、eラーニング開催にあたっての挨拶とコース1の説明が行われました（図）。2回目から5回目は、各コースのQ&Aセッションおよび次のコースの紹介として開催されました。2回目（コース1のQ&Aおよびコース2の説明）には76名、3回目（RRIモデルによる氾濫解析のQ&A）には54名、4回目（コース2のQ&Aおよびコース3の紹介）には55名、5回目（コース3のQ&A）には48名が参加しました。それぞれのQ&Aセッションでは多くの質問があり、活発な議論が展開されました。6回目のクロージングセッションは、8月26日に61名が参加して開催され、修了者には修了証明書が授与されました。

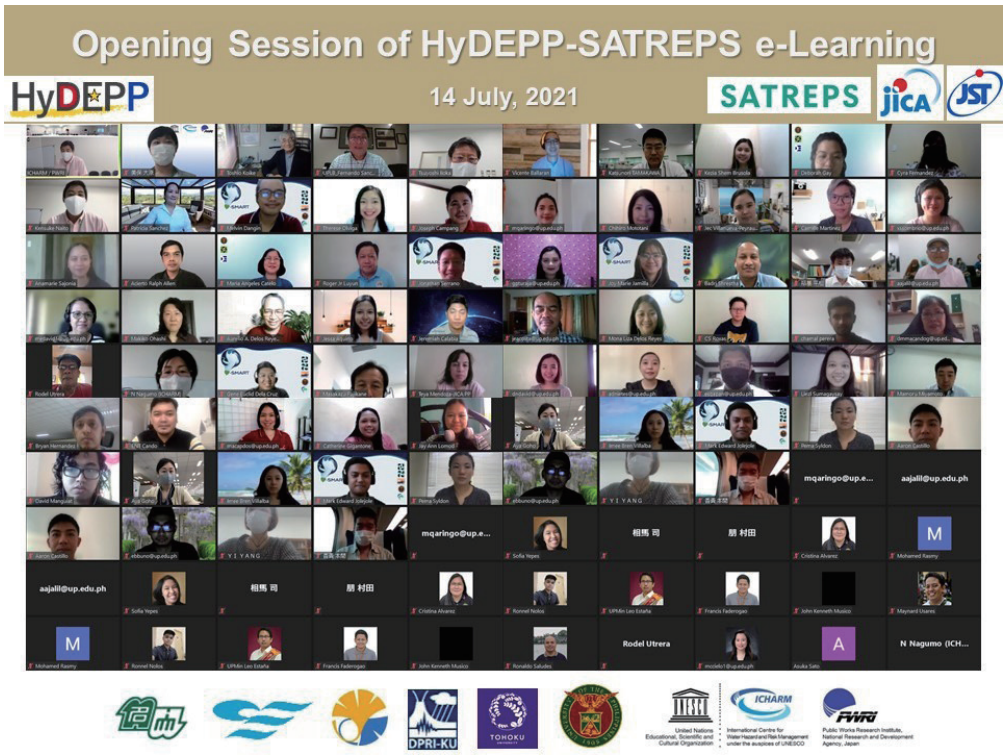
コースの受講者数はコース1が82名、コース2が79名、コース3が78名でした。コース1とコース3の修了要件は試験で80%以上正解すること（試験は何度でも受験可能）、コース2はRRIモデルによる氾濫解析・ハザードマップの作成及びそれらを用いたコミュニティーのリスクアセスメントを行い、レポート課題として提出すること、としました。最終的に59名がコース1を、49名がコース2を、そして55名がコース3をそれぞれ修了しました。また、49名が全3コースを修了しました。クロージングセッションでは、各コースの修了者に修了証明書が授与され（証明書は後日、電子形式にて送付）、また3名がコース2の成績優秀者として表彰されました。

本eラーニングで培った知見・スキルが、受講者の今後のキャリアにおいて役立つとともに、HyDEPP-SATREPSプロジェクト遂行においても大いに役立つことが期待されます。

During the e-learning program, six online sessions, including opening and closing ceremonies, were also held. The first session was held on July 14, 2021, for the opening session and the introduction of the first e-learning course, attended by 89 participants. Figure shows the group photo of the opening session participants. Session 2 was held on July 21 and attended by 76 participants, answering questions on the first e-learning course and introducing the second e-learning course. Fifty-four participants attended Session 3 on July 28, in which they discussed issues on the RRI model they learned in the second e-learning course. In Session 4, held on August 2, 55 participants gathered and discussed issues on the second e-learning course and moved on to the introduction of the third e-learning course. Session 5 took place on August 6 with 48 participants, in which e-learning participants asked questions about the third e-learning course. Finally, in Session 6 on August 26, the closing ceremony and the certificate distribution were held with 61 participants.

The number of registered participants was 82 for Course-1, 79 for Course-2, and 78 for Course-3. After finishing the e-learning lectures and tutorials, the participants were required to take online exams and score at least 80% to complete Course-1 and Course-3 successfully. To pass Course-2, the participants needed to submit a report on RRI model simulation results including 2D/3D flood hazard mapping and risk assessment. At the end of the e-learning program, 59 participants completed Course-1; 49 and 55 completed Course-2 and Course-3, respectively. The number of participants who completed all three courses was 49. The certificate of completion for each course was given at the closing ceremony on August 26 to all participants who passed the courses. Three participants, whose assignment report for Course-2 was evaluated to be the best among all the submitted reports, were also presented with the "Best Assignment Award" during the ceremony.

It is truly hoped that the skills and knowledge acquired through this e-learning program will be useful for the participants in their careers and in conducting activities in HyDEPP-SATREPS.



Group photo of opening session of HyDEPP-SATREPS e-learning program
オープニングセッションでのグループ写真撮影

(Written by Shrestha Badri Bhakta and NAITO Kensuke)

Revision and use of "Collection of Critical Situations during Flood Emergency Response"
水害対応ヒヤリ・ハット事例集の更新と活用状況

ICHARM published a booklet entitled "Collection of Critical Situations during Flood Emergency Response" on its homepage in June 2020, aiming to improve the emergency response capacities of local governments and promote more effective management of flood disasters, which have occurred frequently across Japan in recent years. Defining critical situations as ones in which local government officers panic, do not know what to do, cannot make a decision, are confused, struggle in dilemma, etc., during an emergency response effort, this collection introduces typical critical situations from the review reports of past flood disasters. Also provided with the booklet is the "Appendix for local government response under COVID-19," which lists possible critical situations and necessary countermeasures during flood emergency response under COVID-19.

Currently, the latest version (as of June 2021) is available on ICHARM's homepage (https://www.pwri.go.jp/icharm/special_topic/20200625_flood_response_collection_e.html). The booklet has been updated according to the revised Disaster Countermeasures Basic Act, enforced on May 20, 2021, to reflect the revision that evacuation advisories were abolished into evacuation orders. Along with this revision, the national disaster prevention basic plan was also revised on May 25, 2021. The plan's revisions include not only the amendments related to the revised Disaster Countermeasures Basic Act but also the amendments concerning disaster response under the risk of COVID-19. The "Appendix for local government response under COVID-19" was also updated to explain the revisions of the national disaster prevention basic plan.

The booklet has been well received by people around the world. From its publication in June 2020 to the end of September 2021, the Japanese version on the web had 6,669 accesses, and the English version had 1,261 accesses. Lectures and training using the booklet have been provided upon request. On July 7, Senior Researcher OHARA Miho introduced the booklet to the mayors of 14 local governments and the officers of related organizations, who are members of the disaster reduction council for large-scale floods along the Natori River and the lower reaches of the Abukuma River in the Tohoku region. On September 9, she provided online training to about 20 employees of the Tokyo National Highway Office of the Kanto Regional Development Bureau, the Ministry of Land, Infrastructure, Transport and Tourism. On October 6, she also provided training to the officers of Toyota City in Aichi Prefecture, which has signed an agreement of research cooperation with the Public Works Research Institute. About 80 officers participated in the face-to-face event with some others online. ICHARM will continue disseminating the booklet to help enhance the disaster response capacity of local government officers.

Photo at the training to the officers of Toyota City
豊田市役所職員への研修での写真

(Written by OHARA Miho)

ICHARM では、昨今の全国的な水害の頻発を鑑み、地方自治体の災害対応力の向上を目指して、2020 年 6 月から、「水害対応ヒヤリ・ハット事例集」をホームページで公開しています。この事例集は、水害対応において、職員が「困る・焦る・戸惑う・迷う・悩む」などの状況に陥る事例を「水害対応ヒヤリ・ハット事例」として新たに定義し、地方自治体が公表している過去の水害での災害対応検証報告書などからこれらの事例を抽出し、冊子「地方自治体編」として取りまとめたものです。また、別冊の「新型コロナウイルス感染症への対応編」では、新型コロナウイルスの感染が懸念される中での水害発生を想定し、起こりうる事例と望ましい対策を各ページで紹介しています。

現在、ホームページでは、2021 年 6 月時点で更新したバージョンの事例集を公開しています（https://www.pwri.go.jp/icharm/special_topic/20200625_flood_response_collection_j.html）。日本では 2021 年 5 月 20 日に改正された災害対策基本法が施行され、従来の避難勧告が廃止され、避難指示に一本化されました。これに伴い、事例集の記載につきまして、本改正を反映させた更新を行いました。また、これに伴い、2021 年 5 月 25 日に国の防災基本計画が修正されました。この修正においては、災害対策基本法の改正点の反映のみならず、新型コロナウイルス感染症への対応に関する修正も行われました。よって、本事例集の別冊「新型コロナウイルス感染症への対応編」は、これらの防災基本計画に記載された災害対応を紹介する紙面として更新を行いました。

2020 年 6 月の公開開始から 2021 年 9 月末までに、事例集の日本語版冊子のページには 6,669 件、英語版冊子のページには 1,261 件のアクセスがあり、多くの方々にご活用いただいているようです。また、依頼に応じて、本事例集に関する講演や研修の提供も行っています。7 月 7 日には東北地方の名取川・阿武隈川下流等大規模氾濫時の減災対策協議会にて、協議会に参画している 14 の自治体の首長や防災担当部局、関連機関向けの講演を行いました。9 月 9 日には、国土交通省関東地方整備局東京国道事務所職員約 20 名へのオンライン研修を提供しました。10 月 6 日には、土木研究所と連携・協力協定を締結している愛知県豊田市において、職員向けの研修を市役所で実施し、対面で約 80 名が参加するとともに、オンラインでの配信も行われました。今後も引き続き、普及に向けた活動を行っていく予定です。

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、シュレスサ バドリ バクタ専門研究員の「How flood-control dam operation can effectively reduce disaster risk: a case of Bago River Basin of Myanmar」を紹介します。

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 a researcher as listed below:

Shrestha Badri Bhakta, Research Specialist

How flood-control dam operation can effectively reduce disaster risk: a case of Bago River Basin of Myanmar

How flood-control dam operation can effectively reduce disaster risk: a case of Bago River Basin of Myanmar

Shrestha Badri Bhakta, Research Specialist
シュレスサ　バドリ　バクタ　専門研究員

Recently floods have caused a greater impact on society because of the increasingly growing population and further development in river basins as well as the increasing frequency and scale of extreme flood events [1]. To reduce flood impact, effective preventive measures should be planned and implemented in river basins. The impact of floods can be reduced through non-structural or structural approaches and more effectively by combining both approaches. However, the efficient implementation of preventive measures requires the quantitative assessment of flood risk [2]. Human-made structures such as dams and reservoirs in a river basin play important roles in risk assessment, and for effective implementation of preventive measures, it is essential to assess flood hazard and risk more reliably considering various factors, including the effects of dams and reservoirs [2]. Though essential, the effect of dams on flood hazard and risk assessment is often ignored because of limited data on dams and reservoirs in developing countries, such as dam operation functions and reservoir storage volumes. In this context, this article presents an example of how dam operation for flood control can effectively reduce disaster risk, focusing on the Bago River Basin (BRB) of Myanmar. The discussions in this article are based on the results reported in Shrestha and Kawasaki [2]. We quantitatively evaluated the effectiveness of the flood-control dam operation of Zaung Tu Dam (ZTD), which has the largest storage capacity in the BRB, and discussed the importance of using existing facilities (e.g., dams and reservoirs) for flood control to improve disaster risk reduction.

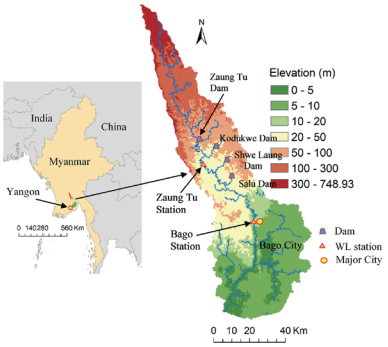


Figure 1 Location of the Bago River Basin in Myanmar and the topographical distribution in the study area.

The BRB is located in lower Myanmar, which is one of the most flood-prone river basins in Myanmar (Figure 1), and floods often cause damage to residential and agricultural sectors in the basin. The study basin catchment covers an area of 5,245 km^2, and the main river is about 331 km long. The annual average rainfall at the Bago station is about 3,300 mm with the wet season from May to October [3]. The ZTD with a reservoir capacity of 407 × 10^6 m^3 for electric power generation was constructed in the BRB in 1996.

To assess flood risk, flood characteristics were computed using the Rainfall–Runoff–Inundation (RRI) model, and flood damage was estimated by integrating the flood characteristics, flood damage curves, exposure characteristics, and property values. In the risk assessment, flood damage was assessed by focusing on flood damage to residential buildings, assets (building contents), and agricultural sectors with and without considering discharge control at the ZTD for flood events with different return periods. The details of the methodology can be found in Shrestha and Kawasaki [2]. The main purpose of the ZDT is hydropower generation, and after the severe flood damage in 2011, the Department of Hydropower Generation Enterprise and the Department of Hydropower Implementation started to store floodwater in the reservoir of the ZTD during the rainy season. During the 2018 flood event, a large amount of water was stored in the reservoir, and the maximum outflow discharge from the dam during the rainy season was in the range of 400–600 m^3/s in recent floods. According to observed dam storage data for recent floods, the ZTD has a free storage capacity of more than 200 × 10^6 m^3 at the beginning of the rainy season. This available dam storage capacity could be used effectively for flood control to reduce the hazard and the damage

in the downstream areas. Therefore, the effectiveness of the ZTD was evaluated utilizing the current capacity of dam storage that can be used for flood control. The flood hazard and the resulting damage were assessed for different outflow discharge control rates such as 400, 500, 600, and 700 m^3/s. The effects of the dam on flooding were simulated using the RRI model, considering the parameters of (i) outflow discharge and (ii) maximum flood storage volume (200×10^6 m^3).

Figure 2 shows the damage-probability curves for buildings with and without outflow discharge control at the ZTD. The expected annual damage (EAD) was calculated by integrating the area under the damage-probability curve. The estimated EAD for buildings with and without outflow discharge control at the ZTD was 31.4 and 60.5 billion kyats, respectively. Figure 3 shows the damage-probability curves for assets (building contents) with and without outflow discharge control at the ZTD. The estimated EAD for assets with and without outflow discharge control at the ZTD was approximately 3.3 and 9.3 billion kyats, respectively. The EAD reduction in building damage when considering outflow discharge control at the ZTD is 29.1 billion kyats (approximately 48% of the building damage without discharge control at the ZTD). In the case of asset damage, it is approximately 6 billion kyats (approximately 64% of the asset damage without discharge control at the ZTD).

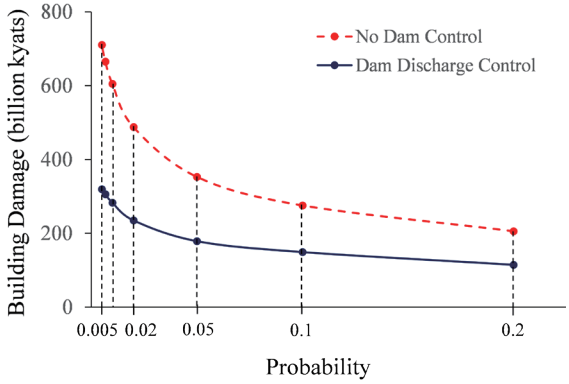


Figure 2 Damage-probability curves for building damage with (discharge control rate: 500 m^3/s) and without flood-control dam operation at the ZTD [2].

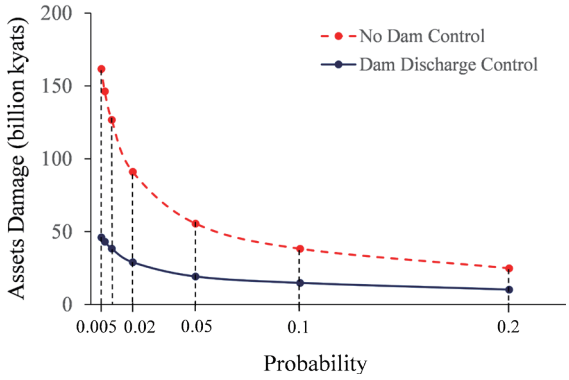


Figure 3 Damage-probability curves for assets damage with (discharge control rate: 500 m^3/s) and without flood-control dam operation at the ZTD [2].

Figure 4 shows the damage-probability curves for agricultural damage (rice crops) with and without outflow discharge control at the ZTD. The estimated EAD for agricultural damage with and without discharge control at the ZTD was 5.1 and 5.8 billion kyats, respectively. The EAD reduction in agricultural damage when considering outflow discharge control at the ZTD is 0.7 billion kyats (approximately 12% of the agricultural damage without discharge control at the ZTD).

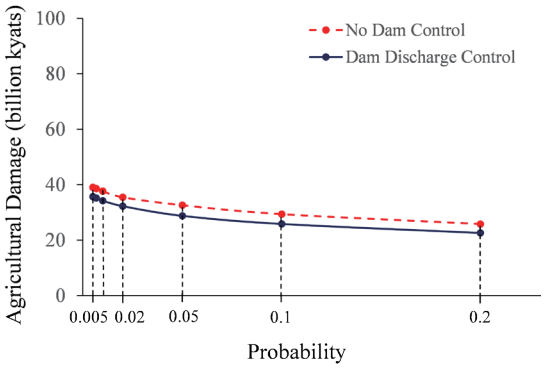


Figure 4 Damage-probability curves for agricultural damage (rice crops) with (discharge control rate: 500 m^3/s) and without flood-control dam operation at the ZTD [2].

The estimated damage with and without the use of the dam for flood control suggests that the dam operation for flood control can significantly reduce the damage in downstream areas. In the case of the BRB, the reduction in flood damage to residential buildings and assets by using the ZTD for flood control is comparatively larger than the reduction in flood damage to agricultural products. In the BRB, most residential buildings are located along the main Bago River and are directly affected by river water overflowing from the main Bago River. The use of the ZTD for flood control can significantly reduce the discharge in the main river and greatly decrease damage to residential buildings and assets in downstream areas. However, large paddy areas located in the low-lying areas of the BRB are affected not only by floods from the main Bago River but also by floods from its tributaries and inland flooding. Dams and reservoirs can store a large volume of water, thereby (i) altering the magnitude of the flood discharge downstream, (ii) changing the form of the exceedance probability of discharge, and (iii) reducing the discharge rates significantly [2]. Therefore, for the proper assessment of flood hazards and damage in a river basin with a dam, the effects of the dam must be considered in flood hazard analysis. Flood hazards and damage in downstream areas may be reduced by storing floodwater in the reservoir of a dam. The construction of new dams and embankments requires a huge amount of investment, and it might be a challenging task in many developing countries in Asia. However, if we can effectively use the current capacity of existing dams in a basin, it may be possible to significantly reduce damage in downstream areas and contribute to disaster risk reduction.

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On the graduation of the 14th ICHARM master's program students
第 14 期修士課程学生の卒業

2021 年 9 月 15 日、第 14 期修士課程プログラムの学位記授与式が行われ、7 名の学生が「修士（防災政策）」を取得し、帰国の途につきました。国別内訳は、バングラデシュ 1 名、ブータン 2 名、マレーシア 1 名、ミャンマー 1 名、モーリシャス 1 名、トンガ 1 名でした。この修士課程プログラムは、大学卒業後、各国の行政機関等において河川行政等の経験を有する者を対象に、JICA の支援のもと GRIPS と ICHARM が共同で運営しているものであり、1 年間で修士号を取得します。

今回第 14 期生は、COVID-19 の影響を色濃く受けることになりました。2020 年 10 月 1 日に開始された洪水防災学コースですが、入学式の後 2 週間は e-learning を行い、実際の講義開始は 10 月後半になりました。さらに、スケジュール調整等により講義日程も後ろ倒しになり、講義日程が終わるのも通常より 1 ヶ月遅れることになりました。また、学生たちの来日も大幅に遅れました。第 1 陣でバングラデシュ、マレーシア、ミャンマーの女性の学生 3 名が 10 月 29 日に来日、第 2 陣でブータンの 2 名が 11 月 10 日に来日、それぞれ 2 週間の隔離期間を経て通学を始め、face to face で研修を行うことができたのは基本的にこの 5 名になりました。そして最後にモーリシャスの 1 名が 8 月 12 日に来日、トンガの学生はついに最後まで来日が叶いませんでした。この 2 名の学生は全期間においてリモート講義を受けることになりました。コロナ禍における緊急事態宣言の発出のため通学制限を受ける期間があり、カリキュラムの中の現地研修の多くが中止となりました。

このような制限下ではありましたが、学生と指導教員の努力の結果、レベルの高い研究結果が得られたと感じています。彼らの研究課題は業務に根ざしたものであり、明確な問題意識に向かって努力を重ねることができたと感じています。また、困難な条件下でも最後までモチベーションを失うことなく、充実した修士論文を完成できたことは素晴らしい経験になったと思います。帰国後は、研修で得た知識・技術や論文研究で得た成果を活用し、組織の中でリーダーとなって大いに活躍されることを期待しています。

卒業時に、ICHARM、GRIPS、JICA は、学生の優れた業績に対して賞を授与します。今年の各表彰は次のように授与されました。

Best Research Award:
KOWLESSER Akshay Prakash, from Mauritius
SONTOKU Award:
Zangpo Jamyang, from Bhutan

主任研究員
GRIPS 連携教授
牛山朋來

On September 15, 2021, the graduation ceremony of the 14th ICHARM master's program "Water-related Disaster Management Course of Disaster Management Policy Program" was held. Seven students, one each from Bangladesh, Malaysia, Myanmar, Mauritius, Tonga, and two from Bhutan, graduated and then left Japan for their home countries. This one-year program, operated by ICHARM and GRIPS with support from JICA, is designed primarily for those who hold a bachelor's degree and have work experience related to river management at government organizations in their countries.

The worldwide pandemic of COVID-19 had a significant impact on the class of 2020-2021. The course began on October 1, 2020. Still, after the opening ceremony, the students were forced to study through an e-learning system for two weeks. The in-person classes finally began in late October. Further, the classes were rescheduled to later dates, about one month later than initially planned, as accommodated to the lecturers' and other unusual circumstances. The students were not able to come to Japan as scheduled. Three female students from Bangladesh, Malaysia, and Myanmar were the first to arrive on October 29. Two Bhutanese followed on November 10. They finally came to ICHARM after a two-week quarantine. Only five of the seven students were in face-to-face classes throughout the year. The student from Mauritius could finally come to Japan on August 12, 2021, but the student from Tonga could not join the rest of the class at all. The last two students had to attend all the classes remotely from home countries. The declaration of a state of emergency sometimes interrupted students coming to ICHARM, and many field trips planned in the curriculum had to be canceled.


JICA Closing ceremony
JICA 閉講式にて

In such a difficult condition, the students accomplished good research results with dedicated support from supervisors. Since they selected a research theme from the issues they found in their duties, they could focus their effort on their research. They were able to keep themselves highly motivated throughout the program and completed a substantial master thesis under this difficult condition. Going through all these should give them a lot of confidence. All faculty members and staff hope that they will utilize the knowledge and techniques they acquired and the research outputs they produced for their countries as project leaders.

At the time of graduation each year, ICHARM, GRIPS and JICA present awards to some selected students for their outstanding work and performance. This year's awards went to the following students:

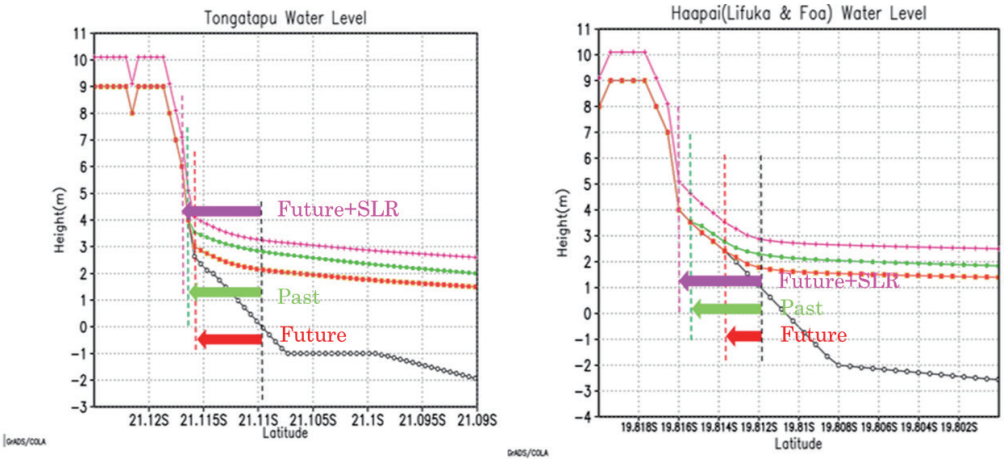
Best Research Award:
KOWLESSER Akshay Prakash, from Mauritius

SONTOKU Award:
Zangpo Jamyang, from Bhutan

USHIYAMA Tomoki
Senior Researcher
Adjunct Professor, National Graduate Institute for Policy Studies

IMPACT OF CLIMATE CHANGE, SEA-LEVEL RISE IN TONGATAPU, HA'APAI AND ITS EFFECT ON LIVELIHOOD, Tonga

Tevita Aho, from Tonga
Civil Engineer / Building and Services Division / Ministry of Infrastructure



A black line is bed level, a green line is the wave height of storm surge in past climate, a red line is wave height in future climate, pink line is wave height in future climate plus sea level rise. The vertical lines show the location of coast and inundation extent.

This work focuses on Storm Surge in Tongatapu and Ha'apai island in the Kingdom of Tonga aiming at the impact of the climate change. Firstly, we simulated storm surge as well as inland flow caused by the cyclone Harold to evaluate Xbeach storm surge model for Tongatapu and Ha'apai and Rainfall-Runoff-Inundation model for Tongatapu only. The Xbeach model successfully simulated the storm surge in a part of the northern coast in Tongatapu, and in the west coast of Ha'apai island, consistent with disaster reports. Secondly, we simulated storm surge driven by climatological extreme wind in 50 year returning period in the past and future climate determined by d4PDF. We also consider the effect of sea level rise obtained from Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC). We found that the storm surge would decrease in the future due to decreasing extreme wind speed. 1.105-meter sea level rise in the future offset and caused 5cm increasing inundation by storm surge. This result suggests the increase of storm surge risk in the future.

Key words: Climate Change, Rainfall-runfall-inundation (RRI) Model, Moderate Resolution Imaging Spectroradiometer (MODIS), Coupled Model Intercomparison Project Phase 5 (CMIP5), Inundation.

I would like to thank the Heavenly Father for the great opportunity he has granted me.

An experience from a far, I won't lie about it, things has been very challenging mostly when your lecturers are not there with you or even your classmates to share the heavy loads of studying. However, with God in it nothing is impossible and here I am still managed to get through with things and I am grateful for it.

This academic experience has taught me a lot and have helped not only myself but also my country The Kingdom of Tonga.

As a Master student pursuing a research on "IMPACT OF CLIMATE CHANGE, SEA-LEVEL RISE IN TONGATAPU, HA'APAI AND ITS EFFECT ON LIVELIHOOD" it is quite an experience. Learning new things, discovering new ideas on how climate changes can be handled, running models that may of good use in my country and developing unique ideas on how to maintain this issue in my country.

In reaching the destination for this academic journey, I would like to thank all my lectures for all the help that they have shown me since day 1 and for not easily giving up on me. To all my supervisors Professor Tomoki Sensei, Professor KOIKE Sensei and Professor SUGAHARA Masaru Sensei for all the support throughout my journey. To all that has contributed academically to this study, Professor MORI Sensei, Professor SHIMURA Sensei and Professor Rasmy Mohamed Sensei knowing for sure that without all the efforts I won't be able to transform this dream into reality. Thank you very much.

Academic experience from a far is not something that should hold you back from fulfilling your dream. Keep striving for excellence.

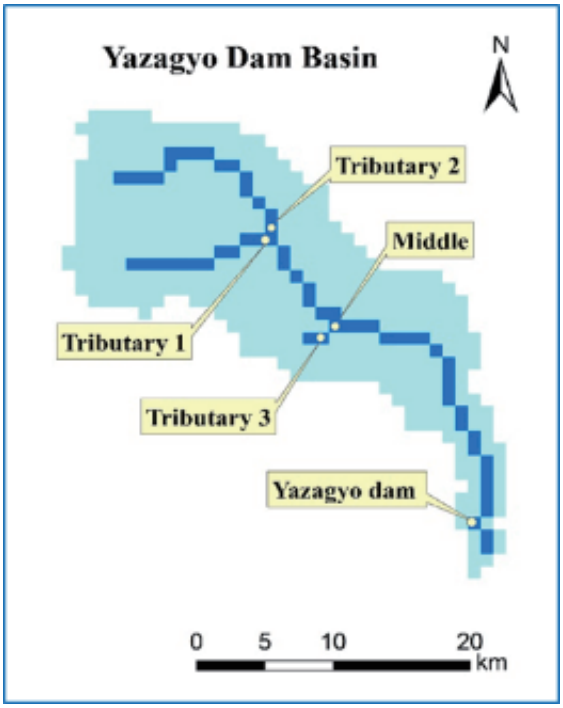
THANK YOU!

METHOD FOR PREDICTING THE SEDIMENT RUNOFF PROCESS DUE TO HEAVY RAINFALL IN THE YAZAGYO RESERVOIR BASIN, MYANMAR

Aye Mon Khaing, from Myanmar
Special Sub-Assistant Engineer / Irrigation and Water Utilization Management Department / Ministry of Agriculture, Livestock and Irrigation

In July 2015, the Yazagyo Dam reservoir experienced a huge amount of sediment deposition due to the heavy rainfall caused by cyclone Komen. The reservoir lost 49.4% of its storage capacity from its initial state (64 million m^3) to (32.4 million m^3) within that year due to sediment deposition in the reservoir. This study predicted and evaluated sediment inflow rate along the river course and at the reservoir using a rainfall-runoff-inundation-based sediment transport model to manage reservoir sedimentation to last the long-life span of the dam. As a result of evaluating three cases of modeling with different sediment size distributions, the dam sedimentation due to the cyclone was reproduced when we employed the finest sediment size distribution. In addition, we found that 70% of sediment comes from Tributary-1, which implies an efficiency of countermeasures as the building of a check dam or other proper methods for this tributary and could expect 5 to 10 million m^3 sediment deposition into the reservoir annually.

Keywords: Sediment Runoff, Dam sedimentation, Landslide, Yazagyo Dam, Heavy rainfall



Result target locations

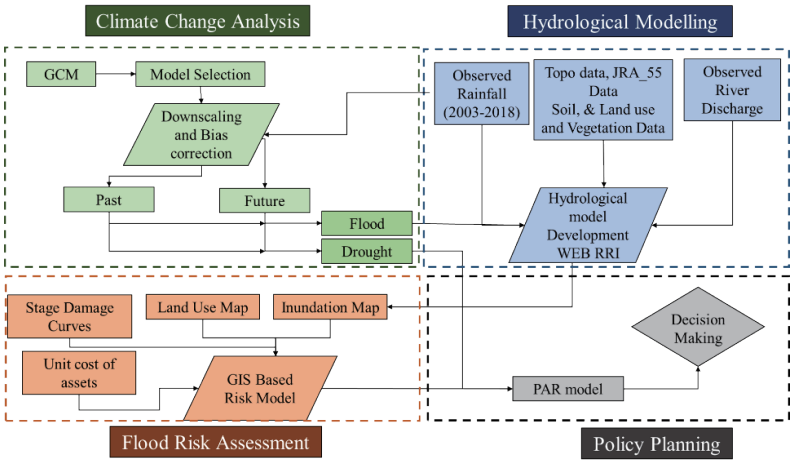
The main objective of my thesis is to predict and estimate sediment inflow volume in the reservoir of Yazagyo dam with the help of RRIS (RRI-based basin sediment transport model). By using the RRIS model, we can get the results such as sediment inflow, bed-load, suspended load sediment, changing of river bed elevation, shear stress friction between sediment size and river bed, and sediment armoring, based upon sediment budget from supply sources of the grain size distribution. This study considered three cases depending on the different grain size distribution and supply sediment sources from divergent locations, and patterns and focused on results at five locations such as tributary-1, tributary-2, tributary-3, middle of the river course, and reservoir location. According to the field observed and computed by the RRIS model result, we can expect 5 to 10 million m^3 sediment deposition into the Yazagyo reservoir annually. According to the model results, 70% of all of the sediment rates from the tributary-1, 20% from tributary-2, and 10% from tributary-3 supplied into the reservoir. Tributary-1 is the major sediment source located in the landslide areas, Chin hill. According to the computation results, the construction of a check dam upstream of the reservoir is the most beneficial result to reduce the sediment that comes to the reservoir, and we can keep the check dam function. This thesis aims to reduce the reservoir sedimentation as the building of a check dam at the proper location and to manage the sediment by slicing, flushing, dry excavation, and to last the long life span of the dam. In my opinion, this research is beneficial for my department (IWUMD) and my country, Myanmar to control and manage reservoir sedimentation in the future. I appreciate my professor and supervisors' support for everything and kindness.

A STUDY ON AN INTEGRATED WATER RESOURCES MANAGEMENT PLAN UNDER CLIMATE CHANGE FOR GRAND RIVER NORTH WEST RIVER BASIN, MAURITIUS

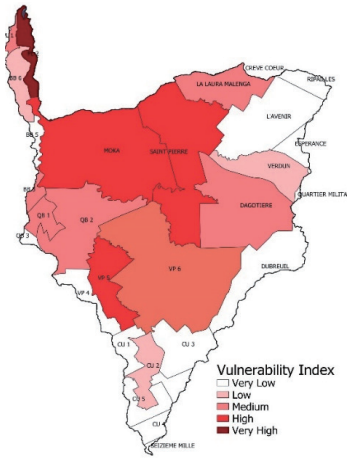
KOWLESSER Akshay Prakash, from Mauritius
Officer / Land Drainage Authority / Land Drainage Authority

Mauritius experiences frequent flood and drought damage due to high variation in rainfall patterns, urbanization, and lack of investment in disaster risk reduction measures. The lack of integrated water resource management (IWRM) plans and threats due to climate change and rapid urbanization make Mauritius more exposed to increased risks in the near future. In this study, the catchment of Grand River North West (GRNW) was selected as a case study to investigate the implementation of an IWRM plan to address the challenges of water security and disaster management for the island. The study contained four main components: (i) climatology analysis for the past (2003–2018) and future climate (2025–2040) to assess the trends in floods and droughts under climate change, (ii) the development of a hydrological model to study the hydrological responses of the basin for extreme flooding events, (iii) a GIS-based flood risk model to develop a risk map and damage evaluation framework, and (iv) a formulation of policies based on the results coupled with the pressure and release (PAR) model. The results showed that an annual decrease in rainfall amount (~ 4%–15%) is projected with very high certainty in the near future, while extreme rainfall events exceeding 50 mm/day have a high likelihood of increasing. Due to the water and energy budget rainfall-runoff inundation (WEB-RRI) hydrological model coupled with a GIS-based risk model, the inundation damage to buildings and farmlands for future extreme events doubled. A vulnerability map for the basin was thus developed based on nine indicators to aid decision making at the village council area (VCA) level and guide financial investments for drought and flood mitigation measures. Finally, recommendations were made based on the PAR model to scale up the IWRM plan for GRNW at a national scale. The study established an end-to-end approach, including scientific, engineering, and socio-economic assessments, to enable evidence-based decision making.

Keywords: climate change, flood, drought, General Circulation Models, WEB-RRI.

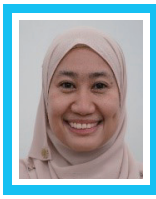


Research framework



Vulnerability nap

My research was centered around developing an integrated water management plan under a changing climate for Mauritius. By using the state-of-the-art climate model tools available through ICHARM, I was able to determine future climatic trends that will affect Mauritius in the near future with high certainty. Drought conditions that have been prevalent in the past 2 decades were seen to perpetuate in the future and these would mean devastating implications to the scarce freshwater resources on the island. On the other hand, high rainfall extreme events were also deemed to be likely to happen in the next 2 decades. Therefore, by further combining the results of the climate model with the WEB-RRI hydrological model and a GIS based risk model, policies were drawn based on the evidence to aid decision making for climate change impacts mitigation. This research established key urgent areas of action for a sustainable and judicious water management and flood risk reduction. This thesis was a great learning experience to further my interest in water related studies by learning from professionals of the field. This one-year master's course has also been a peculiar one due to the COVID-19 global pandemic. Having had to spend most of the program following the courses remotely, the distance was never felt due to the laudable work undertaken by the staff of ICHARM. This master's course has not only given me valuable technical tools as a professional but also made me grow considerably as a person throughout this year. I should hope that the strong bonds and network established throughout this year sustain in the future.

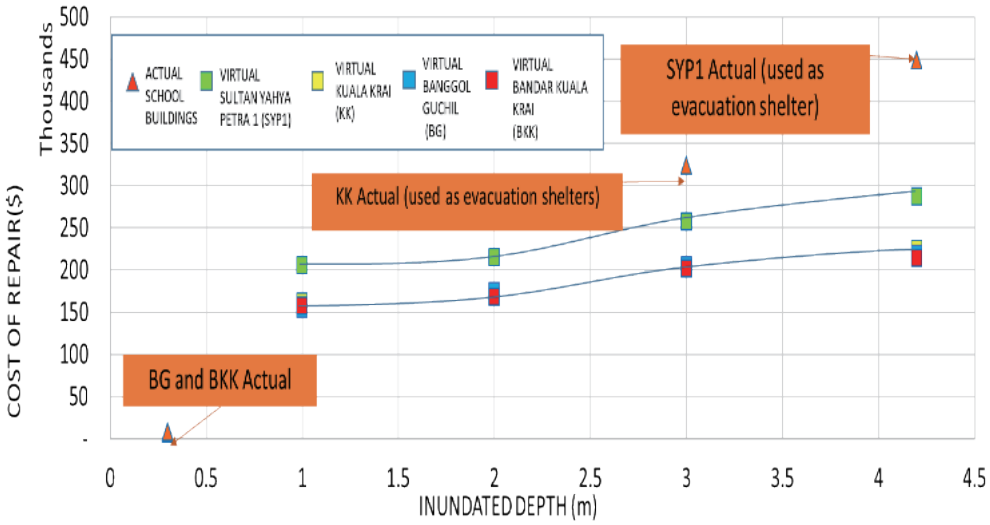


FLOOD DAMAGE INSPECTION METHOD FOR PUBLIC BUILDINGS IN MALAYSIA

Norain binti Osman, from Malaysia
Senior Civil Engineer / Building Maintenance & Facilities Branch / Public Works Department (JKR)

Floods cause more damage than other disasters in Malaysia. Currently, there is no suitable method for determining the damage caused by floods alone. Malaysian Public Works Department, the principal technical agency of the government has developed a method on how to manage the assets and determining the condition of the building with a matrix system called Building Condition Assessment (BCA). In this study, the suitability of the BCA method as a tool in flood damage inspection was evaluated. The results showed the BCA method was reliable and that the processes were standardized and systematic. The BCA method could be used to group the damages by cause and analyze the findings using qualitative and quantitative analyses for each space and area. In addition, the BCA method can be used to compile an urgent budget to rectify damages due to disasters.

Keywords: Flood Damage Inspection, Building Condition Assessment (BCA), Public Building, Flood Disaster Risk Reduction.



Cost of Repair for Inundated/Non-Inundated Floor with Inundated Depth

I arrived in Japan to pursue my DMP during the Covid-19 pandemic. Although we physically commute and attend classes in ICHARM, with the effects of the coronavirus continuing, online teaching is now the primary method of instruction everywhere in Japan. We have limited access to daily lives and lack the freedom to perform outing activities.

Despite those limitations, we can still experience a lot of things in Japan. Japan has kept everything calm and peaceful as the people are informed about the latest Covid-19 news but there is no panic within the country. If I were to be in Malaysia, I am going to live in quarantine with countless restrictions which would probably affect my mental state.

ICHARM with its expert, respectful and kind-hearted director, lecturers, researchers and supporting officers were helping a lot in sharing their knowledge on the water-related field. Learning about hydro-metrological monitoring, the development of early forecasting/warning systems and the development of global water-related disaster risk assessments and indices will allow me to share it with my department and country. This collaboration Master Degree Program with ICHARM, GRIPS and JICA on knowledge sharing from the experts, the technical transfer and reformation in various areas in the water-related field also beneficial to me, my department, and my country.

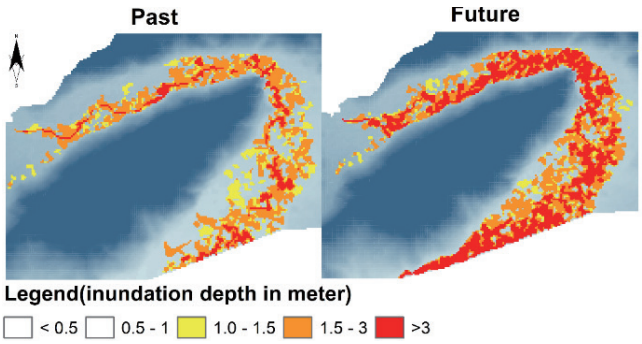
To all ICHARM experts, your patience is second to none! I had so much trouble with some of the difficult parts of class in this program, but all of you stood by me and had faith that I'll get there in the end. Thank you!

IMPACT ASSESSMENT ON EXTREME FLOODS DUE TO CLIMATE AND SOCIAL CHANGES IN THE AMOCHU BASIN, BHUTAN

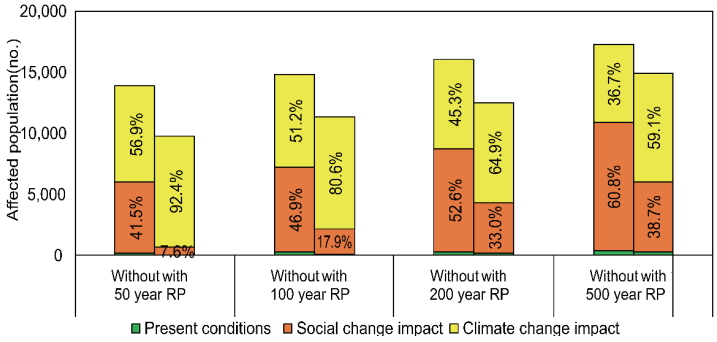
Jamyang Zangpo, from Bhutan
Engineer / Hydrology and Water Resource Division / National Centre for Hydrology and meteorology

Phuntsholing Town, located within the transboundary Amochu River Basin in Bhutan, has experienced recurrent flood damage historically. Besides the impact of climate change, ongoing urbanization along the Amochu River flood plains, due to limited inhabitable flatlands, could exacerbate future flood risk. Therefore, this study aims to assess the impacts of climate change and social change on extreme floods over time. Bias-corrected rainfall outputs from the general circulation models (GCMs), considering the representative concentration pathway (RCP8.5) scenario, are fed into the rainfall-runoff-inundation (RRI) hydrologic model to simulate changes in extreme discharge, inundation, and affected populations. The results show that climate change increases flood inundation and affects the population in the future, but social change aggravates flood risks. The mitigation of flood risk by embankment construction is demonstrated to be effective; however, inland inundation and overflow from extreme floods necessitate integrated flood management. While an adequate drainage system is proposed for the future town, the study highlights the need for proper consideration of the impact of social change on building a more flood-resilient society.

Keywords: rainfall-runoff-inundation model, general circulation model, inundation, return period, transboundary



Change in inundation extent for the 100 year RP flood



Comparison of climate change impact and social change impact in terms of affected population

At such times of distress due to the covid19 pandemic which has been causing unfathomable global damage to everything imaginable and more so cutting short millions of lives, it has been rather a privilege for me to be able to come to Japan and especially to join esteemed International Center for Water Hazard and Risk Management (ICHARM) as a Master's course student. Moreover, the joy of successful completion of the course is beyond expression.

During my study here, I carried out a research titled "Impact assessment on extreme floods due to climate and social changes in the Amochu basin, Bhutan." Of the numerous findings from the research, one shows a substantial increase in both magnitudes and return periods of extreme floods due to climate change, but the population increase affects the vulnerability aspect of flood risk, thereby aggravating the number of the flood-affected population even more than the increase of flood hazard by climate change, as the flood return period increases to 500 years. Inland inundation also increases in the future. This can help the flood and water resource managers to accordingly act to prevent the wrath of flood disasters while deriving the maximum benefits.

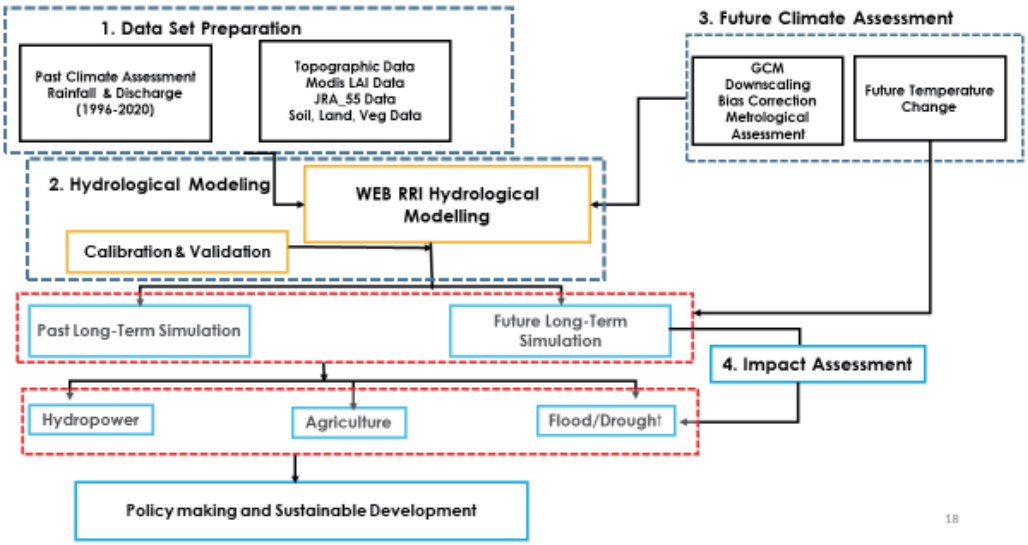
The successful completion of the master's course was partly possible due to the constant instruction of my supervisor, researchers, and help from the Ph.D. students besides my classmates. On the other hand, the study environment at ICHARM is perfect for higher studies and researches with a sense of practical applicability right after graduation. I highly recommend government officials and students to take this one-year DMP course; they will understand how practical, usefully diverse, and different it is from the usual university courses. I extend my gratitude to ICHARM, GRIPS, and JICA for this invaluable opportunity.

ASSESSMENT OF INTEGRATED WATER RESOURCES MANAGEMENT UNDER CLIMATE CHANGE IN WANGCHU BASIN, BHUTAN

Nedrup Tshewang, from Bhutan
Dy. Executive Engineer / Department of Agriculture, Engineering Division / Ministry of Agriculture and Forests

Wangchu Basin, located in the western part of Bhutan, is an area of significant socio-economic importance. With 30% of Bhutan's population and most of its agricultural lands being located here, this basin is also the site for two major hydroelectric projects. Significant variability in precipitation patterns in the basin causes periods of flash floods and dry spells. We assessed the impact of climate change on the water resources of Wangchu Basin using general circulation models (GCMs) and hydrological simulations using the water and energy budget of rainfall-runoff inundation model (WEB-RRI). Analysis results project an increase in future rainfall and discharge, indicating that power generation and agricultural production can be enhanced. However, a pronounced increase in discharge during the rainy season also highlights the increased risk of flooding. To mitigate this risk, the implementation of both soft and hard components of flood countermeasures is necessary.

Keywords: climate change, general circulation models, WEB-RRI, hydropower



Methodology

First of all, I would like to express my heartiest thanks and gratitude to the Royal Government of Bhutan, JICA, GRIPS, and ICHARM for nominating me for the Master's Degree course on Flood Disaster Risk Management. Although it was a difficult time for ICHARM to carry out activities due to the COVID-19 crisis. However, we have completed our course without any problem owing to the endless efforts of the committed professors and staff of ICHARM and GRIPS.

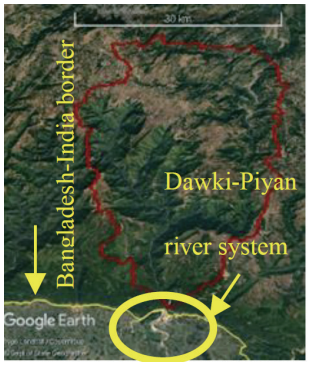
The topic of my research is an assessment of integrated water resources management under climate change in Wangchu Basin. The research was conducted to address scientific, engineering, and policy challenges for inadequate evidence-based data, water resources management plans, and the impact of climate change in Wangchu Basin, Bhutan. Lack of integrated water resources management plans under changing climate will lead to frequent water-related disasters, impacting the socioeconomy of the country. This research implemented recent advancements in science and technology by using selected GCMs based on their regional performances, developing a WEB-RRI model to simulate the basin hydrological response under climate change, and then facilitating evidence-based decision-making procedures and sustainable development of water resources in the basin. The results of this thesis will contribute to the evidence-based decision-making process for decision-makers. And also besides the course works, the knowledge and skill that I gained from field visits to various methods of disaster mitigation works and river engineering in Japan are very useful for me and my Department's future works.

I would like to express my sincere gratitude to my supervisors and the Professors for the endless effort for dissemination of their knowledge and skills.

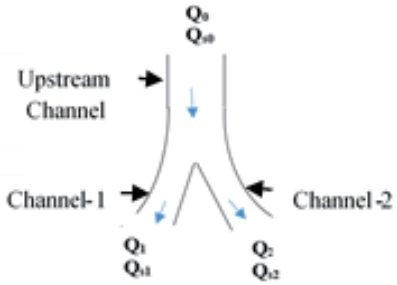
A STUDY ON THE MORPHOLOGICAL CHARACTERISTICS OF DAWKI-PIYAN RIVER SYSTEM IN BANGLADESH

AHMED Farzana, from Bangladesh
Sub-Divisional Engineer / Directorate of Planning-2 / Bangladesh Water Development Board

This study discusses the morphological characteristics of the bifurcation area of the Dawki-Piyan river system in Bangladesh to find out a stable channel planform. First, numerical simulations were conducted to investigate the long-term morphological behavior of the bifurcated area and discharge diversion between two downstream channels. The numerical results show that the diversion ratio of flow discharge changes temporarily due to channel changes together with sandbar deformations. Second, regime relations were derived using continuity conditions for flow discharge and sediment discharge to discuss the stability of a bifurcation system. The derived formulas of regime relations can determine the width of stable channels, which helps us to manage the bifurcation area.



Drainage basin of Dawki-Piyan river



Sketch of the bifurcation area

Keywords: channel bifurcation, river morphology, sediment transportation, regime relations, stable channel.

I am Farzana Ahmed from Bangladesh. I have been working in Bangladesh Water Development Board (BWDB) as a Civil Engineer since 2012. Some of my colleagues completed their master's and PHD from ICHARM. Their excellent performance in the job field encouraged me to apply for the master's program in ICHARM. I really like the working environment of this institution. The teachers, researchers and staffs are very cooperative. In my opinion, this master's course is well designed with respect to the time frame. In addition to the theoretical courses, we learnt several simulation softwares which improved our analytical ability to understand and solve hydro-morphological issues of our countries. I highly appreciate the detailed and profound knowledge as well as the teaching techniques of the teachers of ICHARM. For their incessant cooperation and motivation, we were able to accomplish our thesis works within a short period. I would like to give this master's course a very high rating and will motivate my colleagues to apply here for higher education. I hope I can apply the knowledge acquired through this course for the betterment of my organization as well as for my country.

Training & Education

Educational program updates
研修活動報告

<3 days before graduation>

●Commemorative Tree Planting Ceremony, JICA Closing Ceremony (September 14)


Greeting by Mr. Prakash of Mauritius
Prakash 氏から挨拶

After the final presentation of their graduation theses on August 5, the master's students were told to refrain from coming to ICHARM due to the declaration of a state of emergency issued in Ibaraki Prefecture, where ICHARM is located. However, about a month after that, the students had opportunities to spend their last two days on September 14, 15 at ICHARM in order to participate in events that concluded the training course. Those two days were particularly special for Mr. KOWLESSER Akshay Prakash, a master's student from Mauritius, who was finally able to come to Japan on August 12 with the permission of the Ministry of Foreign Affairs of Japan. For Mr. Prakash, who had to stay at a hotel after

<卒業までの3日間>

● 記念植樹セレモニー、JICA 閉講式（9月14日）

8月5日の最終論文発表会以降、コロナ禍における緊急事態宣言の発出のため学生は ICHARM への通学制限を受けることとなりましたが、研修の締め括りとなる行事に参加するため、9月14～15日の2日間、約1ヶ月ぶりに ICHARM に来所する機会を得ました。8月 12 日に外務省の許可を得てようやく来日することが出来たモーリシャスの修士学生 KOWLESSER Akshay Prakash 氏にとっては初の ICHARM 通学となり、小池俊雄セン

ター長をはじめ、スーパーバイザーの Abdul Wahid Mohamed Rasmy 主任研究員や ICHARM 研究員と対面で挨拶を交わすことが出来ました。

その日の午前中は、例年この時期に実施している植樹セレモニーを行いました。学生は、事前に江頭進治研究・研修指導監より植樹の意義について、次のような話を受けました。

「記念植樹は、古くから山地を保全し洪水災害の防止を祈念し、あるいはお祝い事を記念し、あるいはまた建設工事等が安全に運ぶことを願う行事として行われております。日本人は満開の桜が大好きであり、桜はお祝い事を記念してよく用いられます。皆様の桜は、修士および博士号の取得をお祝いするとともに、皆さんが ICHARM に再訪されたとき、この場において記憶をたどり、桜と語らい友を思う桜でもあります。」

午後には ICHARM 講堂にて第 14 期研修の JICA 閉講式が行われました。JICA 筑波から渡邉健所長、ICHARM から小池センター長、GRIPS からオンラインで菅原賢教授による祝辞が贈られ、学生の代表として Norain binti Osman 氏（マレーシア）が答辞を述べました。優れた研究成果を残した学生に贈られる「Best Research Award」は、8 月 5 日に実施された最終プレゼンテーションの結果と論文を総合的に判断し、KOWLESSER Akshay Prakash 氏（モーリシャス）に授与されました。また、学生同士の他薦により、研修中最も参加者全体のために貢献したと思われる学生に対して、ICHARM から「Sontoku Award」が Jamyang Zangpo 氏（ブータン）に贈られました。

● GRIPS にて記念撮影、学位記授与式（9 月 13 日、15 日）

昨期に続き、今期においても新型コロナウイルスの影響により、9 月 15 日の GRIPS 学位記授与式はオンラインで実施されることとなりましたが、9 月 13 日、博士学生と修士学生は、事前に GRIPS にてアカデミックガウンと角帽を着用し、GRIPS 菅原教授とともに記念撮影を行うことが出来ました。

9 月 15 日の午後、GRIPS 学位記授与式が、昨年度同様 ICHARM にてオンラインで実施されました。修士課程の学生 7 名全員に「修士（防災政策）」の学位が、博士課程の 3 名に「博士（防災学）」の学位が授与されました。

残念ながら本年度修士課程コースにおいて、トンガの Tevita Aho 氏は最後まで来日することが出来ませんでしたが、母国にいながらも無事に修士課程を修了することが出来ました。

卒業した 10 名の更なるご活躍を ICHARM 職員一同祈念しております。

coming to Japan, it was his first visit to ICHARM. He could finally meet Executive Director KOIKE Toshio, his supervisor and Senior Researcher Mohamed Rasmy Abdul Wahid, and other researchers of ICHARM.

With their cherry blossoms, or *sakura* tree
記念植樹を囲んで

On the morning of September 14, a tree planting ceremony was held just as it had been before graduation. Before they started the planting, Training Advisor EGASHIRA Shinji told them what it means to plant a tree together.

"Japan has a long history of tree planting. We plant trees for various reasons: to conserve mountains and prevent flood disasters, celebrate a specific occasion, or pray for construction and other projects to end safely. Japanese people love to see cherry blossoms, or *sakura*, in full bloom, so sakura trees are very popular for this kind of ceremony, especially when celebrating something happy. Today, we plant a sakura tree to congratulate you on earning a master's or doctoral degree. The sakura tree we plant today is also for you to remember the days you spent here at ICHARM. In the future, when you have a chance to come back to ICHARM, talk to the sakura tree and think about the friends you studied together."

In the afternoon, the closing ceremony of the 14th master's program was held at the ICHARM auditorium. JICA Tsukuba Director General WATANABE Takeshi, ICHARM Executive Director KOIKE Toshio made their congratulatory speech. GRIPS Professor SUGAHARA Masaru also made his speech online. Ms. Norain binti Osman of Malaysia spoke in return on behalf of the students.

In the ceremony, the Best Research Award was presented to Mr. KOWLESSER Akshay Prakash of Mauritius this year. The award was given by ICHARM and GRIPS to laud him for his excellent work based on his master's thesis and final presentation. The Sontoku Award, selected by their fellow students, was presented to Mr. Jamyang Zangpo of Bhutan. This award is given every year by ICHARM to a student who made an outstanding contribution to the class throughout the program.

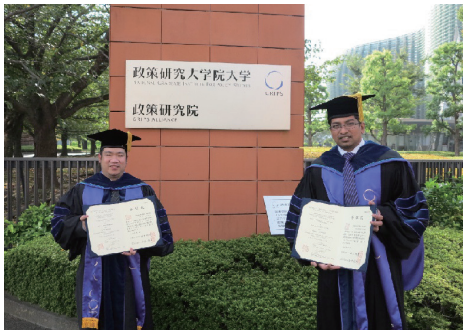
● Commemorative photo at GRIPS and Graduation ceremony (September 13 and 15)

Due to the COVID-19 pandemic, the GRIPS graduation ceremony was held online, the same as last year. However, on September 13, the doctoral and master's students had a chance to visit GRIPS, where they wore a graduation gown and hat and had memorial photos taken with Professor SUGAHARA.

Mr. Aho (upper left) waving from home during the GRIPS graduation ceremony online
GRIPS 学位記授与式にて手を振る修士学生 Aho 氏 (左上)

On September 15, the GRIPS graduation ceremony was held online at an ICHARM lecture room. Three students in the 9th doctoral program and seven students in the 14th master's program were finally awarded a doctoral and master's degree in disaster management. Among the seven master's students was Mr. Tevita Aho of Tonga, who could not come to Japan but successfully completed his master's program online while staying in his home country.

All the staff at ICHARM pray for the future success of the ten graduates in their own countries.



Doctoral students in front of the main gate of GRIPS
GRIPS 正門前にて記念撮影（博士学生）

Master' students with Prof. SUGAHARA of GRIPS
GRIPS 菅原教授と記念撮影（修士学生）

(Written by MIYAZAKI Ryosuke)

Action Reports from ICHARM Graduates

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. John Mathias KIRIWAI (Tanzania), who graduated from the 11th master's program in 2017-2018, has kindly contributed the following article to this issue.

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2017-2018年（11期）修士課程卒業のJohn Mathias KIRIWAI氏（タンザニア）から寄稿いただきましたので、ご紹介します。

John Mathias KIRIWAI

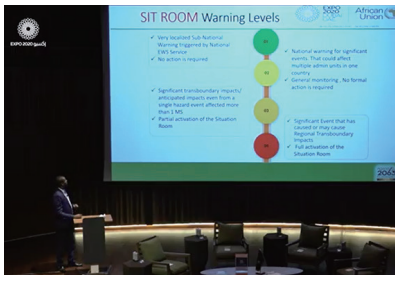
Early Warning Systems Expert , UNDRR Consultant for AUC, UNDRR Regional Office for Africa

The "Effects of Infrastructure Construction in Flood Disaster Prone Areas" was the title of my thesis when I was doing my master's degree. I was curious to know how an already flood-prone area's vulnerability could be exacerbated with the construction of major infrastructures in the area (infrastructure curse). In my thesis, I was interested specifically in road construction. Thanks to Professor OHARA Miho, Professor TAKEUCHI, Dr. MIYAMOTO, and the entire ICHARM team, I was able to get some skills and maneuver through GIS systems and simulate road construction in the RRI model.

The thesis is a milestone in my DRR career. The findings in the research thesis have built up to more interest in developing disaster preparedness and response plans for different agencies to address issues especially on major projects involving constructions. The challenge has always been data availability. Systematic collection of data and disaster risk assessments is a vital component for developing preparedness plans.

When I returned to my country Tanzania after completing my studies, I resumed my regular duties at Prime Minister's Office as a Disaster Management Coordinator in the Disaster Management Department. Since my return, through the skills I acquired at ICHARM, I have managed to contribute to developing disaster prevention and preparedness plans for government agencies and local government municipalities, the National Contingency Plan for floods, country disaster profiles for floods and droughts and mobilizing resources for disaster responses. I also presented my thesis to the director responsible for road construction. She kindly spared time to discuss the findings and agreed to take recommendations during planning and execution of the projects.

In April 2021, I joined UNDRR as a consultant for the African Union on a short term assignment on the capacity of Early Warning Systems Expert. One of my duties in this assignment is to facilitate the establishment of continental multi-hazard early warning systems and manage a continental disaster situation room. The continental situation room is expected to trigger appropriate and timely early actions in the field of early warning and transboundary risk management. The situation room is also responsible for enhancing the vertical and horizontal coordination mechanism and facilitating the access and exchange of risk data and information.



Presenting about the Progress on the Africa Continental Situation Room in World Expo Dubai 2021 on 13th October 2021

We have so far managed to review different early warning systems across the globe, establish different warning levels, threshold levels, and severity indexes for different hazards to be used at the continental level, and standard operating procedures for the situation room.

Information Networking

ICHARM co-organized two sessions at the Stockholm World Water Week 2021
2021 年ストックホルム世界水週間で 2 つのセッションを共催しました

2021年8月23～27日、ストックホルム世界水週間（SWWW）2021が開催されました。2020年のSWWWは世界的な新型コロナウィルス感染症拡大によって中止となりましたが、今年は無料かつオンラインにより開催され、参加者は188か国から13,000名を超え、セッションの数は400を超えました。ICHARMではパートナー機関とのセッション共催や活動発表によりSWWWに積極的に貢献してきています。

8月24日には「Post COVID-19 River Basin Disaster Resilience, Sustainability & Sound Water-cycle（コロナ後における流域治水と健全な水循環）」と題して水と災害ハイレベル・パネル、国土交通省、政策研究大学院大学等とでセッションを共催し、小池俊雄センター長が進行役を務めました。セッションでは気候や社会の変化によって増大する災害リスクの認識の共有と質の高い社会資本の展開による質の高い成長を実現する戦略の特定、アジア諸国のコロナ禍での経験に基づく革新的行動が紹介されました。

また8月25日にはアジア太平洋水フォーラム事務局や世界水パートナーシップ等の協力機関とで「Accelerating Inclusive Water Governance to advance Sustainable Development（持続可能な成長を前進させるために包摂的な水のガバナンスを加速）」のセッションを共催しました。効果的な水のガバナンスを進めることはアジア太平洋地域で高い優先課題の一つであるとの認識の下、本セッションでは持続可能かつ包摂的な発展へと押し上げるために水のガバナンスをより良くする革新的取り組みが共有されました。池田鉄哉特別研究監からは「Enhancing governance structure of the country on water-related disaster risk reduction through collaborative platform and capacity development（協働的プラットフォームや能力開発による国レベルでの水災害リスク軽減に向けたガバナンス構造の向上）」と題して発表を行い、その後のパネルディスカッションでは協働的プラットフォームを通じた組織レベルでのガバナンスの向上と専門研修を通じた個人レベルでの能力向上の重要性が強調されました。

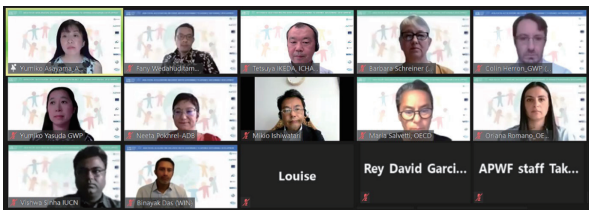
これら2つのセッションの成果については、第4回アジア太平洋水サミット（2022年）や水の国際行動の10年・中間レビューに関する国連会議（2023年）などの主要な政治プロセスへとインプットされることとなります。

The Stockholm World Water Week (SWWW) 2021 was held on August 23-27, 2021. Though SWWW 2020 was canceled due to the global pandemic of COVID-19, SWWW 2021 was redesigned as a free, online event composed of more than 400 sessions with over 13,000 participants from 188 countries. ICHARM actively contributed to the event by co-organizing sessions with partner organizations and providing the presentations of its activities.

On August 24, ICHARM convened a session titled "Post COVID-19 River Basin Disaster Resilience, Sustainability & Sound Water-cycle" together with the High-level Experts and Leaders Panel on Water and Disasters (HELP), the Ministry of Land, Infrastructure, Transport and Tourism, Japan (MLIT), the National Graduate Institute for Policy Studies (GRIPS), and some other organizations. Executive Director KOIKE Toshio moderated the session. This session aimed to share the understanding of disaster risks increased by the changes of climate and society, identify strategies for realizing quality growth through the development of quality infrastructure, and showcase innovative actions based on the experiences of some Asian countries under COVID-19. (*1)

On August 25, ICHARM co-organized another session titled "Accelerating Inclusive Water Governance to advance Sustainable Development" as one of the Asia Focus sessions together with partner organizations, including the Asia Pacific Water Forum (APWF) Secretariat and Global Water Partnership (GWP). Recognizing that addressing effective water governance should be one of the highest priorities in the Asia-Pacific region, this session provided the opportunity to share innovative approaches to improving water governance to boost sustainable and inclusive development. ICHARM Deputy Director (international coordination) IKEDA Tetsuya gave a presentation, "Enhancing governance structure of the country on water-related disaster risk reduction through collaborative platform and capacity development." In the following panel discussion, he emphasized the importance of raising the governance capacity of institutions on flood management through collaborative platforms and developing the capacities of individuals through professional training programs. (*2)

Asia Focus - Governance Session
アジア・フォーカス　ガバナンス・セッション



Speakers at the Asia Focus - Governance Session 2
アジア・フォーカス　ガバナンス・セッション２の発表者

The outcomes of the two sessions will be provided as inputs for key political processes such as the 4th Asia-Pacific Water Summit in 2022 and the UN Conference on Midterm Review of the Water Action Decade in 2023.

(*1) URL:
https://www.worldwaterweek.org/event/9808-post-covid-19-river-basin-disaster-resilience-sustainability-sound-water-cycle

(*2) URL:
https://www.worldwaterweek.org/event/9578-asia-focus-accelerating-inclusive-water-governance-to-advance-sustainable-development

(Written by IKEDA Tetsuya)

Coming Events

ICHARM plans to host the ICFM9 in February 2023
2023 年 2 月に ICHARM が ICFM9 を主催予定

The International Conference on Flood Management (ICFM) has been held as a unique opportunity for various specialists and policymakers to come together to discuss a range of flood related issues and exchange ideas and experiences. This conference was first held in Kassel, Germany, in 2000 under the name of the "International Symposium on Flood Defense." It was renamed ICFM when its 5th conference was held in Tokyo, Japan, in September 2011, organized by ICHARM and attracting more than 450 participants from 41 different countries.

ICFM5 held on September 27, 2011
2011 年 9 月 27 日に開催された ICFM5

Due to the global pandemic of COVID-19 in these two years, ICFM8, originally scheduled in August 2020 in Iowa, USA, was eventually canceled. After this decision was made, a special webinar, "Instead of ICFM8," was held on August 10, 2021. ICHARM Executive Director KOIKE Toshio announced that ICHARM was pleased to host ICFM9 in February 2023 in Tsukuba, Japan, which was unanimously accepted by the participants, including some members of the Ad-hoc Committee, which coordinates a series of ICFMs. Further information, including session topics and important dates, will be announced later on the ICHARM website.

About ICFM:
https://www.icfm.world/About-ICFM
ICFM5:
https://www.icfm.world/ICFM-Conferences/ICFM5
Webinar "instead of ICFM8:
https://www.icfm.world/ICFM-Conferences/ICFM8/729/Recording-of-the-"instead-of-ICFM"-webinar

(Written by IKEDA Tetsuya)

洪水管理国際会議（ICFM）は様々な専門家や政策立案者が集って洪水に関する事項について議論を行い、それぞれのアイデアや経験について意見交換を行う唯一の機会として開催されてきました。第 1 回会議は「洪水防御に関する国際シンポジウム（ISFD）」と称して 2000 年にドイツ・カッセルで開催され、2011 年 9 月に東京で開催された第 5 回会議から ICFM と改名されました。この第 5 回会議は ICHARM が主催し、41 か国から 450 名以上が参加しました。

ここ 2 年間にわたる COVID-19 の世界的な感染症拡大により、当初、2020 年 8 月にアメリカ・アイオアで開催される予定であった ICFM8 は最終的に中止と決定されました。その後、「ICFM8 に替えて」という特別ウェビナーが 2021 年 8 月 10 日に開催され、そこで ICHARM 小池俊雄センター長から 2023 年 2 月に ICFM9 をつくばで主催する旨、意思表明がなされました。これについては一連の ICFM 会議開催を調整する Ad-hoc 委員会の委員を含め、全員一致で受け入れられました。セッションのトピックスや主要日程等は今後 ICHARM のウェブサイトでお知らせすることとしてます。

Announcement of ICHARM Webinar 2021 - Interaction with Students and Young Researchers –
ICHARM Webinar 2021 の開催 ― 学生・若手研究者との交流 ―

In order to disseminate ICHARM's activities widely, "ICHARM Webinar 2020" was held last December mainly for young researchers inside and outside Japan who were interested in ICHARM's research and other activities. It was attended by 14 students, mainly master's and doctoral students, from universities in Japan.

This year, too, ICHARM will organize "ICHARM Webinar 2021," as addressed below. We are looking forward to the active participation of those interested.

https://www.pwri.go.jp/icharm/special_topic/ICHARM_webinar_2021.html

Time and Date: 14:00-16:25, Monday, December 13, 2021

Registration: Required by December 3, 2021 at the following website:

https://forms.gle/VUdVGgMycqcfpnx66

(Written by YOSHINO Hirosato)

ICHARM の活動について広く情報発信をすることを目的に、ICHARM の研究等の活動にご関心のある国内外の若手研究者を対象として、昨年 12 月に ICHARM Webinar 2020 を開催し、国内の大学に在籍する修士・博士課程の学生ら 14 名が参加されました。

このたび、下記により 2021 年においても Webinar の開催を予定しておりますので、ご関心のある皆様の積極的なご参加をお待ちしております。

https://www.pwri.go.jp/icharm/special_topic/ICHARM_webinar_2021_j.html

日　時：2021 年 12 月 13 日（月）
14:00 ～ 16:25

参加方法：下記のフォームにより 2021 年 12 月 3 日（金）までに参加登録をお送りいただけますようお願いします。

https://forms.gle/VUdVGgMycqcfpnx66

Miscellaneous

Comments from internship students
インターン生からのコメント

ICHARMでは、インターン生として、Zhou Li氏を受け入れました。
ICHARMでの研究活動を振り返って、Zhou氏からコメントをいただきました。

ICHARM accepted an internship student Mr. Zhou Li from China from October, 2019 to September 2021.

He contributed a short message as below while looking back at his studying at ICHARM.

Mr. Zhou Li, from China

Stay period: October 15, 2019 - September 28, 2021

I was lucky to get the opportunity supported by the China Scholarship Council to come to ICHARM for two-year research as a visiting Ph.D. candidate under the supervision of Prof. KOIKE, Prof. TAKEUCHI, and Prof. EGASHIRA.

As a target of Prediction in Ungauged Basins (PUB) initiated by the International Association of Hydrological Sciences (IAHS), we conducted research titled "Availability of Ground Observations and Its Impacts on Bias Correction of Satellite Precipitation Products and Hydrologic Simulation Efficiency" and achieved considerable outcomes. We selected the Fuji River as the study area and configured seventeen gauge network patterns. The results show four-gauge is the threshold for reasonable average areal precipitation, satellite precipitation correction, and discharge simulation (Figure 1). Meanwhile, a new bias correction method for satellite precipitation was proposed for the limited and eccentrically located precipitation gauge network, which significantly expanded satellite precipitation's application and improved the prediction in poorly gauged basins (Figure 2).

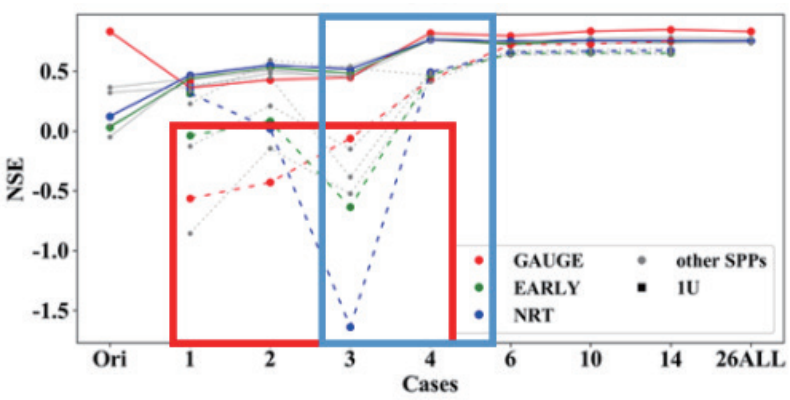


Figure 1 The NSE of average areal precipitation of gauge and satellite under various cases. Well- and Bias-distribution cases correspond to solid and dashed lines, respectively. X-axis means station number. A clear boundary is shown between 3 and 4 stations.

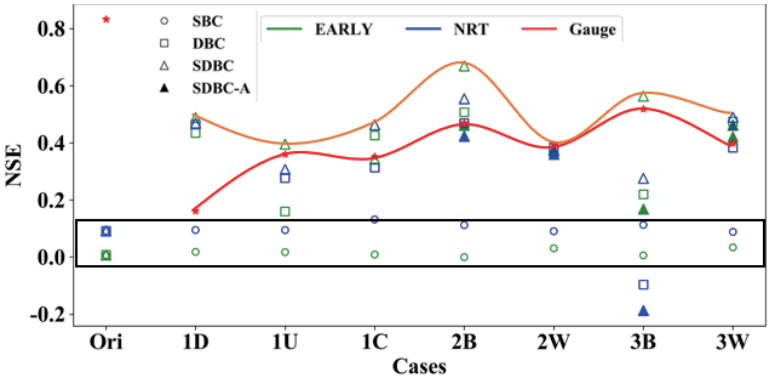


Figure 2 NSE of discharge simulation in the validation period. 1D, 1U,1C represent one station in the downstream, upstream, and center of the basin, respectively. 2B, 2W mean two stations with bias- and well-distribution. SBC- Statistical average ratio-based bias correction; DBC- Dynamical temporal ratio-based bias correction; SDBC- Statistical& Dynamical Bias Correction; SDBC-A (Additional SBC). With the new bias correction, SDBC, hydrological simulation efficiency performs best.

Except for the above research, I joined several lectures and studied the BTOP model and the RRI model with help from Dr. Gusyev and Prof. Rasmy. It is a great advantage that ICHARM has experts specializing in nearly all aspects of water-related affairs such as climate change, ensemble forecasting, sediment movement, and risk management. In addition, the scientific research is well-conducted here, and the application in practice is also highly valued. It is a perfect example of how we combine science and technology with management and policy.

Finally, I would like to extend my sincere appreciation to all ICHARM staff, especially Ms. HIDA and Dr. UMINO. I firmly believe that this meaningful experience will be precious for my future career. Besides, I'd love to collaborate with ICHARM colleagues and do my best to enhance the connection between Sichuan University and ICHARM in the future.

Mr. Zhou Li and
Executive Director KOIKE

Publications / 発表論文リスト

* July - September 2021

1. Journals, etc. / 学術雑誌（論文誌、ジャーナル）

None / 該当者無し

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

- *Daiki Kakinuma, Mamoru Miyamoto, Yosuke Nakamura, Anurak Sriariyawat, Supattra Visessri, Development of industrial park scale flood inundation analysis model for establishing and evaluating BCP/BCM, Asia Oceania Geosciences Society 18th Annual Meeting (AOGS2021) (Online), August 1-6, 2021*
- *Nagumo N., Egashira S., Kubo S. and Ben B., Characteristics of river morphology and bed materials in a tributary river influenced by Lake Tonle Sap, 34th International Geographical Congress, Istanbul University, Istanbul, Turkey (Online), August 16-20, 2021*

3. Poster Presentations / ポスター発表

- *Harada D. and Egashira S., Erosion rate formula of very fine sediment bed based on turbulent entrainment, International conference on cohesive sediments (InterCOH 2021), Delft University of Technology, Deltares and IHE Delft, Delft, the Netherlands (Online), July 13-17, 2021*
- *柿沼太貴、沼田慎吾、望月貴文、大沼克弘、伊藤弘之、近者敦彦、中村要介、崔国慶、国内における高精度地形・土地利用・降雨データを新たに追加したRRI-GUIの整備、日本水文科学会2021年度研究発表会（Online）、水文・水資源学会、2021年9月15日～18日*

4. Magazines, Articles / 雑誌、記事（土技資含む）

None / 該当者無し

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

This past August saw many disasters across Japan, such as floods and landslides. Linear precipitation zones caused heavy rainfall for several days while lingering over northern Kyushu and the Chugoku region in the western part of Japan. I have also seen international news reports about flood disasters in Europe and Asia that have rarely happened before. I would like to express my deepest condolences to the victims and their family members. Coincidentally, in the same month, the Working Group I of the Intergovernmental Panel on Climate Change (IPCC) released its 6th report, which has reminded me anew of the profound impact of climate change.

In the meantime, Japan lifted the almost-three-month-long state of emergency against the COVID-19 pandemic at the end of September. In order to prevent the infection of the virus, ICHARM has refrained from overseas business trips until today. The future situation is still uncertain, but I hope that international conferences will be possible in person as soon as possible.

ICHARM will keep a close eye on the latest development in disaster-related issues and continue to share information with readers around the world through the newsletter. Thank you for your continued support and cooperation.

ICHARM Newsletter Editorial Committee
KAWAMOTO Takatoshi

日本では 8 月に九州北部や中国地方で発生した線状降水帯がもたらす大雨によって、多くの浸水被害、土砂災害が発生しました。また、海外でも欧州やアジアで近年稀となる水害が発生したという報道を目にします。被害に遭われた方々には心よりお悔やみ申し上げます。時期を同じくして 8 月には気候変動に関する政府間パネル（IPCC）第 6 次報告書（AR6）の第一作業部会報告書が公表されたこともあって、今年は改めて気候変動の影響を意識することとなりました。

また、日本では新型コロナウィルス感染症緊急事態宣言が 9 月末をもって全面的に解除となりました。これまで COVID-19 の感染症拡大防止の観点から海外への渡航は制限され、今後の状況は未だ不透明でありますが、少しでも早く対面での国際会議が可能となることを祈念しております。

ICHARM では防災に関する最新の情勢に目を配りながらこれからもニュースレターで情報発信を行ってまいります。引き続き、ご愛顧のほどよろしくお願いいたします。

ICHARM ニュースレター
編集委員会
河元　隆利

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