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ICHARM

International Centre for Water Hazard and Risk Management
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Message from Executive Director

Hatred ceases not by hatred, but by love.



At the Memorial Monument for Mr. J.R. Jayawardena at Kotoku-in Temple, Kamakura Great Buddha Hall
鎌倉大仏殿高徳院 J.R.ジャヤワルダナ氏 顕彰碑にて

On October 6, 1954, Japan joined the Colombo Plan, marking the beginning of its active engagement in international cooperation. In 1987, the Cabinet designated this day as "International Cooperation Day." The Colombo Plan was discussed at the 1950 Commonwealth Heads of Government Meeting (the Colombo Conference), which was held in Colombo, Ceylon (now Sri Lanka). It is said that the discussions at the meeting determined Japan's postwar destiny. The essence of this historic plan can be seen in the speech delivered by J. R. Jayawardena, then Ceylon's finance minister and government representative, at the San Francisco Peace Conference for Japan the following year, in 1951:

Two ideas emerged from that Conference (the Colombo Conference) - one, that of an independent Japan, and the other, the necessity for the economic and social development of the peoples of South and South-East

Asia, to ensure which, what is now known as the Colombo Plan was launched.

The title of this article is from Buddha's words cited by Mr. Jayawardena at that time. He continued, referring to the Treaty of Peace with Japan:

The purpose of the treaty then is to make Japan free, to impose no restrictions on Japan's recovery, [text omitted] no reparations be exacted from her that harm her economy. This treaty is as magnanimous as it is just to a defeated foe. We extend to Japan a hand of friendship [text omitted].

In fact, although the peace treaty stipulated that Japan was obliged to pay reparations, many countries waived their claims. For its part, in 1955, the year after joining the Colombo Plan, Japan began to fulfill its international role by launching government-led technical cooperation, such as accepting trainees from overseas and dispatching experts abroad. This marked the beginning of Japan's official development assistance (ODA) program. That same year, in April, the Asian-African Conference was held in Bandung, Indonesia, where the final communiqué, the Bandung Declaration, proclaiming the Ten Principles of Peace, was adopted. The preamble of the declaration states:

Nations should practice tolerance and live together in peace with one another as good neighbors and develop friendly co-operation.

At this seventy-year milestone, we at ICHARM reflect on the goodwill that the world extended to postwar Japan and revisit how we should embody its mission to share Japan's scientific expertise and experience in reducing water disaster risks with the international community.

憎しみは憎しみによっては止まず、ただ愛によってのみ止む

1954年10月6日、我が国はコロンボ計画に加盟して、本格的に国際協力に乗り出しました。1987年の閣議了解によって、この日は「国際協力の日」と制定されています。このコロンボ計画は1950年コロンボで開催された英連邦外相会議（コロンボ会議）で議論されたもので、この議論が日本の戦後の運命を決定づけた言われています。その内容は、翌1951年サンフランシスコで開かれた対日講和会議におけるセイロン（現、スリランカ）政府代表のJ.R.ジャヤワルダナ財務大臣の演説よりうかがい知ることができます。

「この会議（コロンボ会議）から二つの考え方が出てきました。一つは、日本は独立した国にすべきであり、もう一方は、南方及び東南アジアの人々の経済及び社会的立場の向上を図るために必要で、それを実現するためにコロンボ計画として現在知られている計画が着手されたのです。」

標題は、この時、ジャヤワルダナ氏が引用した仏陀の言葉です。同氏は以下のように続けています。

「この条約の目的は、日本を自由な国にし、また日本の復活に何らの制約もつけず、（中略）経済に悪影響を与えるような賠償金を日本から取り立てないようにする為のものであります。（中略）この条約は敗北した者に対するものとしては寛容な内容であります。我々は日本に対して友情の手を差し伸べましょう。」

講和条約には日本の賠償義務が記されているものの、多くの国が請求権を放棄しました。日本はコロンボ計画加盟の翌1955年から研修員を受け入れ、専門家の派遣といった政府ベースの技術協力を開始しました。これが日本のODAの始まりです。この1955年4月には、アジア・アフリカ会議がインドネシアのバンドンで開催され、平和10原則を謳った最終コミュニケ（バンドン宣言）が採択されています。その前文には、下記のように記されています。

「各国は寛容を実践し、良き隣人として互いに平和に共存すべきである。」

70年という節目に当たって、戦後の日本に差し伸べられた寛容に思いを致し、水災害リスクの軽減に関わる科学と日本の経験を国際社会と共有するというICHARMのミッションのあるべき姿を問い直したいと思います。

October 31, 2025
KOIKE Toshio
Executive Director

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● Information Networking

Visitors from Sichuan University, China 中国・四川大学からの訪問

On July 15, 2025, 20 master's and doctoral students from the Global Vision Program at Sichuan University, led by Associate Professor Bingwei Tian, visited ICHARM. Executive Director KOIKE Toshio gave an overview of ICHARM and a presentation titled "Bridging Science and Society: Well-Informed Decisions on Water Resilience under Climate Change." Chief Researcher KURIBAYASHI Daisuke, the leader of the Risk Team, then introduced two topics from their research: the Collection of Critical Situation during Flood Emergency Response and the Virtual Flood Experience System (VFES). As part of the presentation on the second topic, he played a demonstration video of VFES recreating a flood situation in Kurashiki City, Okayama Prefecture.

The students were highly interested in this VR system and actively engaged in discussion, asking questions such as how VFES could be used during a disaster.



Visiting students listening to a lecture
聴講する学生



Sichuan University' delegates with ICHARM staff
講師と学生の集合写真

(Written by KURIBAYASHI Daisuke)

2025年7月15日、中国の四川大学から Bingwei Tian 准教授率いる "Global Vision Program" に所属する修士学生・博士学生 20 名が来訪し、小池俊雄センター長から ICHARM の概要と Bridging Science and Society: Well-Informed Decisions on Water Resilience under Climate Change (科学と社会の橋渡し：気候変動下における水のレジリエンスに関する十分な情報に基づく意思決定)、および栗林大輔上席研究員から、リスクチームの研究トピックスとして、「水害ヒヤリハット集」と「仮想洪水体験システム」の紹介を行いました。「仮想洪水体験システム」の紹介では、岡山県倉敷市を仮想空間上に再現した洪水体験システムをデモ上映しました。

学生からは、仮想洪水体験システムは災害時のリアルタイムでどのように活用できるのかなどの質問があり、活発な意見交換が行われました。

Joint seminar between Korea University and ICHARM 韓国・高麗大学と ICHARM との共同セミナー

On July 18, ICHARM co-hosted a joint seminar with Korean University, focusing on meteorological and hydrological research. A delegation of five faculty members, five Ph.D. students, and five master's students from Korea University, Incheon National University, and Korea National University of Transportation visited ICHARM to participate in this seminar.

The event began with an introduction of ICHARM by Deputy Director KUSAKABE Takaaki, followed by lectures from Senior Researchers USHIYAMA Tomoki, Mohamed Rasmy, and DENDA Masatoshi, on subjects related to meteorology, hydrology, and risk management, respectively. Lively discussions took place during the Q&A sessions, covering a wide range of topics, including dynamic and statistical downscaling methods, snow observation for hydrological modeling, the application of green water indicators for crop yield prediction, real-time satellite observation data analysis, and the educational use of Minecraft in a virtual flood simulation.

The seminar also featured a presentation by Associate Professor Changhyun Jun of Korea University, titled "AI Applications in Hydrometeorology and the Water Cycle: Toward Smarter Water Risk Management and Climate Adaptation." He showcased innovative research projects, such as a digital twin water management platform to cope with water-related disasters, rainfall intensity estimation using CCTV footage

7月18日に、韓国の高麗大学、仁川大学、韓国交通大学から、教員、博士課程学生、修士課程学生の各5名が ICHARM を訪れ、気象・水文研究に関する共同セミナーを開きました。

日下部隆昭グループ長による ICHARM の紹介の後、牛山朋来主任研究員、モハメッド・ラスミー主任研究員、傳田正利主任研究員が、それぞれ気象、水文、リスク管理についての講義を行いました。質疑の時間には、力学的・統計的ダウンスケーリング手法、水文モデル向けの降雪観測、収獲量推定に使うグリーンウォーター指標、衛星観測データのリアルタイム活用、仮想洪水体験に関するマイクラフトの教育利用等について活発な意見交換がなされました。

続いて、高麗大学の Changhyun Jun 准教授が、「水文気象学と水循環への AI の応用：より優れた水リス

ク管理と気候適応に向けて」と題する発表を行いました。准教授は、革新的な研究事例として、水災害に対するデジタルツイン水管理プラットフォーム、監視カメラ映像や雨音による降雨強度予測、ビッグデータを活用した洪水モデル等を紹介しました。

こうした共同セミナーは、最新の科学技術に触れる貴重な機会であり、互いに学ぶ場となっています。

or raindrop sounds, and big data-driven flood modeling.

This type of joint seminar provides valuable opportunities for participants to engage with cutting-edge science and technology and foster mutual learning.



Participants in the joint seminar
共同セミナー参加者



Presentation by Associate Professor Changhyun Jun
Changhyun Jun 准教授の発表

(Written by OKADA Tomoyuki)

Visitors from UTM, NAHRIM and UiTM, Malaysia マレーシア工科大学、国立水研究所、マラ工科大学の来訪

マレーシアからマレーシア工科大学、国立水研究所、マラ工科大学の計 21 名が 8 月 20 日に ICHARM を来訪しました。この訪問では、水関連災害に関する研究交流を図ることを目的とし、ICHARM の研究員からの講義と意見交換が行われました。

日下部隆明グループ長からの ICHARM の概要紹介に続いて、牛山朋来主任研究員から洪水予測や気候変動影響評価に関する研究、モハメッド・ラスミー主任研究員から、水関連災害リスク予測モデルの現況や課題、将来展望について紹介しました。意見交換では、ダウンスケーリングデータや RRI モデルにおけるデータの扱い方（計算能力やデータ入手の容易さなどの考慮）、土砂移動等も含めた統合解析システムなどに関する質問が予定時間を大幅に超過するほど活発に寄せられたのが大変印象的でした。

昨年度のマレーシア日本国際工科院 (MJIT) に続き、マレーシアの学術機関に対して ICHARM の技術を知っていただくよい機会となりました。今後も機会をとらえ、水災害リスクの軽減のための取り組みを広く国内外の方に発信していく予定です。

Twenty-one people from the University of Technology, Malaysia (UTM), the National Water Research Institute of Malaysia (NAHRIM), and the MARA University of Technology (UiTM) visited ICHARM on August 20, 2025. The purpose of their visit was to promote research and technical exchange on water-related disasters. ICHARM researchers welcomed them by providing lectures with Q&A sessions.

Deputy Director KUSAKABE Takaaki was the first speaker, presenting an overview of ICHARM. A series of presentations followed; Senior Researcher USHIYAMA Tomoki introduced meteorological research on flood forecasting and climate change impact, and Senior Researcher Mohamed Rasmy discussed hydrological research on prediction models for water-related disaster risks. During the Q&A sessions, the visitors asked many questions about the downscaling of data and the handling of data used in the Rainfall-Runoff-Inundation model, covering topics such as computing power and data availability. They also asked about the integrated analysis system, including issues related to sediment transportation. The session continued past the scheduled time.

This event provided ICHARM with a good opportunity to introduce its technologies to academic institutions in Malaysia, following last year's visit by the Malaysia Japan International Institute of Technology (MJIT). ICHARM will continue to promote its activities and achievements to the world through such efforts.



Malaysian visitors with ICHARM researchers
マレーシアからの訪問者と ICHARM 研究員

(Written by FURUMOTO Kazushi)

TICAD9 in Yokohama, Japan 横浜で開催されたアフリカ開発会議

The government of Japan held the 9th Tokyo International Conference on African Development (TICAD 9) in Yokohama, Japan, on August 20-22, 2025. ICHARM co-hosted a side event, "Climate and Water-Related Resilience in Africa: How Water-Related Risks Can Be Reduced?" on the 21st with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), UNCRD, the Japan Aerospace Exploration Agency (JAXA), the Japan International Cooperation Agency (JICA), UNDRR, GFDRR, the World Bank, the African Development Bank (AfDB), OECD, and the Japan Water Forum.

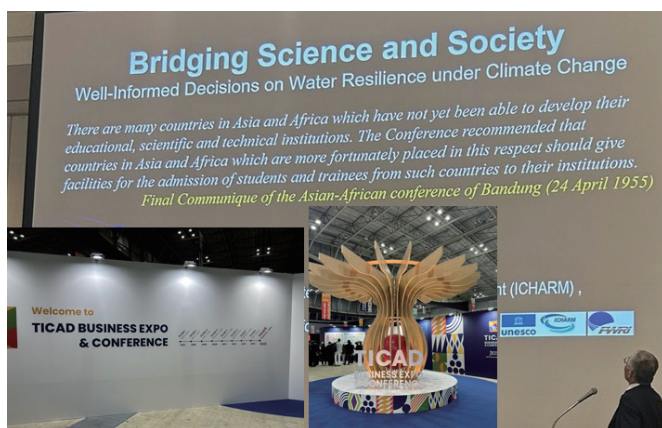
The event featured speeches from high-level speakers, including an MLIT vice minister for engineering affairs, the foreign minister of the Republic of South Sudan, a member of the Nigerian Parliamentary Assembly affiliated with the Presidential Office, and the Egyptian minister of water resources (via video). All speakers emphasized the increasing severity of water-related disasters in Africa, pointing out that these disasters are adversely affecting drinking water, sanitation, and health, consequently undermining sustainable development efforts.

Executive Director KOIKE Toshio was a keynote speaker at the conference. He provided an overview of predicted changes in the water cycle in Africa due to climate change. He also introduced ICHARM's past projects in West Africa, such as those on the Volta and Niger rivers, and human resource development projects carried out in collaboration with GRIPS and JICA, which have produced master's and doctoral graduates from African countries. He emphasized the importance of nurturing facilitators who can serve as bridges between science and society, and concluded his speech by referencing the communique (see photo) from the 1955 Asian-African Conference, also known as the Bandung Conference, which expressed a similar idea.

In another keynote speech, JAXA President YAMAKAWA Hiroshi discussed current and future satellite projects. Taking JAXA's GSMAp as an example, he emphasized the importance of satellite data in areas where ground data is difficult to obtain, such as Africa. In particular, he shared a practical application of GSMAp coupled with ICHARM's Web-RRI model in analyzing water cycles at local river basins in the region. Other organizations, including MLIT, JICA, and the Japan Water Agency, as well as Yokohama City and water-related businesses, also presented their plans and projects in the water sector.

TICAD9 concluded its meeting by adopting the Yokohama Declaration*, which includes the following water-related policy agendas (the numbers in the parentheses refer to sections in the declaration):

- ... build resilience against ..., extreme weather events like cyclones, ... (1.2)
- ... achieve sustainable development, promote climate resilience, ... (1.3)



Executive Director Koike shares a part of the Final Communique of the Asian-African Conference in 1955 with the audience in his presentation at TICAD9, entitled "Bridging Science and Society: Well-Informed Decisions on Water Resilience under Climate Change"

第9回アフリカ開発会議（TICAD9）の中で行った「Bridging Science and Society: Well-Informed Decisions on Water Resilience under Climate Change」と題した講演の中で、1955年のアジア・アフリカ会議の最終コミュニケの一部を紹介する小池センター長

ICARM は、2025 年 8 月 20 ～ 22 日にパシフィコ横浜で行われたアフリカ開発会議（TICAD9）において、21 日のサイドイベント「アフリカにおける気候と水関連レジリエンス、どのように水リスクを軽減するのか」（Climate and Water-related Resilience in Africa How water-related Risks can be reduced?）を、国土交通省、UNCRD、JAXA、JICA、UNDRR、GFDRR、世界銀行、アフリカ開発銀行、OECD、日本水フォーラムとともに共催しました。

会議では、国交省技監、南スーダン共和国外務大臣、ナイジェリアの大統領室関連国会議員、エジプトの水資源大臣（Video message）というハイレベルの方々からの挨拶がありました。いずれも、アフリカにおける水災害の激甚化が強調され、それが飲料水や衛生、健康とも関連し、持続可能な開発の阻害になっていることを指摘されていました。

基調講演では、小池俊雄センター長が、予測されている気候変動によるアフリカにおける水循環変化についての概説に加え、ICARM がこれまで実施してきているボルタ川、ニジェール川等の西アフリカでのプロジェクトや、GRIPS と JICA と協力で行っている人材育成によってアフリカ出身の修士号博士号を輩出している事例等を紹介しながら、科学と社会の架け橋となるべきファシリテーターの育成の重要性を強調され、最後に同様の考え方が示されていた 1955 年のアジア・アフリカ会議いわゆるバンドン会議のコミュニケを紹介して、講演を締めくくりました。

もう一つの基調講演では、JAXA の山川理事長から、衛星事業の現状と将来像についてお話がありました。その中で、JAXA が運用している GSMAp の有効性を取り上げ、アフリカなどの地上データが得られにくい地域での衛星データの重要性を強調、特に、ICARM が開発した Web-RRI モデルと結合することで、GSMAp が現地の流域レベルの水循環解析に役立っていることを紹介されました。

また、国交省、JICA、水資源機構におけるこれまでの水分野での取り組みの紹介に加え、横浜市や水関連民間企業の取り組みの紹介もありました。

なお、TICAD9 では横浜宣言* が採択されましたが、その中に「サイクロンなどの異常気象といった危機に対する強じん性を構築」（1.2）、「気候に対する強じん性の促進」（1.3）、「気候変動」「防災」（2.3）、「アフリカ諸国では、干ばつ、洪水、熱帯サイクロン及び地震の危険による自然災害がますます増加している。我々は、防災分野における日本の貢献とリーダーシップを歓迎し、災害リスクを軽減するためのリスク情報に基づいた開発の重要な役割及びアフ

リカにおける仙台防災枠組 2015 - 2030 行動計画の第 4 優先事項に従った復興、修復、再建における「より良く復興する」ことの重要性を再確認する。また、衛星データを利用した日本主導の防災対策は、収集・分析されたデータを使用してアフリカにおける水関連災害への強靱性を高めることを可能にする。」(3.2.5) と水防災関連政策が盛り込まれました。

* TICAD9 横浜宣言「革新的解決の共創、アフリカと共に」(和文仮訳)
<https://www.mofa.go.jp/mofaj/files/100893311.pdf>

• ... various global challenges such as climate change, ... disaster risk reduction, ... (2.3)

• ... African countries are increasingly experiencing natural disasters due to droughts, floods, tropical cyclones, and seismic risks. We welcome Japan's contribution and leadership in the areas of disaster risk reduction and reaffirm the critical role of risk-informed development to reduce disaster risk and the importance to "Build Back Better" in recovery, rehabilitation and reconstruction according to the 4th Priority of the Program of Action for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015 - 2030 in Africa, and Japan-led DRR solutions that utilize satellite data that allow us to use data collected and analyzed in order to enhance the water-related disaster resilience in Africa. (3.2.5)

* For more information on the Yokohama Declaration:
<https://www.mofa.go.jp/mofaj/files/100893431.pdf>

(Written by FUJIKANE Masakazu)

The 14th RCEM Symposium in Barcelona, Spain スペインで開催された第 14 回 RCEM シンポジウムに参加

第 14 回河川・海岸・河口域地形力学シンポジウム（以下 RCEM と表記）は、2025 年 9 月 1 日から 5 日までスペインのバルセロナで開催されました。RCEM は 2 年ごとに開催され、世界中の研究者が集まり、河川、海岸、河口域環境における最新の科学動向について議論します。

会議では、基調講演者による機械学習や数値モデリングなどの最新の研究動向の発表の後、一般セッションとポスターセッションが行われ、研究者らは 1) 河川、2) 沿岸、3) 河口の形態力学の 3 つの主要トピックに分かれて議論を行いました。

ICHARM からは、カティア アルネス フェレル専門研究員が会議に参加し、「蛇行河川における分流前後の河川形態変化」と題した研究成果を発表しました。アルネス専門研究員は、衛星画像と数値シミュレーションを組み合わせ、河川形態変化を評価する手法を紹介しました。発表では、蛇行河川の 2 つの支流の合流点手前で 2 つの分流部が分流するという特異な事例を示し、分流発生後に合流点の角度が変化する様子を示しました。ポスターセッションでは多くの研究者と活発な議論が行われ、貴重な知見が得られました。

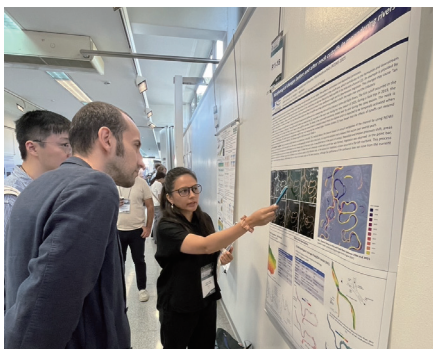
会議期間中の技術視察の一環として、参加者はバルセロナ沿岸の主要地点を訪問しました。これらの地域では、都市化と観光の影響を大きく受けた砂浜や池、沿岸湿地の保護に向けた様々な取り組みが行われています。その一例が、Aubi 川の河口に位置するカステルビーチです。カステルビーチは、現在も良好な状態で保存されている数少ない沿岸システムの一つです。かつて人間の活動によって砂丘が劣化していましたが、2003 年に開始された修復活動により、ビーチの一般利用を維持しながら砂丘の回復が促進されました。

The 14th Symposium on River, Coastal and Estuarine Morphodynamics (the 14th RCEM Symposium) was held in Barcelona, Spain, from September 1 to 5, 2025. RCEM is held every two years, bringing together researchers from all over the world to discuss the latest scientific trends in rivers, coasts, and estuarine environments.

During the conference, keynote speakers presented the most recent research trends such as machine learning and numerical modelling, followed by general sessions and a poster session where researchers were able to have discussions divided into three main topics: 1) Rivers, 2) Coastal, and 3) Estuarine morphodynamics.

From ICHARM, Research Specialist Kattia Rubi ARNEZ FERREL attended the conference and presented her investigation titled "Morphological changes before and after cutoffs in meandering rivers." She introduced a method to investigate morphological changes using satellite imagery in combination with numerical simulations to evaluate changes in the river. Her presentation showed a unique case of two neck cutoffs occurring in two branches of a meandering river before a confluence, showing a change in the angle of the confluence after the cutoff occurrence. The poster session led to active discussions with many researchers, yielding valuable ideas from the conversations.

As part of the technical field trip during the conference, participants visited key locations along the coast in Barcelona, where various efforts have been made to protect beach-dune systems, lagoons, and coastal wetlands in the area heavily impacted by urbanization and tourism. One example is the Castell beach, located at the mouth of the Aubi River, which remains among the few well-preserved coastal systems. Although its dune system had once been degraded by human activity, restoration efforts initiated in 2003 have successfully promoted dune recovery while maintaining



Research Specialist Arnez explaining her work during poster sessions
 ポスターセッションで説明をするアルネス専門研究員



Downstream end of Aubi River in Castell Coast beach
 Aubi 川下流のカステルビーチ

public access to the beach.

The conference proved to be an important venue for fostering international collaborations and exchanging ideas. At the end of the conference, it was announced that Japan would host RCEM 2027. The event will be a great opportunity for Japanese researchers to strengthen connections with the global scientific community.

(Written by Kattia Rubi ARNEZ FERREL)

この会議は、国際的な協力関係の促進と意見交換のための重要な場となりました。会議の最後には、日本が RCEM 2027 を主催することが発表されました。このイベントは、日本の研究者にとって世界の科学コミュニティとのつながりを強化する絶好の機会となる予定です。

The 14th Annual Meeting of the Working Group on Hydrology of the Typhoon Committee 台風委員会水文部会年次会合への参加

The 14th Annual Meeting of the Working Group on Hydrology (WGH) of the Typhoon Committee was held over three days from September 23 to 25, 2025, in Guam, U.S. territory, co-hosted by Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the U.S. National Oceanic and Atmospheric Administration (NOAA). WGH is one of the committee's four working groups, alongside the Working Group on Meteorology (WGM), the Working Group on Disaster Risk Reduction (WGDRR), and the Training and Research Coordination Group (TRCG). This annual meeting, chaired by Senior Researcher MIYAMOTO Mamoru, was held under the theme "Strategic Action for a Resilient Tomorrow: Strengthening Interagency Coordination and Data-Driven, Multi-Hazard Early Warning Systems to Address Typhoon Impacts," attended by more than 30 practitioners and researchers from 10 countries and regions (China, Japan, Laos, Malaysia, the Philippines, South Korea, Singapore, Thailand, Vietnam, and the United States) and the Typhoon Committee Secretariat, including online participants.

Following keynote presentations from MLIT and the University of Guam, each member reported on their typhoon and flood countermeasures for 2024 and 2025, which led to active discussions. Furthermore, the participants discussed the progress, outcomes, and budget status of nine ongoing Annual Operating Plans (AOPs) and new AOP proposals from Malaysia. Other agenda items included preparations for the 20th Integrated Workshop (IWS) and the formulation of WGH's policy for the upcoming annual session, covering various topics related to the current term's group operations. ICHARM recognizes the Typhoon Committee as one of the most important international frameworks for promoting regional cooperation to enhance water-related disaster resilience and intends to continue contributing to this effort.



Participants in the 14th annual meeting of WGH
台風委員会水文部会年次会合の参加者



Presentation by Senior Researcher Miyamoto at the annual WGH meeting
会議の様子

台風委員会第14回水文部会年次会合(WGH)が2025年9月23日から25日の3日間、日本の国土交通省とアメリカ海洋大気庁(NOAA: National Oceanic and Atmospheric Administration)の共同ホストによりアメリカ領グアムにおいて開催されました。本会合は「強靱な未来のための戦略的行動: 台風の影響に対処するための機関間連携とデータに基づく複合災害早期警報システムの強化」というテーマで ICHARM 宮本守主任研究員が議長を務めました。なお、台風委員会(TC)は気象部会(WGM)、水文部会(WGH)、防災部会(WGDRR)、トレーニング・研究連携部会(TRCG)の4つの部会で構成されています。今回の年次会合には10の国・地域(中国、日本、ラオス、マレーシア、フィリピン、韓国、シンガポール(オンライン)、タイ、ベトナム(オンライン)、アメリカ)と台風委員会事務局からオンラインを含め30名以上の実務者や研究者が参加しました。

会合では国土交通省とグアム大学からの基調プレゼンテーションの後、各メンバーから昨年と今年の台風や洪水対策の取り組みに関する報告があり、活発な議論が交わされました。さらに、9つの現在進行中の年次事業計画の進捗と成果、予算執行状況を議論したのち、マレーシアからの新たなAOP(Annual Operating Plan)の提案についても議論しました。その他、第20回統合部会(IWS)の開催準備に関する議論や年次総会に向けた水文部会方針の取り決めなど、今期の部会運営に係る様々な議題が議論されました。ICHARMでは、台風委員会を水災害レジリエンス向上のための地域協力を促進する最も重要な国際的枠組みの1つと理解し、引き続きこの取り組みに貢献する所存です。

(Written by MIYAMOTO Mamoru)

Visit by UNDRR director and officials UNDRR 官房長および職員が来所

国連防災機関（UNDRR）のパオラ・アルブリト官房長他計6名が9月22日に土木研究所を訪問し、施設見学及び意見交換を行いました。今回のパオラ官房長の訪日は、外国の政・経・官・学等の各界において一定の指導的立場に就いている者または近い将来活躍が期待される実務レベルの人物を招へいし、日本の関係者との人脈構築及び親日家・知日家層の育成・底上げを図ることを目的に外務省が実施する「戦略的実務者招へい」の一環で実現したものです。

施設見学では水理実験施設を訪れ、施設概要やダム模型実験について板垣河道保全研究グループ長から説明を受けました。続いて古本特別研究監がICHARMの概要説明を行い、活動方針や能力育成の重要性等について意見交換を行いました。

本イベントはパオラ官房長にICHARMや土木研究所の技術を知ってもらい良い機会となりました。今後もこのような取組を通じて、ICHARMの活動や成果を世界に発信していく予定です。

On September 22, 2025, Ms. Paola Albrito, the director of the United Nations Office for Disaster Risk Reduction (UNDRR), visited the Public Works Research Institute (PWRI) with five other officials. During their visit, they toured the institute's facilities and held discussions with Japanese counterparts. This visit to Japan took place under the Strategic Practitioner Invitation Program, an initiative of the Ministry of Foreign Affairs of Japan. Through this program, the ministry invites foreign leaders and promising individuals from politics, economics, government, academia, and other sectors, creating opportunities to build close networks with Japanese counterparts. The program also aims to broaden the base of Japan-friendly professionals and those knowledgeable about Japan.

The visitors toured the hydraulic experiment laboratory, where ITAGAKI Osamu, the director of PWRI's Hydraulic Engineering Research Group, explained the facility, including a brief overview of a dam model experiment. They then returned to ICHARM, where FURUMOTO Kazushi, the director for special research, gave a presentation on ICHARM's activities. They also exchanged views with ICHARM researchers on topics such as activity policies and the importance of education and training.

ICHARM staff welcomed the valuable opportunity to showcase ICHARM and PWRI's technologies to UNDRR officials. ICHARM will continue to promote its activities and achievements internationally through such efforts.



Visitors at the hydraulic experiment laboratory
水理実験施設を見学する来所者



Visitors at a meeting with ICHARM staff
ICHARM 職員と意見交換を行う来所者



Director Albrito (second from left) with an official of Japan's foreign ministry and ICHARM staff
アルブリト官房長（左から二人目）、外務省職員と ICHARM 職員

(Written by TAKEGAWA Shinya)

● Research

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、(2)に関する取組例としてシェレスサ バドリ バクタ専門研究員より「Development of Methodological Framework for Assessment of Flood Risk under Climate and Social Changes」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, while remaining sensitive to local needs, priorities, development stages, and other factors, 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) Data collection, storage, sharing, and statistics on water related disasters**
- (2) Risk assessment on water related disasters**
- (3) Monitoring and prediction of changes in water related disaster risk**
- (4) Proposal, evaluation and application of policy ideas for water related disaster risk reduction**
- (5) Support in constructing the applicability of water-related disaster management**

In this issue, Research Specialist Shrestha Badri Bhakta shares his recent research, titled “Development of Methodological Framework for Assessment of Flood Risk under Climate and Social Changes”.



Development of Methodological Framework for Assessment of Flood Risk under Climate and Social Changes

Shrestha Badri Bhakta, Research Specialist

シェレスサ バドリ バクタ専門研究員

Floods are the most frequently occurring water-related disasters in the river basins of many countries, which can cause serious damage, such as loss of lives and destruction of infrastructure and property. Recently, flood disasters have worsened due to climate change and increased social vulnerability from urbanization, population growth, and inadequate preventive infrastructure. These combined factors lead to more destructive floods that threaten lives and cause significant economic damage, particularly in the flood-prone areas of developing countries, because of limited resources for flood management. Under these circumstances, understanding changes in flood damage in the future due to climate change while considering social change is crucial for better managing flood disaster risk in the future. Therefore, it is essential to develop a flood risk assessment method and assess potential flood damage and flood risk levels, considering the future impacts of climate and social changes in the future, in order to better protect flood-prone areas by implementing effective preventive and adaptation measures, including land use regulations. In this context, this article introduces two research activities that focus on the assessment of flood damage and risk and climate and social changes, including the development of appropriate methodological frameworks: (a) Flood damage assessment under climate and social changes in the Solo River basin of Indonesia, and (b) Exploration of the relationship between floods, poverty, and environmental sustainability.

a) Flood damage assessment under climate and social changes in the Solo River basin of Indonesia

As part of the Advanced Studies of Climate Change Projection (SENTAN Program) supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, this research focused on developing a method to quantitatively assess flood damage to the agriculture sector and residential areas under scenarios of climate change and social change (land use, land cover, and population). A methodological framework was developed by coupling water and energy budget-based rainfall-runoff-inundation model outputs and a flood loss model (Fig. 1). Flood damage curves were developed to quantify agricultural damage and residential building and content damage. Then, flood damage to agricultural crops and households was assessed under scenarios of climate and social changes, focusing on the Solo River basin of Indonesia. This study used MRI-AGCM climate model outputs for the past

(1979–2002) and far-future (2075–2098) periods. For consideration of future changes in paddy area in assessing agricultural flood damage, land-use and land-cover changes (LULC) were analyzed using historical land-cover maps published by the Ministry of Environment and Forestry, Indonesia, and future changes in LULC were projected based on the learning process using historical maps and static variables. The effects of possible changes in future population growth on flood damage to households were analyzed using shared socio-economic pathways (SSPs) based on projected population. The developed method was first verified for a severe past flood event by comparing calculated results with reported damage data. Then, the assessment of flood exposure and damage was conducted for the past (1979–2002) and future (2075–2098) periods.

Fig. 2 shows the calculated flood damage to the rice crop and houses for the past and future periods (Shrestha et al., 2025a, b). The findings revealed that the average annual rice crop damage for the study area may increase in the future period by 93.7% due to climate change impacts alone, if there are no changes in paddy field area in the future (Shrestha et al., 2025a). The average annual rice crop damage may increase in the future by more than 50%, if both the effects of climate change and changes in future paddy field area are considered. This reduction in percentage points is due to a decrease in paddy field area in the future. The findings of this study showed that the rice production may decrease in the future not only due to climate change impacts, but also due to a decrease in paddy field area. Rice production may decline by 24.6% in the future due to a decrease in paddy field area alone (Shrestha et al., 2025a).

The results showed that the increase in household damage in the future widely varied depending on future population scenarios. The estimated building and content damage in the future period was relatively higher in all future population scenarios than that in the past period with the base-year population. The average total household damage value per year may increase by 146% in the future in the case of the base-year population (Shrestha et al., 2025b). The increases in average total household damage per year in the future period in the cases of SSP1, SSP2, SSP3, SSP4, and SSP5 compared to that in the past period were 150%, 193%, 259%, 121%, and 146%, respectively (Shrestha et al., 2025b). The flood damage to households will be most severe in the case of the SSP3 projected population scenario compared with the other future population scenarios.

The results of flood damage assessment under a changing climate and society in this research are useful for understanding future flood damage conditions and implementing practical mitigation and adaptation actions to climate change. The outcomes of this research provide information on flood hazards and damage that could also help policymakers and decision-makers establish policies and strategies required for disaster risk reduction.

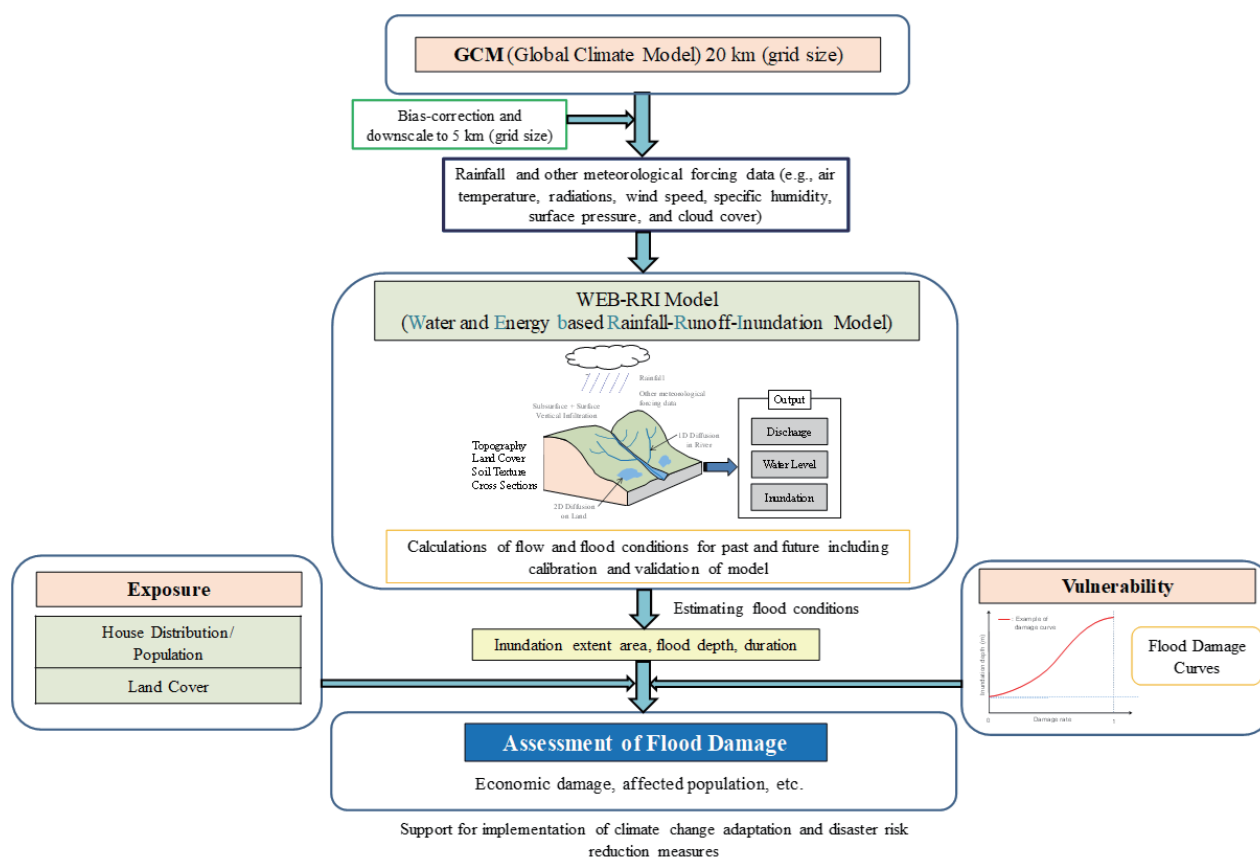


Fig. 1 Overview of methodology for assessing flood damage quantitatively

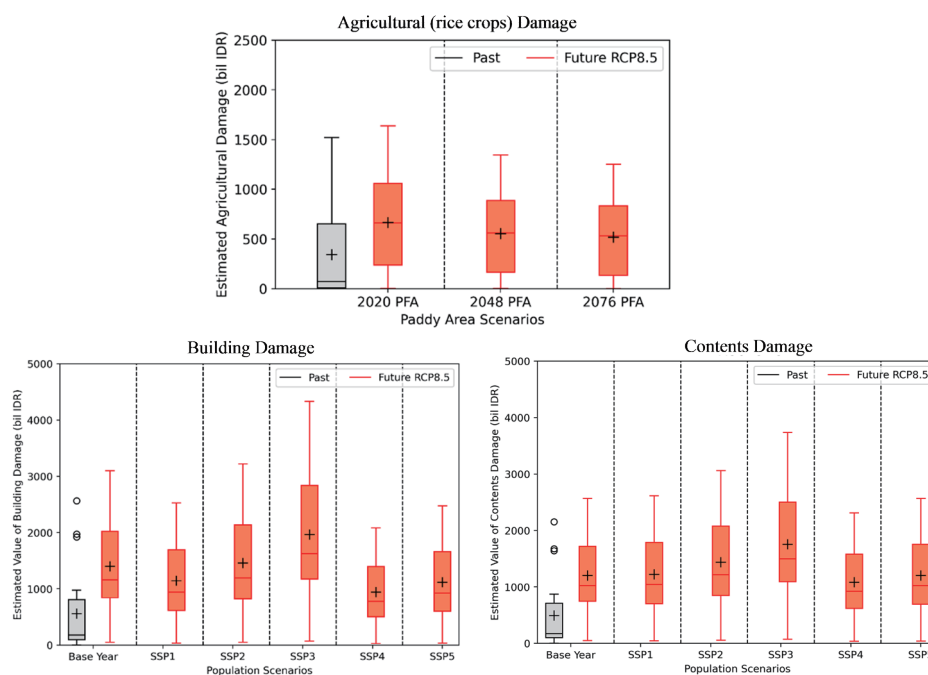


Fig. 2 Calculated value of agricultural damage, building damage, and contents damage for past and future periods (Shrestha et al., 2025a, b)

b) Exploration of relationship between floods, poverty and environmental sustainability

Since April 2024, we have been implementing a research project, “Exploration of the relationship between floods, poverty, and environmental sustainability,” supported by the JSPS KAKENHI Research (Grant number: 24K07692). This research focuses on the investigation of the relationship between floods, poverty, and dynamic environmental sustainability of livelihoods under social and climate changes by integrating newly developed quantitative flood risk assessment approaches and socio-economic information collected through intensive questionnaire surveys. The quantitative flood risk assessment approaches have been developed by coupling a hydrologic-hydraulic model and a flood loss model. This study considered flood-prone river basins in South Asian countries, such as the Bagmati River basin in Nepal and the Kalu River basin in Sri Lanka, as case study areas. Flood hazards were simulated using a hydrologic-hydraulic model called the Rainfall Runoff Inundation (RRI) model under different scenarios of social (land use) and/or climate change conditions in the future. Flood damage and risk were assessed, focusing on agricultural crops and household buildings and contents. To collect flood damage data and socio-economic information at the household level, intensive questionnaire surveys were conducted for local households in the flood-prone areas in the Bagmati River basin of Nepal and the Kalu and Mundeni Aru River basins of Sri Lanka (Photo 1). The collected data were used for developing and validating risk assessment approaches to quantifying flood damage and risk. The activities of this research are ongoing, and the key final outputs will be the identification of the linkage between floods, poverty, and environmental sustainability of livelihoods, which will help improve living conditions and reduce the vulnerability of poor people living in flood-prone areas. The field investigations revealed that the poor people living in flood-prone areas are highly vulnerable to floods in the study areas because most of them live in temporary-type houses, which are more likely to be destroyed by floods (Photo 2). The findings of this research are useful for planning and implementing flood prevention measures and policies required for the reduction of flood damage and loss, and contribute to improving both living and economic conditions of the poor people living in the flood-prone areas.

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- Shrestha B.B.**, Rasmy M., Ushiyama T., Acierto R.A., Kawamoto T., Fujikane M., Shinya T., Kubota K.: Assessment of future risk of agricultural crop production under climate and social changes scenarios: a case of the Solo River basin in Indonesia. *Journal of Flood Risk Management*, 18 (1), e13052, 2025. <https://doi.org/10.1111/jfr3.13052>
- Shrestha B.B.**, Rasmy M., Ushiyama T., Acierto R.A., Kuribayashi D., Kubota K.: Assessing climate change-driven social flood exposures and flood damage to residential areas in the Solo River basin of Indonesia. *Modeling Earth Systems and Environment*, 11, 144, 2025. <https://doi.org/10.1007/s40808-025-02330-1>

a. Nepal



b. Sri Lanka



Photo 1: Conducting household questionnaire surveys for collecting damage and socio-economic data



Photo 2: Affected temporary houses by a flood event of 2024 in the Bagmati River basin, Nepal

SIP Activity Report: Outreach and Educational Activities Across Japan Using the Virtual Flood Experience System

SIP 活動報告 ～仮想洪水体験システムを用いた、日本各地におけるアウトリーチ活動および教育活動～

ICHARM では、「戦略的イノベーション創造プログラム（Cross-ministerial Strategic Innovation Promotion Program：SIP）」第3期に位置付けられた課題「スマート防災ネットワークの構築」を構成するサブ課題の一つである「リスク情報による防災行動の促進」に共同研究機関として参加しています。

ICHARM は研究開発テーマ2)「水災害リスク・被害影響可視化技術の開発」において、将来の水災害リスク情報と企業の自社データを活用して水災害想定被害額を算出するとともに、対策実施による費用対策効果を算出して企業のレジリエンス向上を支援するシステム「水災害リスク・レジリエンス評価支援基盤システム」の開発や、仮想空間での洪水体験を通じて住民の洪水に対する経験値を上げる「仮想洪水体験システム」の開発および実装を行っています。これらの活動を通して、洪水をはじめとする水災害が「ジブンゴト」として捉えられ、事前の防災行動が促進される社会づくりに取り組んでいます。

以下、最近の活動について報告します。

ICHARM is participating in the 3rd phase of the Cross-ministerial Strategic Innovation Promotion Program (SIP), a five-year project launched in September 2023 by the Cabinet Office of Japan. Its central involvement is in the sub-project "Promoting Disaster Prevention Actions Using Risk Information," under the broader project "Development of a Resilient Smart Network System against Natural Disasters."

More specifically, ICHARM is contributing primarily to the second R&D theme of this sub-project, "Risk and Damage Visualization." It is developing a platform system to support the assessment of water-related disaster risks and resilience. This system enables businesses to estimate potential damages from future water-related disasters by combining hazard information with their own data. It also supports their efforts to strengthen disaster resilience by calculating the cost-effectiveness of the damage-control measures they plan to implement. In addition, through this sub-project, ICHARM is developing and implementing the Virtual Flood Experience System (VFES), which allows people to experience flooding virtually and learn how to act during such events. Overall, ICHARM is making steady progress toward building a society in which people regard floods and other water-related disasters as personal concerns and are fully aware of the importance of taking preventive actions to minimize damage.

The following is a report on its recent activities.

Visit by Tagajo High School students

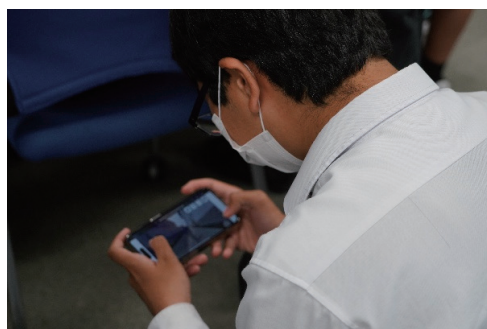
On July 4, forty second-year students from the Disaster Science Department of Tagajo High School in Miyagi Prefecture visited ICHARM. This department offers a specialized curriculum in disaster management, which is rare in Japan, providing practical education aimed at fostering future leaders in disaster management. The visit was organized for the students to learn about cutting-edge disaster research and deepen their understanding of the importance of disaster management based on scientific knowledge.

Chief Researcher KURIBAYASHI Daisuke first introduced ICHARM's research activities and international initiatives in disaster risk reduction. Then, Researcher YAMASHITA Daiki explained VFES. Afterward, the students had the opportunity to try out VFES themselves. In this session, ICHARM provided a Wi-Fi environment so that students could access VFES on their personal smartphones via the web. By experiencing a flood situation reproduced from past events, the students were placed in scenes that required them to consider the best actions and decisions to protect themselves. Disseminating information about the system's accessibility on personal devices is an important step toward its broader adoption in society. After experiencing VFES, many students shared positive feedback such as "I was able to learn while having fun" and "The cityscape and flooding looked very realistic."

ICHARM will continue to collaborate with educational institutions to support the development of the next generation of disaster management professionals. It is also expected that this visit will deepen the students' learning and contribute to enhancing their disaster management activities.



Chief Researcher Kuribayashi giving a presentation
栗林大輔上席研究員による講義の様子



A student experiencing VFES on his smartphone
自身のスマートフォンで仮想洪水体験システムを体験する様子

Participation in a public education program at Shinshu University

On July 28, a public education program for local elementary school students was held at the Faculty of Education, Shinshu University. The program aims to provide opportunities for children to enjoy learning about everyday science and disaster management. Under the direction of Associate Professor MIWA Shuheji, ICHARM was in charge of a hands-on session using the Minecraft-based VFES.

In the session, the children operated avatars in a virtual space to move around the city and experience how to act safely during a flood. After Researcher YAMASHITA Daiki explained the local topography and flood risks, the children helped each other reproduce the cityscape by creating landmark buildings and incorporating hazard-map information, while identifying safe and dangerous areas. This event marked the first instance of using the Minecraft-based VFES in a real educational setting for elementary school students, highlighting its promising potential for disaster education.



Researcher Yamashita explaining VFES to children
山下大輝研究員による説明の様子

多賀城高校災害科学科生徒が ICHARM を訪問

2025年7月4日、宮城県多賀城高校災害科学科の2年生40名が ICHARM を訪問しました。同学科は、全国でも珍しい防災専門の教育課程を有しており、将来の防災人材育成を目的とした実践的教育を展開しています。今回の訪問は、防災研究の最前線に触れ、科学的知見に基づく防災の重要性を理解する機会として実施されました。

当日は、栗林大輔上席研究員から ICHARM の研究活動や国際的な防災協力の取り組みの紹介、山下大輝研究員から仮想洪水体験システム (Virtual Flood Experience System, VFES) の説明があり、その後学生による VFES 体験が行われました。今回の体験では、ネット環境を提供したうえで、生徒が個人のスマートフォンでも WEB 上で VFES を操作できるようにしたのが特徴です。実際に数名は自身のスマートフォンを使って体験し、仮想空間上で洪水シナリオを再現した映像を通して、自らの行動や判断を考える場面に触れていました。自分の端末で体験できることは、今後の社会実装を考えたときに大きな一歩となる取り組みです。VFES 体験後、生徒からは「楽しみながら学べた」「街並みや浸水の様子がリアルだった」といった肯定的な声が多く聞かれました。

ICHARM では今後も教育機関との連携を進め、次世代の防災人材育成を支援していく予定です。今回の訪問が、生徒の学びを深め、将来の防災活動に活かされることが期待されます。

信州大学学習講座への参加

2025年7月28日、信州大学教育学部にて地域の小学生を対象とした学習講座が開催されました。本講座は、身近な科学や防災について楽しみながら学ぶことを目的としています。当日は三和秀平准教授の企画のもと、ICHARM は仮想洪水体験システム (マインクラフト (マイクラ) 版) を用いた体験指導を担当しました。

参加した子どもたちは、仮想空間内でアバターを操作して街の中を移動し、洪水時にどのように行動すれば安全かを体験しました。山下大輝研究員から地域の地形や水害リスクについて説明をした後、マイクラ内でランドマークとなる建物の作成やハザードマップの再現を協力して行い、安全なエリアと危険なエリアを確認しました。この取り組みは、小学生を対象にマイクラ版 VFES を本格的に活用した初の事例であり、防災教育への新たな可能性を実感する機会となりました。

仮想洪水体験システムの出展

SIP の取り組みでは、SIP 終了後において、開発した技術が社会に広く活用されること（社会実装）を目指し、開発成果を広く社会に適時発信し、実際に体験してもらうことを重視しています。

2025 年 7 月 27 日には信州大学工学部で開催された「めざせ！逃げ遅れゼロ防災・ラジオ工作教室」にて長野版 VFES を iPad で展示し、参加した小学生や保護者約 20 名に体験していただきました。操作方法や画面表示についての意見が多く寄せられました。

2025 年 9 月 6 日には「ぼうさいこくたい 2025 in 新潟」にて北海道大学・河川情報センターと共同で札幌版 VFES を展示しました。来場者は子どもから専門家まで幅広く、地域防災教材としての活用可能性に関心が寄せられました。

さらに 9 月 20 日には「自然災害に関するオープンフォーラム」にて同様の展示を実施し、約 80 名に体験していただきました。特に小学生などは避難に失敗すると繰り返し挑戦する様子が見られ、失敗を通じた学びが防災教育で重要であることが改めて示されました。

Exhibition of VFES

The SIP project places strong emphasis on promoting the widespread adoption of its developed technologies. Accordingly, each project team undertakes outreach activities, including disseminating information on their research outcomes and offering opportunities for hands-on experience.

As part of this effort, ICHARM participated in a workshop held on July 27 at the Faculty of Engineering, Shinshu University, in Nagano Prefecture. The event was designed for elementary school students to raise their disaster management awareness while teaching them how to build a radio. The project team prepared the Nagano version of VFES on iPads, which about 20 students and their parents were able to try out. Participants provided many comments and suggestions to improve the system's operability and visualization.

On September 6, ICHARM participated in another disaster-related event in Niigata Prefecture, held in collaboration with Hokkaido University and the River Information Center. For this occasion, the project team exhibited the Sapporo version of VFES (Sapporo is the capital of Hokkaido). The system attracted considerable attention from a wide range of visitors from young children to experts for its potential as an effective tool to help communities educate residents about disaster management.

On September 20, the project team organized another exhibition as part of an open forum on natural disasters. Approximately 80 people attended this event and tried out VFES. Elementary school children were particularly eager to repeat the evacuation process using the system until they succeeded, which reinforced the importance of learning from failures even in disaster education.



An elementary school student trying out VFES while getting advice from Researcher Yamashita at the Niigata event

ぼうさいこくたい 2025 in 新潟にて、仮想洪水体験システムを体験する小学生（左）と山下大輝研究員



Researcher Yamashita explaining how VFES works at the open forum on natural disasters

自然災害に関するオープンフォーラムにて仮想洪水体験システムの説明を行う山下大輝研究員

「SIP/BRIDGE 未来の科学フェス」で洪水避難をマイクラ体験

2025 年 9 月 27 日、大阪科学技術センターで開催された「SIP/BRIDGE 未来の科学フェス」に、ICHARM は仮想洪水体験システム（Virtual Flood Experience System, VFES）を出展しました。本イベントは内閣府が主催するもので、戦略的イノベーション創造プログラム（SIP）や BRIDGE プログラムの成果を、親子で楽しく学びながら体験できる科学イベントです。

体験では、まず大阪の地形や洪水リスクを学んだ上で、2 種類の洪水シナリオに挑戦しました。ひとつは大阪駅付近の堤防が決壊し、梅田が早い段階で浸水して避難が難しくなるシナリオ（シナリオ 1）。もうひとつはより遠方で堤防が決壊し、梅田にも水は到達するものの、淀屋橋（大阪市役所）まで逃げ切る余裕があるシナリオ（シナリオ 2）です。

A Minecraft-based VFES experience event at the SIP/BRIDGE Future Science Festival

On September 27, ICHARM participated in the SIP/BRIDGE Future Science Festival held at the Osaka Science and Technology Center. Hosted by the Cabinet Office of Japan, this event promotes science by giving children and parents the chance to learn about the inventions and findings from the SIP and BRIDGE projects in an enjoyable way. For the occasion, ICHARM offered the visitors the opportunity to experience a simulated flood using the Minecraft-based VFES. The system was specially prepared for this event by recreating Osaka's streets from Umeda to Yodoyabashi and around the Osaka castle by utilizing Minecraft, a game popular among children. A total of 73 children, mostly elementary school students, and their parents tried out the system, virtually practicing evacuation through flooded Osaka streets.

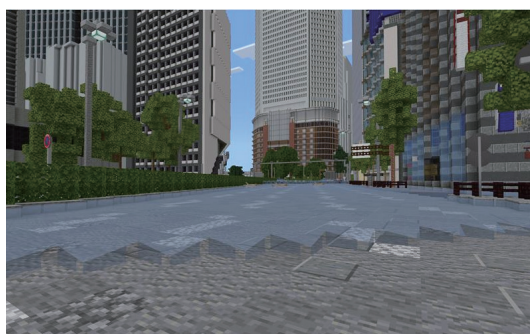
At the VFES event, participants first learned about Osaka's topography and flood risks before experiencing two different flood scenarios. In the first scenario, a levee near Osaka Station breaches, causing the Umeda area to flood early and making evacuation difficult. In the second scenario, a levee breaches farther from the Umeda area; although floodwaters eventually reach the area, people have time to evacuate to Osaka City Hall at Yodoyabashi. Many participants failed to evacuate safely in the

first scenario, while in the second scenario, with more time to act, many successfully carried out smoother evacuation actions by applying the lessons they had learned from the first scenario.

At the festival, ICHARM held a stage event in addition to its booth exhibition, inviting Miran, a second grader and a powerful influencer with over 3 million SNS followers, to try out the Minecraft-based VFES. The audience watched it on a large screen as the young influencer searched for a safe evacuation route through a simulated flood, as if they themselves were experiencing it. This opportunity proved particularly valuable in promoting the new technology and highlighting the importance of disaster education to a wide audience.

The project team received a variety of feedback from participants. Some children were impressed by how realistic the streets and floodwaters appeared, which even made them feel scared. Others highlighted the unique use of Minecraft, saying that it made learning about disasters enjoyable. Parents also shared positive comments, expressing gratitude for the rare opportunity to reflect on disasters with their children. From observing participants, the team also learned that learning can become more effective when people are motivated by experiencing failure. Subsequent successes then bring a sense of satisfaction, which in turn fosters even more effective learning.

This exhibition was among the first real-world applications of the Minecraft-based VFES for disaster education, marking an important step toward broader use in society. Looking ahead, ICHARM will continue creating technologies that make disaster awareness personal, relevant, and part of everyday life.



Osaka's streets and floodwaters reproduced using the Minecraft-based VFES

仮想洪水体験システム（マインクラフト版）で再現された大阪のまちと洪水の様子



Senior Researcher DENDA Masatoshi (standing in a pink vest) explaining Osaka's topography and flood risks

大阪の地形や洪水リスクについて説明を行う傳田正利主任研究員

シナリオ 1 では多くの参加者が避難に失敗しましたが、より避難時間の猶予があるシナリオ 2 では、再び避難に失敗しないようシナリオ 1 での学習効果を活かしながら多くの参加者が効率的に避難し、避難に成功しました。

さらに今回は、体験ブースに加えてステージイベントでも紹介を行いました。SNS 総フォロワー数 300 万人を超えるインフルエンサーの望蘭（みらん）さん（小学 2 年生）が登場し、マイクラでの洪水避難に挑戦。スクリーンには実際に洪水が迫り逃げる様子が映し出され、観客も臨場感ある体験を共有しました。大勢の前で取り組みを紹介することで、より多くの来場者に防災教育の意義を伝える機会となりました。

参加者からは「街並みや浸水がリアルで少し怖かった」「マイクラで防災を学べるのは面白い」といった声が寄せられました。保護者からも「子どもと一緒に考えるよい機会になった」と好評でした。参加者の体験の様子を観察していると、失敗することが次の体験へのやる気を引き出して、学習効果を高めるとともに、成功体験が体験者に満足感を与え、さらなる学習効果向上につながるとうかがえました。

今回の出展は、マインクラフト版 VFES を活用した防災教育の実装事例の一つであり、社会実装に向けた重要なステップとなりました。ICHARM では今後も、多くの人が身近に災害を「ジブンゴト」として学べる仕組みづくりを進めていきます。

(Written by KURIBAYASHI Daisuke, DENDA Masatoshi and YAMASHITA Daiki)

Inception workshop for the UNESCO Kenya Project

UNESCO ケニアプロジェクトのインセプションワークショップの開催

An inception workshop was held in Nairobi, Kenya, on July 2, 2025, to kick off the "Enhancement of Flood Resilience in Kenya" project funded by the Japanese government's supplementary budget for fiscal year 2024. From ICHARM, Executive Director KOIKE Toshio and Senior Researchers USHIYAMA Tomoki, Mohamed Rasmy, and MIYAMOTO Mamoru participated in this event. ICHARM, together with the University of Tokyo, is leading the implementation of this project in cooperation with the UNESCO Regional Office for Eastern Africa. The project will conduct a creation of predicted rainfall, hydrological modeling, identification of hotspots, and the introduction of an early warning system with awareness-raising activities in Kenya's Tana River Basin.

The day before the workshop, the ICHARM researchers visited the regional office

ICHARM と東京大学が UNESCO 東アフリカ地域事務所と協力して推進している令和 6 年度日本政府補正予算事業「ケニアにおける洪水レジリエンス強化」のキックオフとして、インセプションワークショップが 2025 年 7 月 2 日に現地ナイロビで開催されました。ICHARM からは小池俊雄センター長と牛山朋来主任研究員、モハメッド・ラスミー主任研究員、宮本守主任研究員が参加しました。このプロジェクトでは、ケニアのタナ川流域において、予測降雨データの創出、水文モデリング、ホッ

トスポットの特定、早期警戒システム導入と意識啓発を実施します。

ワークショップ前日には UNESCO 東アフリカ地域事務所長を訪ね、ルイズ・ハクストハウゼン所長および関係部署の職員と翌日のインセプションワークショップに向けた事前打合せを実施し、特にケニアにとって水害は重大な問題であること、現地データの統合と共有が重要であることについて認識を共にしました。

インセプションワークショップには、在ケニア日本大使館の松浦博司大使やハクストハウゼン所長、ケニアのケニア水資源省のキニャンジュイ評価・監視部長に参加いただき、その他ケニア気象庁 (KMD) やケニア赤十字社、大学など約 50 名が参加しました。まず、ICHARM 職員から、洪水レジリエンス強化を目的としたタナ川流域洪水予警報システムの開発計画やケニア実務者の能力開発プログラム計画について発表を行い、現地ステークホルダー等と開発計画と活動内容を共有しました。午後からは、1) データ、2) トレーニング、3) 情報伝達、の 3 つに分かれたグループディスカッションで具体的な活動計画を議論しました。

7 月 3 日から 6 日はタナ川の現地視察を実施し、主要な気象水文観測所の視察やタナ川沿いに居住するコミュニティとの意見交換を行いました。コミュニティとの意見交換では、洪水に対する脅威やリスクは比較的 low、共生する意識が感じられました。具体的には、土で作られた家はずもともと 2、3 年で建て替えるものであるため洪水による被害影響はそれほど深刻ではなく、家財が使えなくなることで村全体が周辺地域から遮断されることが問題視されていました。ただし、それよりむしろ、農業のための水が得られることを歓迎している点は非常に印象深く、洪水によるリスクと恵みの両面から、予警報システムによって洪水対応のリードタイムが長くなることは重要であることが確認されました。

and met with Director Louise Haxthausen and staff from relevant departments for a preliminary meeting to discuss final preparations for the inception workshop. Through the meeting, both sides reached a common understanding that floods are an urgent issue in Kenya and that integrating and sharing local data is crucial to the project's success.

The inception workshop was attended by approximately 50 participants, including H.E. Ambassador MATSUURA Hiroshi of the Embassy of Japan in Kenya, Director Haxthausen, and Mr. Kinyanjui, the director of the Monitoring and Evaluation Department at Kenya's Water Resources Authority, as well as other participants from the Kenya Meteorological Department (KMD), the Kenya Red Cross Society, and local universities. The ICHARM researchers delivered presentations to share project plans and activities with local stakeholders, including a development plan for a flood forecasting and early warning system for the Tana River Basin to enhance the basin's flood resilience, as well as a capacity development program plan for Kenyan practitioners. In the afternoon, more detailed activity plans were discussed in breakout group discussions divided into three themes: 1) data, 2) training, and 3) information dissemination.

From July 3 to 6, the project team conducted a field survey in the Tana River area. They visited main meteorological and hydrological observation stations and had meetings with residents living in communities along the river. Through conversations with them, the team learned that floods are not necessarily seen as a threat or risk, but rather as something to be lived with. People in the area generally do not view flood damage to houses as a major issue, since they often rebuild every two to three years. They are more concerned about damage to household goods and the risk of isolation from nearby areas. Despite these concerns, the team found it noteworthy that local people often welcome floods as a source of water for agriculture. These findings highlighted the need for an early warning system that allows longer lead times, helping communities prepare for floods while balancing their risks and benefits.



Preliminary meeting at the UNESCO East Africa Regional Office
UNESCO 東アフリカ地域事務所における事前打ち合わせ



Participants in the Inception Workshop
インセプションワークショップの参加者



Scenes of group discussion
グループディスカッションの様子



Gravel extraction in the Tana River
タナ川における砂利採取



Dialog with local community residents regarding flood early warning
地元コミュニティとの洪水予警報に関する意見交換

(Written by MIYAMOTO Mamoru)

A business trip for the UNESCO Ghana project UNESCO ガーナプロジェクト出張報告

ICHARM has been conducting an assignment "Development of an integrated early warning system for water-related hazards in Ghana" in collaboration with the University of Tokyo, which is part of a UNESCO project funded by the government of Japan. On July 3-4, Executive Director KOIKE Toshio and Research Specialist NAGUMO Naoko visited Accra, the capital city of Ghana, as part of this assignment.

On July 3, the ICHARM researchers met with Mr. Edmond Moukala, the director of the UNESCO Accra office to present an overview of ICHARM's recent activities as a UNESCO category 2 center, including the development of an integrated early warning system and the training planned in Accra (Photo 1). They also paid a courtesy visit to Mr. YOSHIMOTO Hiroshi, Japan's ambassador extraordinary and plenipotentiary to Ghana, who briefed them on the "24-hour economy and accelerated export development programme," a new national policy launched on July 2. The researchers learned



Photo 1 Meeting with Director Moukala at the UNESCO Accra office

写真1 UNESCO アクラ事務所の Moukala 所長との打合せ風景

ICHARM では、UNESCO から受託した「ガーナにおける水関連災害の統合型早期警戒システムの開発」業務を東京大学と協力しながら進めています。この業務は UNESCO が日本政府の支援を受けて実施しているプロジェクトの一部であり、その一環として、小池俊雄センター長と南雲直子専門研究員が、2025 年 7 月 3 日から 4 日にかけてガーナの首都アクラを訪問しました。

7 月 3 日には、UNESCO アクラ事務所の Edmond Moukala 所長に面会し、UNESCO カテゴリー 2 センターとしての ICHARM の最近の活動や、統合型早期警戒システムの開発およびアクラで実施予定のトレーニングの概要について説明しました（写真 1）。また、日本大使館の義本博司駐ガーナ特命全権大使を表敬訪問し、ガーナ政府が 7 月 2 日に正式に開始した政策「24-hour economy and accelerated export development

programme」について情報共有頂きました。この政策において、統合型早期警戒システム開発の対象地となっている Volta 川流域が、農業生産の中心地および生産地と消費地を繋ぐ交通路として重視されていることが分かり、研究への意欲をさらに高めて取り組む決意を新たにしました。

7 月 4 日には、統合型早期警戒システムの開発について、ガーナの水文局、気象局、水資源委員会の代表者らと意見交換を行いました（写真 2）。この打合せでは、ICHARM の気候モデリングや気候変動を踏まえた水文シミュレーションに対し、ガーナ側から強い関心が寄せられました。そして、日本とガーナの関係者間で月例オンライン打合せを行うことや、早期警戒システム開発に必要な降雨や河川流量などのデータを提供いただくこと、また、ガーナのステークホルダーを対象としたトレーニングを 11 月に行うことについて合意することができました。

ICHARM では、今後も UNESCO および東京大学と協力しながらガーナでの活動を進めていきます。

that this policy specifically targets the Volta River basin, a focus area for the early warning system installation in the UNESCO project, given its importance for agricultural production and as a transportation hub linking production and consumption centers. The ambassador's briefing underscored the basin's strategic significance and further strengthened their commitment to the project.

On July 4, the visiting team exchanged views on the development of the integrated early warning system with representatives from the Ghana Hydrological Authority (HYDRO), Ghana Meteorological Agency (GMet), and Water Resources Commissions of Ghana (WRC) (Photo 2). In this meeting, the Ghanaian side showed strong interest in ICHARM's climate modeling and hydrological simulations considering climate change. In addition, both sides reached an agreement to hold monthly online meetings, to share the data necessary for the early warning system development, such as rainfall and river discharge, and to conduct training for Ghanaian stakeholders in November.

ICHARM will continue its active involvement in the Ghana project, in collaboration with UNESCO and the University of Tokyo.

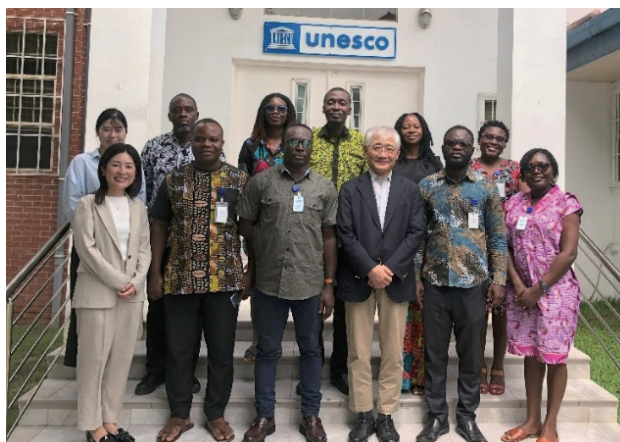


Photo 2 ICHARM researchers with Ghanaian partners after the meeting
写真 2 ガーナの関係者との集合写真

(Written by NAGUMO Naoko)

Field survey and the first JCC meeting in Ghana for the SATREPS project SATREPS Ghana : ガーナにおける現地視察と第 1 回 JCC の開催

ICHARM は、JICA と JST による地球規模課題対応国際科学技術協力プロジェクト「沿岸域の持続的な保全、防災、生活改善を実現する総合土砂および環境管理手法の構築」に参画しています。8 月 8 日～14 日に秦夢露専門研究員がガーナに渡航し、対象地の現地視察と第 1 回合同調整委員会（JCC）に参加しました。

8 月 8 日から 11 日、および 13 日の 5 日間には、Volta 川と Pra 川の河口および数キロ上流区間を船で移動し、河床・河岸の状況を確認するとともに、ソナーセンサーによる試験的な深浅測量を実施しました（写真 1）。また、Pra 川の濁水が沿岸域へ及ぼす影響を確認し（写真 2・3）、今後予定している横断測量や河床・河岸材料サンプリングに向けた基礎情報を収集しました。さらに、図 1 に示すようにトーゴ国境から Pra 川（写真 4）に至るガーナ沿岸域を調査し、昨年 10 月の調査と比較して浸食・堆積の変化を確認しました。

ICHARM is involved in the JICA-JST Science and Technology Research Partnership for Sustainable Development (SATREPS) project, "The Project for the Development of Integrated Sediment and Environmental Management Towards Sustainable Conservation, Disaster Risk Reduction, and Livelihood Improvements in Coastal Areas." From August 8 to 14, Research Specialist QIN Menglu visited Ghana to participate in the field survey and the first Joint Coordinating Committee (JCC) meeting. The field survey was conducted for a total of five days, from August 8 to 11 and on August 13. The project team navigated the estuaries of the Volta and Pra Rivers and continued several kilometers upstream along these rivers, while observing riverbed and riverbank conditions and performing trial bathymetric measurements using sonar sensors (Photo 1). The team also checked the turbid water conditions of the Pra River and their impacts on the coastal zone (Photos 2-3), collecting basic information necessary for future cross-sectional surveys and sampling of riverbed and riverbank materials. In addition, as shown in Figure 1, they surveyed the coastline stretching from the Togolese border to the Pra River (Photo 4), and investigated changes in erosion and sedimentation to compare them with the findings from last October's survey.

Through this field survey, the project team confirmed remarkable sediment deposition in the Volta River estuary, where continuous erosion had been previously

observed. In contrast, in the coastal section east of the estuary - where groins had been constructed and last year's survey had confirmed beach recovery due to sediment deposition - more than half of the beach was eroded away (Photo 5). Overall, except for a part of the Volta estuary, severe coastal erosion was observed along most of the coastline investigated in this survey. The team also learned from local residents that tidal wave events occurred three times between March and August this year, with houses washed away or flooded in severely eroded areas (Photo 6).

Qin attended two meetings with other project members during her visit. On August 12, she met with researchers from the Africa Centre of Excellence in Coastal Resilience (ACECoR) of the Centre for Coastal Management, the Ghanaian counterpart of this project, and discussed the overall research direction and activity plans in detail for the coming year (Photo 7). On the 14th, she attended the first JCC meeting (Photo 8). The attendees received a report on the meeting with ACECoR, and Ghanaian partner institutions agreed to cooperate in sharing data and supporting future observations and surveys.



Photo 1. Bathymetric survey using a sonar sensor (Left: Volta River; Right: Pra River)
写真1 ソナーセンサーを用いた水深測量



Photo 2. Highly turbid coastal seawater extending several kilometers from the Pra River estuary
写真2 Pra川河口から数キロも続く高濁度の沿岸海水



Photo 3. Highly turbid condition of the Pra River in the rainy season
写真3 雨季のPra川の様子



Photo 4. The project members observing coastal erosion
写真4 沿岸域の浸食観測調査メンバー

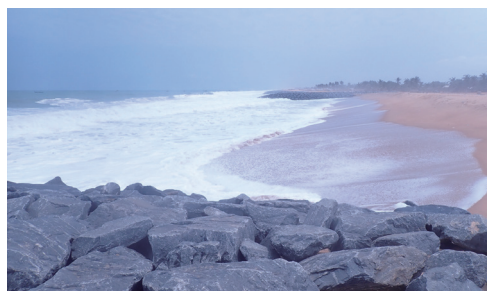


Photo 5. Coastal erosion observed in the section with groins
写真5 連続突堤区間における海岸浸食の状況



Figure1. Coastline area of the field survey
図1 調査した沿岸域

その結果、これまで継続的に浸食が進んでいた Volta 川河口付近で顕著な堆積が観察された一方、連続突堤が建設されていた区間では、昨年見られた堆積が大きく失われ、砂浜の半分以上が浸食されていることが明らかになりました（写真5）。今回調査を実施した沿岸域全体では、Volta 川河口の一部を除き、広範囲に浸食が進んでいることを確認しました。さらに、現地住民の証言から、今年3月以降に3回の Tidal Wave が発生し、浸食の激しい地区では家屋の流出や浸水被害が生じていることが分かりました（写真6）。

8月12日には、ガーナ側の共同研究機関である ACECoR (Africa Centre of Excellence in Coastal Resilience, Centre for Coastal Management) の研究者と、プロジェクト全体の研究方針および今後1年間の詳細計画について協議しました（写真7）。その内容を8月14日の JCC Meeting にてガーナ側の研究協力機関に報告し（写真8）、データ提供や観測・調査の実施に際する協力体制について合意しました。



Photo 6. Houses destroyed by severe coastal erosion this year
写真6 今年の深刻な海岸浸食による流出した家屋



Photo 7. Research meeting with ACECoR
写真7 ACECoR との研究打ち合わせ



Photo 8. The 1st Joint Coordinating Committee (JCC) Meeting
写真8 第1回JCC会議

(Written by QIN Menglu)

Research trip to Argentina for a SATREPS project SATREPS アルゼンチン出張報告

SATREPS（地球規模課題対応国際科学技術協力プログラム）アルゼンチンプロジェクト「気象災害に脆弱な人口密集地域のための数値天気予報と防災情報提供システム」の現地視察と意見交換のため、令和7年8月22日から31日まで、牛山朋来主任研究員と秦夢露専門研究員がアルゼンチンに出張しました。このプロジェクトに新たに参画した秦専門研究員が、2つの対象河川の現地視察を通して対象流域の課題を把握し、現地協力機関との意見交換を行って研究の進捗を図ることができました。

最初に、対象地域のひとつであるコルドバ市を訪問し、市街地の河川の状況を視察しました。また、コルドバ大学にて共同研究機関のグループの皆さんによる精力的な研究発表を聞くことができ、プロジェクトが順調に進んでいることを理解できました。

次に、ブエノスアイレス州の国立水研究所（INA）を訪問し、意見交換を行うとともに、ブエノスアイレス州の対象河川の視察を行いました。ここでは、河川の状況や、河川改修工事の状況を視察し、さらに流域内の2つの市町村の災害対策センターを訪問しました。市内の洪水脆弱地域にある住宅地への対策として、住民の避難教育をまず子供たちを対象に行い、それが家族に伝わることで住民の避難体制の構築につながるといった取り組みを行って

Senior Researcher USHIYAMA Tomoki and Research Specialist QIN Menglu visited Argentina for field surveys and research discussions from August 22 to 31, 2025. This research is conducted under the framework of the Science and Technology Research Partnership for Sustainable Development (SATREPS), entitled "Argentina Project: the Numerical Weather Prediction and Warning Communication System for Densely Populated and Vulnerable Cities to Weather Disasters." QIN, who recently joined this project, played a pivotal role in advancing the research by leading on-site inspections to identify the issues facing the target river basins and discussions with local partner organizations.

The two researchers first visited Córdoba City, one of the target areas, and inspected the conditions of the rivers in the city. They also listened to energetic research presentations by members of the joint research group at the National University of Córdoba, confirming that the project is progressing smoothly.

Their next visit was to the National Institute of Water (INA) in Buenos Aires Province. They jointly investigated the river conditions in the area and checked the status of river improvement works with local researchers. They then visited disaster response centers in two municipalities within the watershed. They learned that, to protect residential areas in flood-prone zones, the centers were implementing initiatives, such as providing evacuation education for children, with the intention that the knowledge would spread from children to their family members, thereby helping them establish an evacuation system for themselves. The two researchers also paid a visit to the "Puente 12" Strategic Coordination Center of the Ministry of Security of Buenos Aires Province and learned an example of good practice. Staff members explained that by consolidating all information, including the spatiotemporal distribution of 911 emergency calls, meteorological data, and river monitoring information, information dissemination to municipalities became more effective and efficient, which helped prevent the escalation of damage during past heavy rainfall disasters.

At the National Institute of Water, the ICHARM researchers were able to have detailed discussions on the future direction of hydrological model development. Although the target river basin in Buenos Aires Province is small, with an area of 240 km², it has a complex sewage network, requiring the development of methods to calculate water flows, including sewage flows, in real time. For this purpose, researchers from INA and the National University of Córdoba will stay at ICHARM from September to October as part of a researcher exchange program to collaborate on developing a practical model and methods, based on the discussions in Argentina. The joint effort is expected to generate significant results for the project.



Research presentation by local researchers at the National University of Córdoba
コルドバ大学における研究発表



Discussion with public defense service staff at Quilmes City
Quilmes 市の公共サービス局での説明



ICHARM researchers (fourth and fifth from left) at the "Puente 12" Strategic Coordination Center
ブエノスアイレス州治安省訪問



ICHARM researchers (second and third from left) at INA
国立水研究所 (INA) 訪問

(Written by USHIYAMA Tomoki)

ました。さらに、ブエノスアイレス州政府の治安省を訪問した際には、911 緊急コールの時空間分布や、気象情報、河川モニタリング情報などのすべての情報を統括することによって、市町村に対する情報伝達がスムーズになり、豪雨災害時に被害の拡大を防ぐことができたということです。

国立水研究所では、今後の水文モデル開発についての方針について詳しい議論をすることができました。ブエノスアイレス州の対象河川は、流域は 240km² と小さいのですが、下水道網が複雑に絡み合っており、下水道を含む水の流れを高速で計算する方法の開発が求められています。今後 9 月から 10 月にかけて、研究員の相互訪問により INA とコルドバ大学から研究員が来日します。ここで議論した内容をもとに、アルゼンチンの研究員と共同で、ICHARM でモデル開発を行う予定です。両国の研究員の共同開発により、プロジェクトの成果が実り多いものになることが期待されます。

East and South Africa Flood and Drought Countermeasures Training Program in Japan 東・南部アフリカ洪水・渇水対策プログラム訪日研修

The "East and South Africa Flood and Drought Countermeasures Training Program in Japan" was conducted on August 25-29, 2025, as part of the "Knowledge Exchange on Flood and Drought Management between South Sudan and Japan," a project commissioned by the World Bank (WB). Its purpose was to provide an opportunity for South Sudanese government officials to gain an overview of science and technology for flood and drought monitoring, forecasting, and warning and strengthen their foundational capacity for developing flood and drought early warning systems. A total of 19 participants attended from five African countries—South Sudan, Malawi, Comoros, Madagascar, and Mozambique—along with representatives from the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and WB. From ICHARM, Executive Director KOIKE Toshio, Chief Researcher OKADA Tomoyuki, Senior Researchers Mohamed Rasmy,



Locations of field visits
現地視察箇所

2025 年 8 月 25 日から 29 日にかけて、「東・南部アフリカ洪水・渇水対策プログラム訪日研修」が実施されました。本研修は、世界銀行からの委託業務である「南スーダンと日本の洪水・干ばつ管理に関する知識交換」の一環であり、南スーダン政府職員が、洪水・干ばつの監視、予測、警報のための科学技術の概要を学び、洪水・干ばつ早期警報システム開発のための基礎的能力を強化することを目的に実施したものです。南スーダン、マラウイ、コモロ、マダガスカル、モザンビークのアフリカ 5 国及びナイル赤道直下湖周辺補助行動計画 (NELSAP) と世界銀行から計 19 人が、ICHARM からは小池俊雄センター長、岡田智幸上席研究員、Mohamed Rasmy 主任研究員、宮本守主任研究員、武川晋也主任研究員、筒井浩行専門研究員、Ralph Acierio 専門研究員が参加しました。

【8月25日（月）】

利根川中上流部にある草木ダム、渡良瀬遊水地、加須市役所を訪問しました。草木ダムでは、水資源機構の職員からダムの概要に加えて、2019年10月の台風19号の際に非洪水期にも関わらず事前放流を実施したことで限られたダム容量を有効活用できた実績について説明を受けました。渡良瀬遊水地では、国土交通省関東地方整備局利根川上流河川事務所の職員から遊水地の洪水調節の仕組みや豊かで多様な湿地環境の保全・再生の取組について説明を受けました。加須市役所では、市民の安全を守るための広域避難の取組や、田んぼダム、雨水貯留浸透施設の設置による洪水及び浸水対策など、災害に強いまちづくりについて説明を受けました。

【8月26日（火）】

利根川下流部にある稲戸井調節池、宮城県の大崎市役所を訪問しました。稲戸井調節池では、利根川上流河川事務所の職員から上流や対岸の他の調節池と一体となった洪水調節の仕組みや用地買収及び掘削等の事業の進捗状況について説明を受けました。大崎市役所では、遊水地の設置、渇水時に順番に水を利用する番水などの巧みな水管理、屋敷林である居久根も活用した多様な生物と共生する水田農業等について紹介があり、先人の知恵と技術が現在まで引き継がれているとの説明を受けました。

【8月27日（水）】

鳴瀬川・吉田川流域にある鎌田三之助記念館、国土交通省東北地方整備局北上川下流河川事務所鹿島出張所、幡谷サイフォン、明治潜穴、志田谷地防災センターを訪問しました。鎌田三之助記念館では、大崎市の職員から鹿島台地区の水害と対策の歴史や品井沼干拓に尽力した鎌田三之助の功績、地域住民が協力して行う水防団の活動などについて説明を受けました。鹿島出張所では、北上川下流河川事務所の職員から水害に強いまちづくりの一環として氾濫拡大防止のために設置された二線堤について説明を受けました。幡谷サイフォンや明治潜穴では、両施設が建設された経緯について品井沼の排水や干拓の歴史と併せて説明を受けました。志田谷地防災センターでは、鶴田川沿岸土地改良区から度重なる洪水被害、土地改良事業や国土交通省と連携した流域治水の取組について、北上川下流河川事務所から防災センターや排水ポンプ車について説明を受けました。

【8月28日（木）】

小池センター長が、「Bridging Science and Society -Well-Informed Decisions on Water Resilience under Climate Change-」と題した講義を行い、気候変動評価、エンドツーエンドのアプローチ、知の統合を含むICHARMの研究活動を概説しました。Ralph 専門研究員は、降雨モニタリング、予測、データ検証に関する講義を行い、地上雨量計観測、日本の気象レーダーネットワーク

MIYAMOTO Mamoru, and TAKEGAWA Shinya, and Research Specialists TSUTSUI Hiroyuki and Ralph Acierto took part in the training.

[August 25]

The participants visited the Kusaki Dam, the Watarase Retarding Basin, and the Kazo City Hall, which are located in the middle and upper reaches of the Tone River. At the Kusaki Dam, staff from the Japan Water Agency provided an overview of the dam and highlighted its successful operations during Typhoon Hagibis in October 2019. Despite it being a non-flood season, during which standard procedures typically exclude pre-flood reservoir water releases, the dam's limited capacity was effectively utilized by executing emergency pre-flood releases. At the Watarase Retarding Basin, staff from the Tone River Upper Stream River Office of the Kanto Regional Development Bureau, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), explained the basin's flood control mechanisms and efforts to preserve and restore its rich and diverse wetland environment. At the Kazo City Hall, the participants received an explanation about building a disaster-resilient city through initiatives such as developing wide-area evacuation plans to protect citizens from flooding and preparing flood and inundation control measures by utilizing rice paddies as temporary retarding basins and building rainwater storage and infiltration facilities.



Participants at Kusaki Dam
草木ダムでの集合写真



Participants at Watarase Retarding Basin
渡良瀬遊水地での集合写真



Training at Kazo City Hall
加須市役所での研修風景

[August 26]

The participants visited the Inadoi Detention Basin in the lower reach of the Tone River and the Osaki City Hall in Miyagi Prefecture. At the Inadoi Detention Basin, staff from the Tone River Upper Stream River Office explained the flood control mechanism coordinating upstream and opposite-bank reservoirs, as well as the progress of projects such as land acquisition and excavation. At the Osaki City Hall, they



Field visit to Inadoi Detention Basin
稲戸井調節池の視察



Training at Osaki City Hall
大崎市役所での研修風景

learned about floodwater retention basin construction, sophisticated water management practices such as "bansui," a rotational irrigation system during droughts, and rice paddy farming that coexists with diverse organisms utilizing farmstead shelterbelts called "igune." They were told that the wisdom and techniques of their predecessors have been passed down to the present day.

[August 27]

The participants visited several places: the Kamata Sannosuke Memorial Museum in the Narusegawa and Yoshidagawa river basins; the Kashimadai Branch Office of the Kitakami River Lower Stream River Office, the MLIT Tohoku Regional Development Bureau; the Hataya Siphon; the Meiji River Tunnel; and the Shida-Yachi Disaster Prevention Center. At the museum, staff from Osaki City explained the history of flood events and flood control in the Kashimadai area, the contributions of Kamata Sannosuke in the Shinai Marsh reclamation, and the activities of flood fighting corps, which are organized cooperatively by residents. At the Kashimadai Branch Office, staff from the Kitakami River Lower Stream Office explained secondary levees installed as part of flood-resilient community development to contain floodwaters. At the Hataya Siphon and the Meiji River Tunnel, they received explanations about the background of both facilities' construction, alongside the history of the Shinai Marsh drainage and reclamation. At the Shida-Yachi Disaster Prevention Center, they received an explanation from the Tsuruta River Coastal Land Improvement District about repeated flood damage, along with their land improvement projects and collaborative efforts with MLIT in the basin-scale flood control initiative. They also received an explanation from the Kitakami River Lower Stream Office about the Disaster Prevention Center and drainage pump trucks.



Field visit to Kamata Sannosuke Memorial Museum
鎌田三之助記念館の視察



Field visit to Hataya Siphon
幡谷サイフンの視察



Training at Shida-Yachi Disaster Prevention Center
志田谷地防災センターでの研修風景

[August 28]

The participants attended a series of lectures by ICHARM researchers and others. Executive Director Koike delivered a lecture titled "Bridging Science and Society: Well-Informed Decisions on Water Resilience under Climate Change," outlining ICHARM's research activities, including climate change assessment, the end-to-end approach, and knowledge integration. Research Specialist Ralph delivered a lecture on rainfall monitoring, forecasting, and data validation. He explained ground-based rain gauge observations, Japan's meteorological radar network, and satellite observations such as GSMaP. He also demonstrated rainfall monitoring and forecasting in South Sudan, comparing GSMaP data with observations from the Juba Observatory.

ク、GSMaPなどの衛星観測について説明するとともに、南スーダンにおける降雨モニタリングと予測を実演し、GSMaPデータとジュバ観測所の観測データを比較しました。Rasmy 主任研究員は、水・食糧・エネルギーの相互関係を考慮した洪水・干ばつリスク管理のシームレスなアプローチを強調するとともに、RRI モデルの仕組みと WEB-RRI モデルの開発について説明しました。東北大学の本間香貴教授は、稲作モデルと水文学モデルを組み合わせ、気候変動が稲作に与える影響に関する講演を行い、衛星やドローンによるリモートセンシングが大量の観測データを生成し、より正確なモデリングが可能になると説明しました。筒井専門研究員は、植生のグリーンウォーター概念に基づく農業干ばつ監視・予測手法に関する講演を行い、トウモロコシやソルガムの収量と植生水分含有量の関係を示し、収量を正確に推定したことを説明しました。

【8月29日（金）】

午前中に宮本主任研究員が、ジュバ近郊のナイル川支流を対象に、RRI モデルによる洪水シミュレーション実践トレーニングを実施しました。まず、モデル構造と検証手法を紹介し、その後参加者が2006年の2か月間の地上観測降雨データをRRI モデルに入力し、河川流出量と浸水区域を再現しました。午後には参加5カ国及び1機関(NELSAP)が、日本から得た課題と教訓、さらに必要な知識について発表しました。

今回の訪日研修を通じて、日本の洪水・渇水対策及び ICHARM の知見の普及を図ることができました。南スーダンの参加者の1人からは、「日本が経験した渇水や洪水の話聞き、現地も見ることができて参考になりました。住民が協力してやるべきことをやっている姿が印象的でした。今回学んだことを自国での政策に活かしたいです。」とのコメントをいただきました。ICHARM は今後もアフリカの水災害被害の軽減や人材の育成に貢献していく予定です。

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。

Senior Researcher Rasmy emphasized a seamless approach to flood and drought risk management considering the water-food-energy nexus, explaining the mechanism of the RRI model and the development of the WEB-RRI model. Professor HONMA Koki of Tohoku University gave a lecture on the impact of climate change on rice cultivation, combining a rice cultivation model and a hydrological model. He explained that remote sensing using satellites and drones generates large amounts of observation data, enabling more accurate modeling. Research Specialist Tsutsui spoke about agricultural drought monitoring and prediction methods based on the concept of green water from vegetation. He showed the relationship between corn/sorghum yields and vegetation water content and explained how yields were accurately estimated.

[August 29]

In the morning, Senior Researcher Miyamoto conducted practical training on flood simulation using the RRI model, targeting a tributary of the Nile River near Juba. He first explained the model structure and validation methods. Participants then input two months of ground-observed rainfall data from 2006 into the RRI model to reproduce river discharge and inundation areas. In the afternoon, the participants from five countries and one institution (NELSAP) gave presentations on challenges and lessons learned from the training in Japan, as well as the necessary knowledge to address them.

This training was also an excellent opportunity for ICHARM to disseminate Japan's flood and drought control measures and its expertise. One participant from South Sudan commented: "Hearing about the droughts and floods Japan experienced and seeing the sites firsthand was very informative. I was impressed by how residents were cooperating to do what needed to be done. I want to apply what I learned here to policies in my own country." ICHARM plans to continue contributing to reducing water disaster damage and developing human resources in Africa.

Finally, ICHARM was very thankful to all the staff and officials for their excellent cooperation during the field visits.



Executive Director Koike at the lecture
小池センター長による講義



Hands-on training
ハンズオントレーニングの風景



Participants and ICHARM staff in front of the ICHARM building after a workshop
ワークショップ後の集合写真

(Written by TAKEGAWA Shinya)

Thesis summaries and comments from graduating doctoral students

博士論文の概要と学生からのコメント

ICHARM started a doctoral program, "Disaster Management Program," in 2010 in collaboration with GRIPS to produce experts who are capable of developing policies on water-related disaster risk management and taking the leadership in implementing them. By September 2025, 24 students graduated from this program.

In this section, four students, who just graduated from the program this September, briefly present their thesis research, along with some reflections on their three years at ICHARM.



Graduation ceremony at GRIPS on September 12, 2025
政策研究大学院大学で行われた学位授与式（2025年9月12日）

ICHARMは、2010年度から政策研究大学院大学（GRIPS）と連携して、水関連災害リスクマネジメントの政策立案と、その実行においてリーダーシップを発揮できる専門家の育成を目的とした博士課程「防災学プログラム」を実施しています。2025年9月までに24名の学生が修了しました。

以下では、今年9月に修了した4名の学生の研究内容を紹介します。



AN INVESTIGATION OF TROPICAL CYCLONE-DRIVEN EXTREME RAINFALL IN SRI LANKA: HISTORICAL TRENDS AND CLIMATE CHANGE PROJECTIONS

Jayasekara Sachintha, Ph.D. in Disaster Management

ジャヤセカラ サチンサ 博士（防災学）

Heavy rainfall from tropical cyclones (TCs) in the North Indian Ocean (NIO) often poses severe challenges to Sri Lanka. Our recent study addresses this gap by analyzing the relationship in Sri Lanka during the pre- and post-monsoon seasons, considering the impact of climate change. The analysis begins with observational data from recent TC events and then expands into a climate model-based assessment to identify the future variation of TC-associated rainfall. Results highlight strong seasonal contrasts: during the pre-monsoon season, high water vapor over the equatorial Indian Ocean supports intense cyclones that bring heavy rainfall to the southwest. In comparison, post-monsoon cyclones tend to be weaker but pass closer to Sri Lanka, directly affecting the Eastern, Northern, and North-Central provinces. Interestingly, a strong negative correlation between maximum rainfall and the Indian Ocean Dipole index was found in the pre-monsoon season, but not in the post-monsoon season.

Secondly, we analyzed GCMs to understand the current climatology and expected future trends of change in extreme events. We used the high-resolution Meteorological Research Institute-Atmospheric General Circulation Model (MRI-AGCM3.2H) to examine the impact of climate change on TC activity and associated rainfall patterns. We utilized 25 years of past climate data (1979-2003) and future climate scenarios under the Representative Concentration Pathways (RCP) 8.5 and 4.5 (2075-2099). The Cyclone Tracking (CyTRACK) framework was applied to detect and track TCs over the NIO region within these simulations. The TC track analysis indicates a future decrease in TCs in the NIO region, and around Sri Lanka due to the poleward shift of TC genesis points. However, due to the high WV content in the future climate, there will be an increase in the frequency of high-intensity TCs over the NIO, resulting in a greater impact on Sri Lanka.

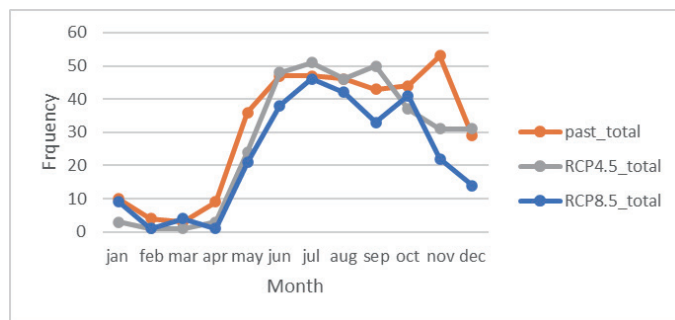


Figure 1: The Monthly TC frequency comparison between Past (1979-2003) and Future (2075-2099) climate scenarios RCP4.5 and RCP8.5

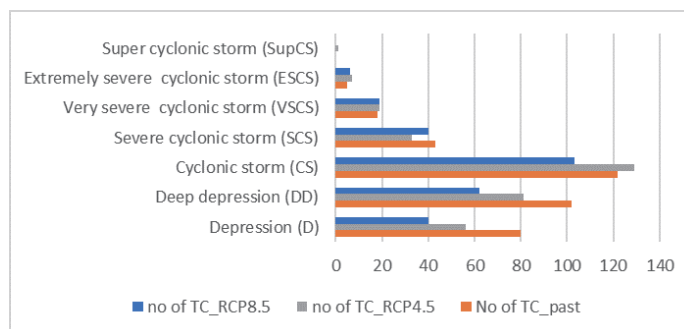
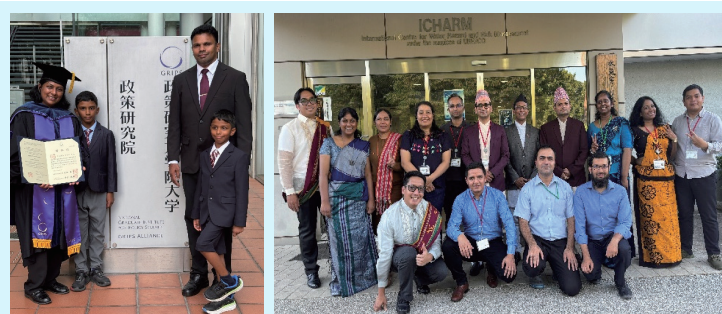


Figure 2: TC intensity categories between past (1979-2003) and future (2075-2099) climate scenarios

Thirdly, we analyze downscaled climate projection data to study the extreme rainfall events in the future climate. Dynamically downscaled MRI AGCM_3.2H shows a significant increase in future yearly average rainfall over Sri Lanka. There is an increase in future rainfall in the post-monsoon season and a reduction in the pre-monsoon season. Additionally, there is a significant reduction in TC-rain in the future climate.

Finally, we analyzed selected past and future extreme events to identify the future variation of TC-associated rainfall to reduce the adverse impact of extreme events. There is a significant change in the spatial distribution of maximum rainfall in the future climate. Therefore, Sri Lanka can expect heavy rainfall in the northern half of the country in the pre-monsoon season as well.

These findings underscore the need for Sri Lanka to adopt season-specific, cyclone-aware adaptation strategies rather than relying solely on broad monsoonal planning. Strengthening early warning systems, updating disaster management policies, and conducting high-resolution, multi-model simulations will be crucial steps in preparing for future climate risks.



ICHARM and GRIPS has been a rewarding achievement, made possible with the guidance of esteemed experts. The knowledge and insights I have gained will be essential in strengthening disaster management systems in my home country when I return. I sincerely thank ICHARM, PWRI, and GRIPS for giving me the opportunity to pursue this three-year Ph.D. program in disaster management.



INTEGRATED USE OF SOCIOECONOMIC VULNERABILITY ASSESSMENT AND HAZARD MODELING FOR LOCAL LEVEL FLOOD AND DROUGHT RISK REDUCTION

Hassan Haren Hote, Ph.D. in Disaster Management

ハサン ハーレン ホテ 博士 (防災学)

Water-related disasters in Pakistan have caused losses of billions of dollars and affected millions of citizens, despite the country's comprehensive efforts to strengthen its disaster management institutional framework. The flooding of 2022 was the most damaging in Pakistan's history, inundating approximately one-third of the country. The flooding was similar to that of 2010, which was the biggest disaster at the time in terms of impact. Despite the vast network of structural measures for long-term protection against flooding, Pakistan lacks a holistic approach of integrated flood management that involves non-structural measures, especially those addressing the linkages between rural poverty and disaster risk reduction (DRR). Pakistan is also affected by frequent drought disasters. The most severe drought in recent history occurred from 1998 to 2002 and had a nationwide economic impact. Unlike floods, droughts develop gradually over extensive areas; hence, their impacts are relatively difficult to comprehend.

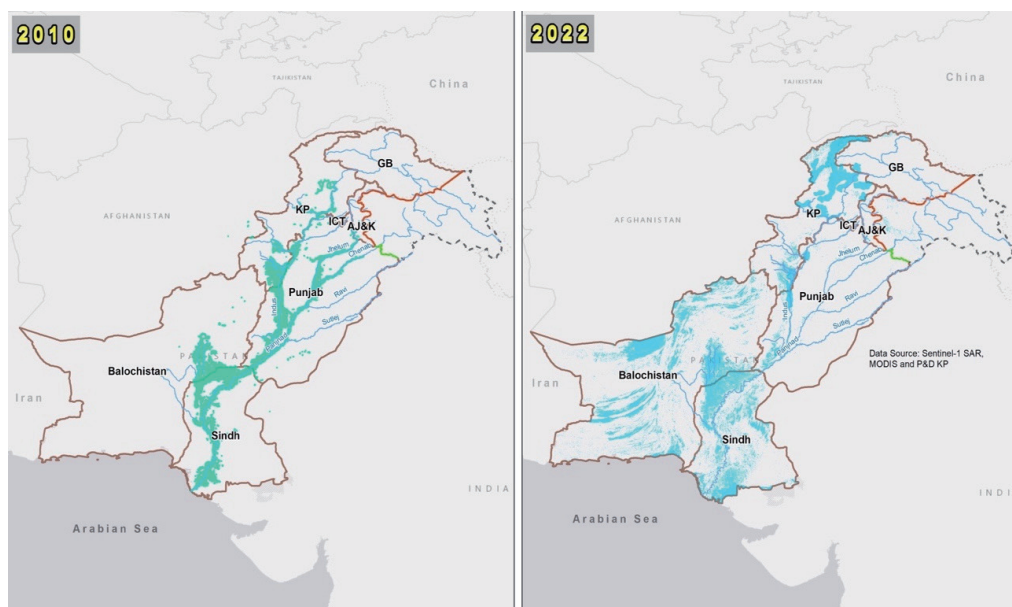


Figure 1: The inundation extent in the 2010 and 2022 floods (World Wide Fund for Nature Pakistan, 2022)

The disaster management governance regime in Pakistan has seen significant progress since 2007, with the establishment of a national legislative and institutional framework. Yet the scale of human displacement and damage across multiple sectors in the flooding of 2010 and 2022 is evidence of underlying or systemic factors of disaster risk. Tackling water-related disasters requires an understanding of a country's economic and social structures, which form the basis for development and have an indirect impact on disaster management through the functional capacities of state agencies as well as the resilience levels of citizens. Typically, government systems or sectoral agencies perform their roles within their specified domains with insufficient coordination. Overall sustainable development requires effective policy outcomes that can be practically achieved through sufficient coordination and synergistic use of agency resources. Statistical data collection is imperative for a holistic approach to development that is based on integrated and multifaceted policies and investments. The availability of local-level indicator data showing the performance of the social sector and the status of citizens' living standards can help to address issues of poverty and social and economic development.

The similar destructive impact of both the 2010 and 2022 floods demonstrates that, despite the functioning of an established multi-tiered disaster management framework, flood impact mitigation and DRR in general are lacking in Pakistan. This research aimed to examine the impact of the 2010 and 2022 flooding in Pakistan in order to identify and analyze the basic factors that negatively impact the effectiveness of its disaster management system. The study utilized an integrated approach to disaster management, which used multidisciplinary assessments through instruments of social policy and natural science by employing widely available socioeconomic indicators and hydrological modelling tools for flood and drought impact mitigation.

The Sendai Framework emphasizes hazard impact management and reduction by addressing the exposure of systems and societies to the risk generated by hazard events. The damage to life and property at the time of a hazard occurrence partly depends on the pre-existing social and economic vulnerabilities of a community. The attainment of the Sustainable Development Goals and DRR is interlinked and requires an integrated multidisciplinary approach. Such an approach can utilize socioeconomic assessment instruments that employ the integrated use of available data and scientific tools designed to assist in hazard prediction and measure subsequent exposure generated along different parameters of intensity, duration, and extent for improved impact-based forecasting.

Using an integrated approach, this study provides a basis for district-level assessment of water-related hazard risk through the synergistic use of socioeconomic vulnerability indicators and outputs from hazard exposure monitoring tools, namely, the Water and Energy Budget-based Rainfall Runoff Inundation (WEB-RRI) model and the Coupled Land and Vegetation Data Assimilation System (CLVDAS), for floods and droughts, respectively. In this regard, the study first developed a socioeconomic vulnerability index (SEVI) for the two poorest provinces of Pakistan, Balochistan and Sindh. The central statistical agency of the country is the Pakistan Bureau of Statistics (PBS), which conducts the Pakistan Social and Living Standards Measurement (PSLM) surveys at regular intervals. Besides being used for government poverty reduction strategies, the PSLM survey data are also utilized to monitor progress on 31 indicators related to the SDGs. The Multidimensional Poverty Index (MPI) in Pakistan was also calculated using several indicator values taken from the PSLM. As such, to develop the SEVI, the study relied on PSLM and MPI district-level indicator data and classified the districts into three categories of high, moderate, and low socioeconomic vulnerability.

In addition, WEB-RRI outputs of inundation extent, depth, and duration were simulated for the high-vulnerability

areas. The study shows that scientific outputs can be used for minimizing impact and disruption to socioeconomic functioning in general, and health and education service delivery in particular. For example, modeling outputs can be used to prevent declines in indicator values that measure health and education performance, such as 'child immunizations,' which may be affected as a result of the inundation of health facilities. Flood simulation parameters of inundation depth and duration can also help to control a rapid increase in the indicator of 'out of school children' by assisting decision-makers in making alternate arrangements. Similarly, the CLVDAS-simulated ecohydrological variables, i.e., vegetation water content and root-zone soil moisture, can be used to monitor changes in agricultural drought conditions in drought-hit districts to improve food security management.

The vulnerability index developed in this study can be used by provincial-level policy makers to allocate need-based resources to different districts. The index highlights districts at higher risk of humanitarian emergency, as such districts would have a higher proportion of population that would not be able to meet basic needs in the case of a hazard occurrence. It can aid in identifying social and economic disparities existing at the local level, and as such can act as an effective tool to support district DRR policy. The index can also aid in delineating the sectoral responses required to achieve the SDGs related to poverty, health, and education. It can quantify underlying risk factors, which helps decision-makers recognize and identify specific vulnerabilities through the use of an indicator-based approach. As and when new PSLM and MPI data are released, the SEVI can also be used for temporal analysis of socioeconomic vulnerability and gauge the impact of development measures in the districts.

Knowledge of hazard parameters, such as flood inundation depth and duration, can help to significantly improve DRM at the local level for mitigating the impact on schooling and health service provision. In the case of Pakistan, where significant disparities are evident in development indicators across provinces and among districts within a single province, the utility of such parameters is even more pronounced. Specific depth and duration information provided by WEB-RRR modeling can be used to take precise steps required to mitigate the impact of hazard events on basic social services at the community level. The situation discussed in this study highlights the complexity of the relationship among poverty, low levels of health and education services, and the lingering effects of floods. Such circumstances can be better managed with a higher degree of information related to the flood hazard. In the long run, investments can be made to redesign or relocate facilities facing repeated inundation to mitigate the impact of future disasters on health and education service delivery. District authorities can also prepare detailed hazard risk maps showing possible depths at different locations in terms of hospitals, schools, and shelters.

This study used vegetation water content as an indicator for determining agricultural drought, as plants and crops require water uptake for healthy growth. Wheat is the major staple crop in Pakistan and widely grown across all regions of the country. Therefore, the temporal average of vegetation water content in the month of January for selected districts and the annual wheat crop yield of Balochistan Province were utilized as monitoring parameters of agricultural drought. The CLVDAS output showed a generally declining trend in vegetation water content after 2017, which was indicative of the drought conditions that prevailed in the area during that period. The use of additional ecohydrological variables, namely, land-surface soil moisture, root-zone soil moisture, and leaf area index, also provided important information on changing drought conditions. Monitoring ecohydrological variables, such as root-zone soil moisture, can be conducted on a regular basis to assess the severity of droughts. Near-surface soil moisture may be affected by high evapotranspiration, but crops can still grow if sufficient amounts of root-zone soil moisture are available. Simultaneously, precipitation information based on accurate and timely prediction can be used to inform local farmers about the effects of rainfall on soil moisture levels, which is important information for shifts between hydrological and agricultural droughts. Drought early warning information, when combined with food insecurity indicators, can also inform provincial- and district-level decisions on maintaining food security. The integrated approach enables a multidimensional view of vulnerability and allows for improved targeting of measures towards agriculture and irrigation planning, as well as nutrition programs in anticipation of drought stress.

Overall socioeconomic uplift will strengthen DRR capacity in Pakistan, and resources must be enhanced at the district tier. This study provides a framework for strengthening district DRM capacity by showing that hydrological modelling output parameters can be used to improve social and economic functioning by minimizing hazard impacts on health, education, and food security, all of which are interlinked with poverty.

My academic journey at ICHARM and my life in Japan in general were wonderful experiences, which brought along many challenges but also a sense of accomplishment. The Ph.D. journey instilled in me a higher degree of patience and perseverance. The research skills and critical thinking approach, combined with an enhanced ability of analytical disposition that I learnt, will certainly help me in my future work. I am greatly thankful to my supervisor, Koike sensei, and everyone at ICHARM for supporting me during the course of the degree program.



HYDROLOGICAL CHARACTERISTICS OF THE HIGH MOUNTAIN CRYOSPHERE AS A BASIS FOR INTEGRATED WATER RESOURCES MANAGEMENT

Tuladhar Subash, Ph.D. in Disaster Management

ツランダール スバシ 博士 (防災学)

Pressure on water resources is certain to increase due to population growth and climate change in Nepal. Major challenges in the water resources sector include managing glacierized and glacier-free river basins, taking into account the impacts of climate change. In this context, the “Water Resources Policy, 2077 of Nepal” has adopted a strategy to utilize and manage water resources based on the nation’s River Basin Master Plan. The government has also put forward the “Energy Development Roadmap and Action Plan 2081”, setting an ambitious target to generate 28,500 MW of electricity by 2035 AD, up from the current 3,600 MW capacity. Water resources planners need to understand water availability throughout the year in each river basin of the country to align with the above-mentioned policy and action plan. This effort requires information about the quantity of water resources in each river basin by assessing the availability of water from glacierized and glacier-free river basins so that the optimum water resources can be utilized. It is important to know how much precipitation - liquid and solid - occurs and how much is the loss to obtain accurate information about the actual availability of water in the river basin. However, measuring precipitation in mountain regions is challenging due to accessibility, rugged terrain, and harsh climatic conditions such as high wind speeds. Measuring snowfall is even more difficult, with actual measurements almost impossible. Nonetheless, detailed knowledge of the water budget is essential to estimate the actual water available in the river basin, which is even more necessary in the context of climate change.

Although mountains are often associated with clouds and rain, there is less precipitation at high altitudes due to a combination of two primary factors: the rain shadow effect and the diminished moisture-holding capacity of cold air. Large-scale transport of water vapor can lead to extremely heavy rainfall and snowfall due to the orographic effect at higher altitudes. Furthermore, the rates of evaporation and condensation are driven by the difference in vapor pressure, which is directly influenced by temperature, which depends on altitude. This study focuses on addressing the uncertainty of precipitation in the high mountain cryosphere and analyzing the water budget at varying altitudes within the river basins of Nepal. Its findings will facilitate a comprehensive understanding of the hydrological characteristics and an assessment of the water resources in the basins.

This study selected two separate river basins: the Dudhkoshi basin, which is glacierized, and the Chameliya basin, which is glacier-free or with minimal glacial coverage. The WEBDHM-S Model, a physically-based water and energy budget distributed hydrological model, was calibrated and validated for integrated hydrological modeling of these basins. In-situ discharge data and remote sensing products of snow cover were used to correct precipitation biases. Three separate sub-basins – upper (sub-basin 1), middle (sub-basin 2), and lower (sub-basin 3) – were set in these two river basins based on altitude, and water budgets were calculated in these sub-basins, as well as in the two river basins (Figures 1 and 2).

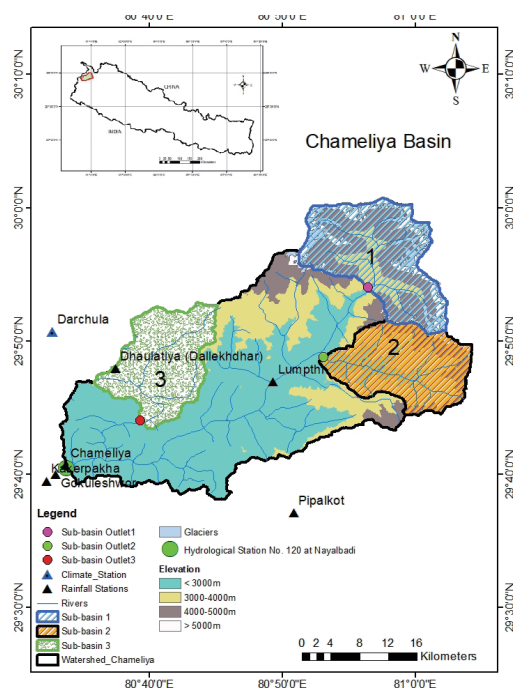


Figure 1: Chameliya basin and sub-basins

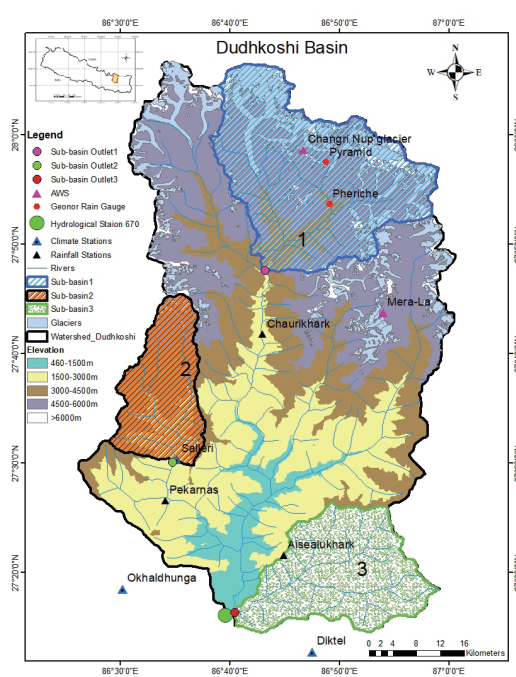


Figure 2: Dudhkoshi basin and sub-basins

The findings show that in both glacierized and glacier-free basins, evaporation is dominant in the low- and mid-altitude sub-basins, while condensation is dominant in the high-altitude sub-basins (Figures 3 and 4). The evapotranspiration amounts to 525 mm/yr and 284 mm/yr in the low-altitude sub-basins of the Dudhkoshi basin and the Chameliya basin, respectively. The condensation amounts to 335 mm/yr and 180 mm/yr in the high-altitude sub-basins of the Dudhkoshi basin and the Chameliya basin, respectively. Significant condensation occurs in both glacierized and glacier-free high-altitude regions, leading to increased precipitation and snow accumulation. This snowpack functions as a natural water reservoir, releasing water during warmer months and thereby supplying streams and rivers that flow into the lower parts of the basin. However, concerns will be raised regarding the rapid melting of glaciers and snowpack, as latent heat will be produced during the condensation process. This phenomenon should be taken into consideration in the context of climate change when the temperature is expected to rise in the future. Future research should consider observation data and integrate such data into the current model's algorithm to clarify the issue of significant condensation in high-altitude regions.

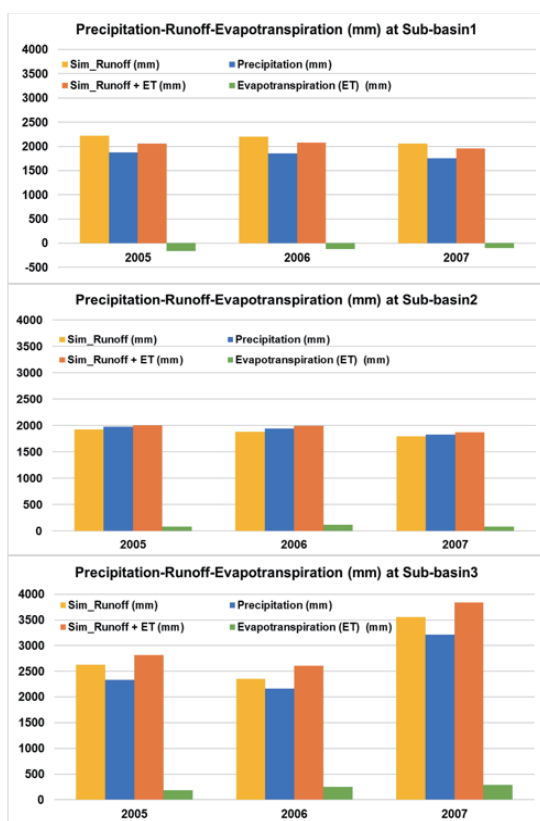


Figure 3: Water Budgets at Sub-basin 1, Sub-basin 2, and Sub-basin 3 of the Chameliya basin

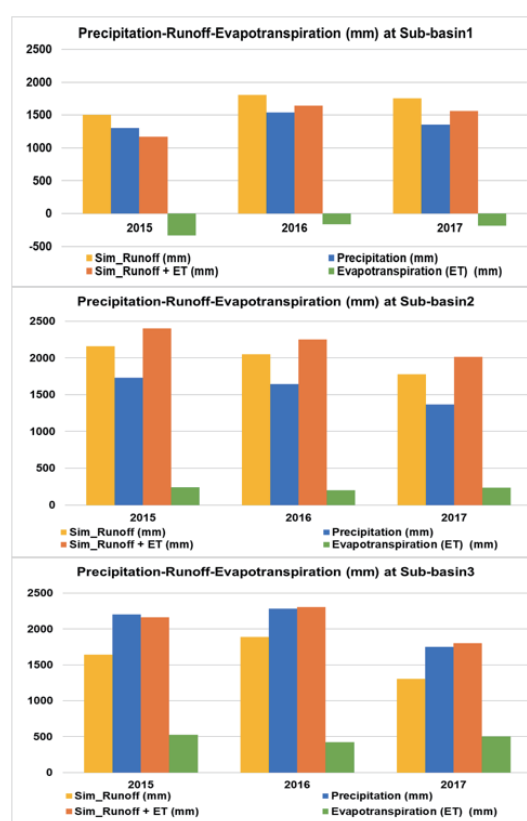


Figure 4: Water Budgets at Sub-basin 1, Sub-basin 2, and Sub-basin 3 of the Dudhkoshi basin

By assessing the water budget in river basins and understanding their annual water availability, the findings can be used to plan water-related activities and help advance sustainable development. Moreover, in the context of current climate change, this study is even more important - especially in glacierized basins - because we need to conceptualize plans (e.g., optimization of water resources for hydropower, irrigation, drinking water, industrial purposes, recreational activities, water transportation) and design projects based on water availability in the future.

Reflection of my three years in ICHARM

I had the privilege of spending three fruitful years at ICHARM, where I had the opportunity to work alongside highly accomplished researchers. I am forever indebted to my supervisor, Professor Toshio Koike, for his unwavering support and invaluable guidance despite his busy schedule. I would also like to express my sincere gratitude to my co-supervisors, Professor Mohamed Rasmy and Dr. Katsunori Tamakawa, for their substantial guidance. I want to thank all the researchers, administrative staff and my fellow students for their support throughout my Ph.D. journey.



Research meetings, seminars and lectures by foreign researchers provided a platform for learning and understanding new ideas and deepening my research expertise. In addition to academic activities, the ICHARM Open Day facilitated a brief cultural exchange with international students and Japanese high school students. The cherry blossom celebration instilled in me a sense of perseverance and the importance of achieving my goals at the right time.

Overall, I had a wonderful experience at ICHARM, which I will remember throughout my lifetime.



STUDY ON SEDIMENT TRANSPORT PROCESSES AFFECTED BY THE TIDAL CURRENTS, IN THE MEGHNA ESTUARY, BANGLADESH

Rahman Md Shahinur, Ph.D. in Disaster Management

ラーマン モハマド シャヒヌール 博士 (防災学)

The Bengal Delta, one of the world's most dynamic tide-dominated deltas, is characterized by high water and sediment discharges but remains highly vulnerable to floods, cyclones, riverbank erosion, salinity intrusion, and sea-level rise driven by climate change. A comprehensive understanding of its sediment transport processes is therefore essential for addressing present challenges and ensuring sustainable development.

Although several studies have investigated tidal dynamics and morphological changes in the Meghna Estuary, limited attention has been given to sediment transport at seasonal, daily, and hourly scales, and the sediment budget of this suspended-sediment dominated system remains underexplored. This study investigates sediment transport dynamics, sediment budget, and sorting mechanisms in the Meghna Estuary using a depth-averaged two-dimensional (2-D) numerical model over a 350 km stretch for one year. The model is developed and validated with field observations of river discharge, tidal water levels, topography, suspended sediment concentration (SSC), and sediment grain size distributions.

The simulations assess uniform and non-uniform sediment transport, focusing on seasonal and tidal variations, sediment budgets, and morphological changes, particularly around the Noakhali islands. Results indicate that during the ebb tide of spring tides in the monsoon season, strong current divergence from the Lower Meghna River transports large volumes of suspended sediment toward the Noakhali islands, enhancing storage. Sediment transport peaks during rising and falling tides, while deposition dominates during slack tides in low-velocity zones.

Sediment sorting is strongly linked to morphological changes: depositional areas exhibit fining trends, while erosion-prone zones show coarsening due to sediment supply limitations. In tidal estuarine zones, ebb-phase currents promote fine sediment export, causing coarsening in erosional areas. Furthermore, cross-dam interventions significantly increase sediment storage. In conclusion, this study clarifies non-uniform suspended sediment transport and morphological evolution in the Meghna Estuary, providing insights for sediment management and climate adaptation strategies.

JAPAN and ICHARM Life

During my three years at ICHARM, I have been fortunate to receive warm support from lecturers, researchers, staff, and friends, all of whom played a vital role in my achievements. I am profoundly grateful to my supervisors and professors—Prof. Shinji Egashira, Dr. Daisuke Harada, Prof. Yoshihiko Shimizu, Prof. Toshio Koike, Prof. Shoji Fukuoka, Prof. Kenzo Hiroki, and Prof. Takeyoshi Chibana—for their invaluable guidance and mentorship, which enriched both my research and personal growth. ICHARM's nurturing environment, advanced facilities, and cultural experiences made these three years truly memorable, and the dynamic spirit of ICHARM and PWRI will remain an inspiration for me.



Presentation of a part of my research work at the 41st IAHR World Congress, 22–27 June 2025, Singapore.

● Training & Education

<https://facebook.com/icharmtrainingcourse/>



Educational program updates 教育・研修活動報告

8月18日：新入生入国前オンラインガイダンスセミナー

8月18日、ICHARMは、2025年10月から新たに修士課程に加わる学生が事前準備をしっかりと行えるよう、入国前オンラインガイダンスセミナーを初めて実施しました。

GRIPS、JICA、ICHARMが協力して2007年からスタートした修士課程は、通常、大学で2年かかる修士号取得を、途上国政府の水防災担当実務者が日本で1年間学ぶことで実現できるという特徴があり、当該政府の欠員負担を軽減できるメリットがあります。一方で、卒業生と新入生の在籍期間が日本で重なることがないため、先輩が後輩にアドバイスする機会がないというデメリットがあります。2023年から2024年に在籍した学生が卒業の際にも「先輩の経験に基づき入国前に事前に準備しておけばよかったと思うことが多かった」という意見が出ていました。

そこで、ICHARMは、JICAの協力を得て、新入生の合格発表後でかつ現学生が論文を提出し終えた時期に、オンラインでの入国前セミナーを開催することにしました。セミナーには、現修士課程学生、新入生、ICHARM教員スタッフ、JICA筑波関係者のみならず、新入生の出身国のJICA事務所の担当者の方さらにアルumnイも11名が参加しました。

セミナーは、JICA筑波高橋亮所長、小池俊雄センター長による開会挨拶後、90分間行われ、先輩学生から、論文執筆のための事前準備、特に出国前のデータ収集の重要性や生活上の注意点についてアドバイスがありました。また、GRIPSでの集中講義用に自国の防災体制について勉強しておくという助言もありました。

時間が限られているため、卒業生には事前にアドバイスを書面で募集したところ、12人から回答があり、新入生に共有されました。以下は、その一部です。

- ・1年は長く聞こえるかもしれないが、思ったより早く過ぎる。プレッシャーや混乱、時には途方に暮れることも必ずあると思っていた方がよい。
- ・実際に修士課程が始まる前に、もっと入念に準備しておけばよかったということが経験から言える。事前準備をしっかりとすることで、時間が節約でき、焦ることなく、目標をより効果的かつスムーズに達成することができる。
- ・サポートネットワークを作ることをお勧めする。一人で抱え込まないほうがよい。論文を書いている同士で仲間になろう。彼らこそが最も貴重な励ましの源になる。あなたの状況を誰よりも理解してくれるのは彼らだけだから。

最後に、セミナー担当者は、開催にあたり協力していただいた多くの関係者に謝意を示していました。

August 18: First online pre-arrival guidance seminar for new students

On August 18, ICHARM held the first online pre-arrival guidance seminar for new students entering its master's program this October. The seminar was organized to help them make thorough preparation before coming to Japan.

ICHARM launched the master's program in 2007 in collaboration with the National Graduate Institute of Policy Studies (GRIPS) and the Japan International Cooperation Agency (JICA) to provide government officials of developing countries in charge of water disaster management with the opportunity to study in Japan for one year and earn a master's degree. This one-year format, shorter than the typical two-year duration at many universities, offers the advantage of minimizing extended absences from work. However, it also presents a drawback: limited opportunities for junior students to receive guidance from senior students, as their enrollment periods do not overlap. In fact, graduating students of the 2023-2024 class mentioned that they could have been better prepared before coming to Japan if they had received advice from previous graduates in advance of their departure.

In response, with the cooperation of JICA, ICHARM held an online pre-arrival guidance seminar at this timing when new students were informed of their acceptance and when current students submitted their theses. The event was attended by new and current master's students, ICHARM faculty and staff, and JICA staff from Tsukuba and the new students' home countries, as well as 11 alumni from around the world.

After opening remarks by JICA Tsukuba Director TAKAHASHI Makoto and ICHARM Executive Director KOIKE Toshio, the 90-minute session started, in which current students provided valuable advice on pre-departure preparation for writing a dissertation, particularly data collection from relevant organizations, as well as practical tips for daily life. They also advised the new students to study their countries' disaster prevention systems while at home in preparation for the intensive lectures at GRIPS during their academic year in Japan.

Due to time constraints, alumni were asked to provide written advice in advance, and 12 responded to the request. Below is a selection of the advice they shared with the new students:

"A year may sound long, but it will pass faster than you think. Pressure, confusion, and even moments of feeling lost are unavoidable."

"As someone who has walked this path before, I want to share the things I wish I had prepared more thoroughly before officially starting. This preparation not only saves time but also provides crucial peace of mind, helping you conquer your goal more effectively and smoothly."

"Build a Support Network: Don't go it alone. Connect with fellow students who are also writing their theses; they are the most valuable source of encouragement, as no one understands what you're going through better than them."

To conclude, ICHARM expressed its sincere gratitude to everyone who contributed to organizing this meaningful event.



Senior students giving advice at the online pre-arrival guidance seminar for new students
新入生入国前ガイダンスセミナーの様子

(Written by FUJIKANE Masakazu)

August 26: IISEE/ICHARM Collaborative Research Presentation

ICHARM and the International Institute of Seismology and Earthquake Engineering (IISEE) jointly held the fourth Collaborative Research Presentation for master's students at the Public Works Research Institute (PWRI). Both institutes provide master's degree programs in disaster prevention for government officials from developing countries in collaboration with the Japan International Cooperation Agency (JICA) and the National Graduate Institute for Policy Studies (GRIPS). The two institutes selected three students each for this occasion. ICHARM selected Mr. FARUKUZZAMAN (Bangladesh), Mr. VIDAL MORENO James Dean (Peru), and Ms. LENORA Robolge Ushali Hasinika (Sri Lanka) to present their research. Professors from GRIPS also joined this event. It was a good opportunity for the students to hear presentations in different research fields. In his opening remarks, Research and Training Advisor Professor SHIMIZU Yoshihiko noted that the same area hit by the Noto Peninsula earthquake on January 1, 2025, was hit again by a severe flood in September of the same year, and emphasized the significance of this joint presentation, given the reality that complex disasters actually occur.



Participants from ICHARM and IISEE after the presentation session
合同発表会に参加した ICHARM および国際地震工学センターの学生

(Written by FUJIKANE Masakazu)

September 2-3: PCM Follow-Up Training

On September 2-3, students participated in two-day follow-up sessions to the "Project Cycle Management (PCM)" training held last March. On the first day, they created a "Project Design Matrix (PDM)," a project plan outline for implementing the projects discussed in their master's theses. On the afternoon of the following day, they had discussions after each student gave a presentation on their PDM. ICHARM staff and faculty members also joined them, making comments and exchanging ideas.

To conclude the sessions, Executive Director KOIKE Toshio delivered closing remarks. Mentioning that it had been three years after the PCM training was included in the master's program, he praised the students for their skills to create PDMs while incorporating the unique characteristics of each country's rivers, rather than simply creating standard matrices. He also expressed his strong hopes for the students'



A student explains his PDM in front of the class
自分の PDM をクラスの前で説明する学生



ICHARM staff discuss a PDM with students
学生と PDM について議論する ICHARM 研究員

8月26日：IISEE / ICHARM 合同発表会

土木研究所 (PWRI) にて、今年で5回目となる ICHARM と建築研究所国際地震工学センター (IISEE) の合同発表会を行いました。ICHARM と IISEE は、JICA および GRIPS と連携して、防災にかかる修士課程教育を開発途上国の行政官等を対象に実施しています。今回はそれぞれ3名の学生が選抜され、ICHARM からは、Mr.FARUKUZZAMAN (バングラディシュ) Mr. VIDAL MORENO James Dean (ペルー)、Ms. LENORA Robolge Ushali Hasinika (スリランカ) が、各自の研究発表をしました。発表会には、GRIPS の先生方も参加されました。研究分野の違う発表を聞くよい機会となりました。開会のあいさつで清水義彦研究・研修指導監より、2025年1月1日に能登半島地震が発生し、同年9月に同じ地域が大洪水に見舞われたことに言及され、複合災害が実際に発生している現実に鑑みて、本合同発表会の意義が改めて強調されました。

9月2～3日：PCM フォローアップ研修

9月2、3日の2日間に渡り、学生は3月に実施した「Project Cycle Management」(PCM) 研修のフォローアップ研修に参加しました。本研修のアウトプットである、各自の修士論文で取り上げたプロジェクトを実施に移すためのプロジェクト計画概要表「Project Design Matrix」(PDM) の作成及び学生相互のディスカッションを行いました。そして3日の午後に、各学生は、各自のプロジェクトを母国で実施に移すという PDM について、プレゼンテーションを実施しました。ICHARM 職員や教員スタッフが傍聴し、活発な議論や意見交換が行われました。

終了のあいさつの中で小池センター長より、本研修は初めてから3年が経過し、型にはまったマトリックスのみならず、各国各河川特性に合わせた応用までできるようになってきた、と各学生の PDM を高く評価され、そして、実際に現地でプロジェクトを成功させるのは、やはりその国の技術者であると、学生たちの帰国後の活躍への期待をのべられました。さらに、この PDM 発表は、現地でのプロジェクト実施に

直結できる可能性があることから、来期から今回のプレゼンテーションには、該当国の JICA 事務所等主要ドナーの方々も可能な限り傍聴できるように場にしていきたいとの将来の抱負も語られました。

9月9日：植樹セレモニー開催

ICHARM では 2014 年より、修士課程・博士課程を修了する学生が、修了前に桜の植樹式に参加することが恒例になっています。今年も土木研究所内の桜の木に 2025 年修了生の記念プレートを立てました。プレートを設置した後、清水義彦研究・研修指導監より「皆さんが高い志を持って研修された姿を見てきました。ICHARM で学び、研究し、協働した経験のもとに、自然災害に強く持続的な社会をぜひ実現させてください。そのためには努力と時間がかかります。桜も苗木から開花するまでかなりの時間がかかります。しかし開花したとき、それを見た人々はとても幸せになります。桜は毎年3月下旬から4月上旬に開花しますが、その時皆さんがそれぞれの国で活躍している姿を思い出すでしょう。その桜の花のように皆さんの仕事も花開き、人々を幸せにすることを願っています」というお言葉をいただきました。

success after returning home, stressing the critical role of engineers in leading projects to success. Furthermore, noting that the PDM presentations have the potential to directly contribute to the implementation of the proposed projects in each country, the executive director shared a plan to invite local JICA offices and other major donors to attend the presentation sessions starting from the next term.

(Written by FUJIKANE Masakazu)

September 9: Commemorative sakura tree planting ceremony

Since 2014, it has been a tradition at ICHARM for students graduating from its master's and Ph.D. programs to participate in a sakura (cherry tree) planting ceremony before graduation. This year, the ceremony was held on September 9, and the class of 2025 placed a commemorative plaque on their sakura tree, which was planted near ICHARM's building. After that, Research and Training Advisor SHIMIZU Yoshihiko told the graduating students: "I have seen you all come to this training with high aspirations. I hope that you will use the experience of studying, researching, and collaborating at ICHARM to realize a sustainable society that is resilient to natural disasters. This will take time and effort. It also takes a long time for cherry blossoms to bloom from seedlings. However, when they bloom, they bring great joy to people who see them. Cherry blossoms bloom every year from late March to early April, and during that time, they will remind me and everyone at ICHARM of you actively working on your missions in your respective countries. I hope that you and your work will blossom like cherry blossoms, bringing happiness to people in your countries."



Graduating students with their sakura tree
桜の木とともに集合写真



Graduating students huddle their hands around the memorial plate
記念プレートに手をかざす卒業生

(Written by FUJIKANE Masakazu)

9月11～12日：ICHARM 修士課程卒業式

2025 年 9 月 11 日、JICA 筑波において、ICHARM 第 18 期修士課程「防災政策プログラム水災害リスクマネジメントコース」の閉講式が執り行われました。バングラデシュ、メキシコ、フィリピン、スリランカ、東ティモールから 1 名ずつ、ペルーから 2 名の計 7 名の学生がプログラムを修了しました。JICA、政策研究大学院大学 (GRIPS)、ICHARM の三者で運営しているこの 1 年間の修士課程プログラムは、自国の政府機関で水や河川の管理に関連した実務経験を持つ人を対象に設計されています。式では高橋亮 JICA 筑波所長と小池俊雄 ICHARM センター長、田村英之 GRIPS 教授から祝辞が述べられ

September 11-12: Graduation ceremony of the 18th ICHARM master's program

The closing ceremony of the 18th ICHARM master's program, "Water-related Disaster Management Course of Disaster Management Policy Program," was held at JICA Tsukuba on September 11, 2025. Seven students from six countries graduated from the program; one each from Bangladesh, Mexico, the Philippines, Sri Lanka, and Timor-Leste, and two from Peru. This one-year master's course, operated by JICA, GRIPS, and ICHARM, is designed primarily for those who have work experience related to water or river management at governmental agencies in their countries. In the closing ceremony, JICA Tsukuba Director General TAKAHASHI Makoto, ICHARM Executive Director KOIKE Toshio, and



Ms. RAMIREZ GONZALEZ Nina Danae receiving the Sontoku Award from Executive Director Koike
ラミレス・ゴンザレス・ニーナ・ダナエ氏への尊徳アワードの授与

GRIPS Professor TAMURA Hideyuki gave congratulatory speeches. Following the presentation of the certificates, Mr. BADUA Dean Aldrene of the Philippines spoke in return on behalf of the students. The ceremony also presented two awards: the Best Research Award to Mr. FARUKUZZAMAN of Bangladesh and Mr. VIDAL MORENO James Dean of Peru to praise them for their excellent research work and academic performance, and the Sontoku Award to Ms. RAMIREZ GONZALEZ Nina Danae of Morocco, who was selected by her fellow students for her outstanding contribution to the class throughout the program.



Students and guests after the closing ceremony at JICA Tsukuba
JICA 筑波閉講式後の学生と参列者

The next day, September 12, a graduation ceremony was held at GRIPS. At the farewell gathering before the graduation ceremony, Executive Director Koike stated: "I am confident this program has provided an excellent opportunity to experience diversity alongside colleagues gathering from around the world. Ecosystems teach us that diversity is more resilient than simplicity. At first glance, simple systems may appear more efficient, but they cannot adapt to unexpected changes. Only diverse systems can respond to such changes. As you graduate, you join the alumni of this program, who are rich in diversity. And remember that cherishing diversity means respecting differences while acknowledging and sharing common ground."

After that, the master's students put on graduation gowns and hats for the graduation ceremony and had memorial photos taken with students graduating from the International Institute of Seismology and Earthquake Engineering (IISEE).

The staff at ICHARM wished the graduates all the best in their endeavors.



Graduating students of ICHARM and IISEE with their faculty members (in red gowns) at GRIPS
政策研究大学院大学にて国際地震工学センターの学生と記念写真を撮る卒業生

ました。修了証書授与の後にはフィリピンのパドゥア・ディーン・アルドリン氏が学生を代表して答辞を述べました。式では2つの賞も授与されました。学業と研究成果を称える最優秀研究賞はバングラデシュのファルクジャマン氏とペルーのビダル・モレノ・ジェームズ・ディーン氏に贈られ、プログラム全体を通してクラスに最も貢献した尊徳賞（学生による互選）はメキシコのラミレス・ゴンザレス・ニーナ・ダナエ氏に贈られました。

翌日の9月12日にはGRIPSにおいて学位記授与式が開催されました。学位記授与式前のFarewell Gatheringでは、小池俊雄 ICHARM センター長より、「このプログラムは世界中の国々から集まった仲間と多様性を実感できる素晴らしい機会であったと思う。エコシステムの観点から見ると、シンプルの方が効率よく見えるが予期できない変化にはシンプルなエコシステムは対応できないため多様性を持ったシステムのみが変化に対応できる。卒業生の皆さんはこれからこういった多様性のある本プログラムのアルムナイに加入していただく。多様性を重視することは、共通性を見つけ共有しつつ、違いを尊重することである」とのお言葉をいただきました。

修士学生たちは式に先立って卒業式用のガウンと帽子を着用し建築研究所国際地震工学センター（IISEE）の学生らと記念撮影をしました。

ICHARM スタッフ一同、卒業生の益々のご活躍を心よりお祈りしております。

(Written by HERAI Masahiko)

Thesis summaries and comments from graduating master's students

研究論文7件と修士課程研修生のコメント

修士学生7名がこの1年間で完成させた修士論文の概要と、コース全体の感想についてご紹介します。

In this section, 7 students, who just graduated from the master's program this September, briefly present their thesis research, along with some reflections on their one year at ICHARM.



NUMERICAL STUDY ON SEDIMENT TRANSPORT PROCESSES AND ASSOCIATED MORPHOLOGICAL CHANGES OF THE TEESTA RIVER, BANGLADESH

Farukuzzaman from Bangladesh

The Teesta River originates from the Khangtse Glacier in Sikkim, India, and flows for 414 km, including 293 km in India and 121 km in Bangladesh, before joining the Brahmaputra near Chilmari. Its basin covers 12,442 km², with 10,076 km² in India and 2,366 km² in Bangladesh. To address chronic water scarcity for irrigation, the Teesta Barrage Irrigation Project was completed in 1998 at Doani, Lalmonirhat. This project provides irrigation, flood control, and livelihood support for 111,406 hectares across 12 Upazilas. Despite these benefits, the river faces severe bank erosion during monsoons, causing land loss, displacement, and disruption of livelihoods. Embankments and revetments frequently fail, requiring costly repairs, while sediment accumulation reduces reservoir storage capacity and limits dry-season irrigation. The current study investigates sediment transport and associated morphological changes in the Teesta River (Bangladesh), focusing on the 0–40.8 km stretch downstream from the border. A depth-averaged two-dimensional (2D) numerical model was used to simulate flow dynamics and sediment transport processes. Between July 1 and October 24, 2022, covering multiple flood events, the model reasonably reproduced water level and sediment concentration variations, showing good agreement with satellite images and observed cross-sectional data, confirming its effectiveness in evaluating sediment transport and river morphology. During this period, heavy sediment loads caused bed aggradation of 2–39 mm across river segments, reducing the Teesta Barrage's storage capacity by 0.10 Mm³ (10.07%). Simultaneously, sandbar migration altered the river's morphological regime, intensifying riverbed adjustments and increasing right-bank erosion. To address these issues, three interventions were tested using the model: In Option I, a uniform 160 m-wide channel is dredged across three zones: Zone 1 (7.92–15.92 km), Zone 2 (19.12–23.12 km), and Zone 3 (27.12–40.80 km). A bed slope of 50 cm/km is used in Zone 1, and 30 cm/km in Zones 2 and 3. Dredged bed levels are designed as follows: Zone 1 (51.125–47.125 m), Zone 2 (47.00–45.8 m), and Zone 3 (45.00–40.896 m). Option II involves spur dikes, each 1.6 km long, arranged alternately with 1.6 km longitudinal spacing. In Zone 1 (right bank), spur dikes are spaced 2.4 km apart transversely. Zone 2 has dikes on the left bank every 1.6 km, while Zone 3 features dikes on both banks. Option III combines dredging and spur dike construction. Dredging improved channel conveyance and partially restored reservoir storage, while reducing scouring near vulnerable banks, but had a limited effect on land reclamation due to minimal sediment trapping. Spur dikes effectively reduced bank erosion and promoted sediment deposition between spurs, encouraging land reclamation. Combining dredging with spur dikes provided the most balanced benefits, enhancing storage capacity, controlling erosion, enabling localized land gain, and improving flow alignment. Still, interactions between measures caused slightly less land gain and storage increase than either measure alone. Overall, these interventions significantly influence sediment transport and river morphology: spur dikes excel in land reclamation and bank protection, dredging most effectively restores reservoir storage, and their combination provides a balanced approach to integrated river management.

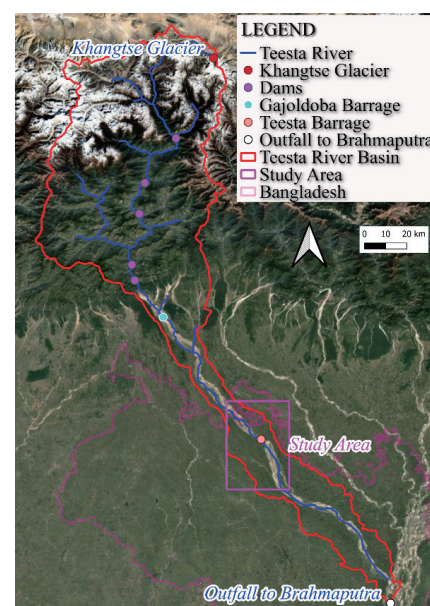


Fig. 1. Teesta River Basin

Keywords: *morphological change, suspended sediment, reservoir, spur, dredging*

The master's program at ICHARM has been a truly transformative experience, enriching both my academic journey and personal growth. Immersed in a vibrant research atmosphere and a beautifully amicable environment to learn without fear, I was able to broaden my perspectives through seminars, workshops, and discussions with colleagues from across the globe. The program provided a well-balanced combination of rigorous academic training and hands-on learning, where field visits and practical exercises added real-world relevance to theoretical knowledge, sharpening our ability to address emerging water-related challenges.

The specialized courses deepened my technical foundation while also exposing me to innovative approaches in disaster risk reduction and flood management. A particularly rewarding aspect was learning how to use satellite data and Google Earth Engine, which greatly enhanced my capacity to analyze and interpret large-scale hydrological and disaster phenomena. The exposure to the latest technology, combined with Japan's advanced systems of disaster preparedness and river management, was both inspiring and instructive, offering valuable lessons that can be applied globally.



Beyond academics, one of the most meaningful aspects of this journey was the opportunity to learn and share with fellow participants from diverse cultural and professional backgrounds. These exchanges extended far beyond classrooms, building bonds of friendship, mutual respect, and collaboration that will endure well into the future. At the same time, the immersion into Japan's culture, values, and traditions enriched the experience further, leaving lasting impressions that continue to shape my outlook.

Looking back, I feel immense gratitude for the opportunities this program has afforded me. I carry forward not only enhanced technical skills but also a renewed sense of purpose to contribute to water and disaster management in my home country and beyond. I sincerely thank GRIPS, ICHARM, JICA, and BWDB for making this journey possible. Above all, I extend my heartfelt appreciation to my supervisors, mentors, and the dedicated staff at ICHARM for their constant encouragement, guidance, and support throughout this remarkable journey.



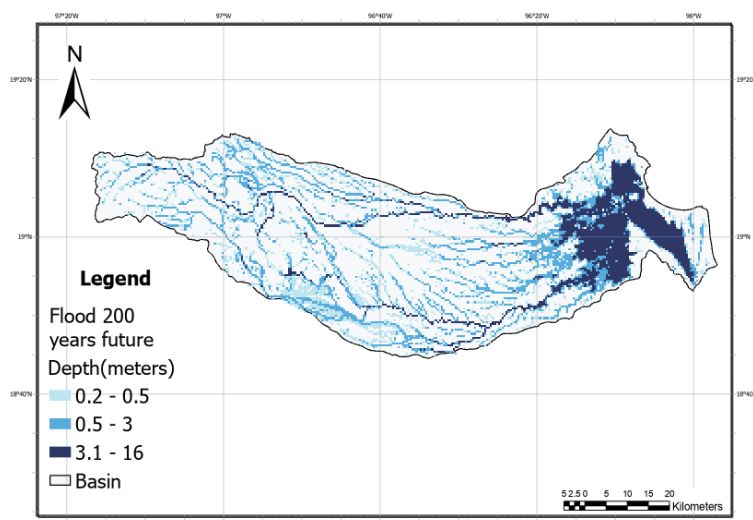
SUGGESTION OF EFFECTIVE COUNTERMEASURES BASED ON FLOOD IMPACT ASSESSMENT UNDER CLIMATE CHANGE IN THE JAMAPA RIVER BASIN, MEXICO

Ramirez Gonzalez Nina Danae from Mexico

The Jamapa River basin, located in the states of Veracruz and Puebla, represents a region of great environmental, social, and economic importance. It is home to key productive activities such as livestock farming, fishing, and tourism. However, its geographical configuration, extreme hydrometeorological conditions, and anthropogenic pressure make it highly vulnerable to flood events. This research proposes a set of mitigation measures based on the analysis of climate change scenarios and their influence on the frequency and severity of floods in the basin. Accordingly, the RRI (Rainfall Runoff Inundation Model) hydrological model was employed to simulate runoff and delineate the extent of flood-prone areas under different future scenarios. Four Global Climate Models (CESM1-CAM5, CEMCC-CM,

MPI-ESM-LR, and MPI-ESM-MR) were analyzed, comparing the periods 1980–2001 (baseline climate) and 2050–2071 (projected climate). The results indicate a considerable increase in future precipitation, which translates into an increase in the flood area: 35.5%, 43.9%, and up to 47% for a 25-year return period, for 100 years, and for 200 years, respectively. These findings emphasize the importance of incorporating climate change analysis and adaptation measures within flood studies and decision-making.

Keywords: Jamapa River basin, Hydrological modeling, Climate Change, Flood impact, Rainfall Runoff Inundation (RRI)



Future flood scenario for a 200-year return period

Completing the master's program at ICHARM has been a deeply enriching experience, both academically and personally. This past year has marked a transformative stage in my life, during which I gained specialized knowledge in disaster risk management, particularly in flood risk reduction, while also developing key skills such as critical thinking, technical analysis, and problem-solving in complex contexts.

One of the most valuable aspects of this program was the ongoing interaction with colleagues from diverse cultures, disciplines, and regions of the world. This multicultural environment fostered the exchange of ideas, promoted intercultural collaboration, and strengthened our understanding of global challenges related to water and natural disasters. This year has not only contributed to my professional development but also to my personal growth. Living and learning alongside other participants, engaging in collective learning, and immersing myself in Japanese culture broadened my perspective and reaffirmed my commitment to public service. The friendships and networks built throughout this journey are, without a doubt, among the most valuable achievements of this stage.

I am confident that the knowledge and skills acquired here will be essential for making meaningful contributions to risk management efforts in my home country. I also feel highly motivated to continue promoting sustainable, inclusive, and evidence-based strategies to reduce the vulnerability of communities to extreme hydrometeorological events.

I sincerely thank JICA, ICHARM, PWRI, and GRIPS for granting me this invaluable opportunity. Their support has been instrumental in making this academic and professional journey possible.





SEDIMENT TRANSPORT AND THE ASSOCIATED HAZARDS IN ARID RIVER BASINS: A CASE STUDY OF THE CHANCAY HUARAL RIVER BASIN, PERU

Bautista Mejia Jhon Alex from Peru

The coastal basins of Peru, such as the Chancay Huaral River Basin (CHHRB), are highly vulnerable to sediment-related disasters. Current dredging and levee works lack a basin-wide strategy, limiting their effectiveness. This study integrates a basin-scale Rainfall and Sediment (Production) Runoff (RSR) model with a 2D flow and bed variation model to evaluate sediment dynamics and associated hazards, and to assess the effectiveness of proposed upstream check dams in reducing bed aggradation in the CHHRB. Results indicate that although sediment from hillslope erosion and debris flows in steep gullies is consistently high, sediment delivery to the river network is dominated by debris flows. This high upstream sediment yield drives significant bed aggradation in the plain, characterized by a braided channel system. Simulations with check dams demonstrate their effectiveness in mitigating aggradation, highlighting the need for basin-wide measures complemented by targeted local interventions to manage flow and bar migration, thereby protecting infrastructure and communities.

Keywords: Sediment-related disasters, Rainfall-induced Sediment production and runoff modelling, braided channel modelling, check dams

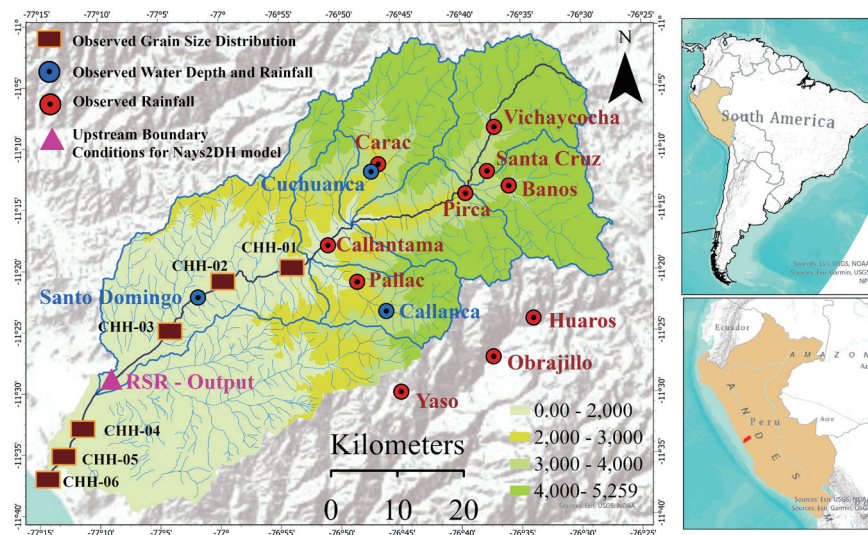


Figure 1. Location of the Study Area

It's hard to believe that a year has already passed since I started the Master's program at the International Centre for Water Hazard and Risk Management (ICHARM). The time has flown by, and I think that's because the program has been so engaging and rewarding. Between the fascinating lectures provided by the senseis, the vibrant environment in Japan, and the wonderful moments I shared with my classmates, it's been an unforgettable experience. Through this program, I've not only gained technical expertise in Water-Related Disaster Management Policy, but also a broader understanding of how it connects with Integrated Water Resources Management (IWRM) and Integrated Disaster Risk Management (IDRM), especially through Japan's unique experiences.

Looking ahead, I feel more confident in applying the knowledge I've gained to contribute to my country's development, with a focus on achieving IWRM and IDRM. I believe the first step is strengthening cooperation between institutions, colleagues, and stakeholders, while ensuring that science and technology are effectively incorporated into policy making. Japan's integration of cutting-edge science and technology into its disaster management policies, such as the use of real-time data for flood forecasting, successful dam operations, the unique approach to sediment-related disaster management, and the strong collaboration between research institutions and government agencies, is a model I hope to see mirrored in other countries. This success is reflected in Japan's achievement of SDGs, including Indicator 6.5.1, which measures the degree of IWRM implementation at the national level, with Japan reaching up to 95% by 2024. However, this remains a significant challenge for many countries, including Peru, where institutional coordination and data integration are still evolving.

This year has also been invaluable in building connections with colleagues from several countries: Peru, Mexico, Timor-Leste, Sri Lanka, Bangladesh, and the Philippines, who share the same passion for IWRM and IDRM. Sharing experiences from different technical, social, economic, and political perspectives, and how they relate to IWRM and IDRM in their respective countries, has been one of the most rewarding aspects of our long conversations. Beyond academics, the emotional support we provided each other has made this experience even more enriching.

I would like to express my sincere gratitude to ICHARM, the Japan International Cooperation Agency (JICA), and the National Graduate Institute for Policy Studies (GRIPS) for providing me with this life-changing opportunity. It has truly been an incredible experience, and I'm excited to carry this knowledge forward. I will always be thankful to Japan for the warm hospitality I have received.

Arigatou Gozaimasu.



ENHANCING EARLY FLOOD WARNING IN THE PIURA RIVER BASIN THROUGH A HYBRID APPROACH USING DEEP LEARNING

VIDAL MORENO, James Dean from Peru

Floods are recurrent in Piura. This type of event causes a variety of damages, such as the destruction of bridges, the loss of homes, and sometimes even the death of people. Therefore, here, an Long Short-Term Memory (LSTM) model was developed to forecast floods in the Piura River basin, specifically in the city of Tambogrande, using only precipitation data. To train the LSTM model, a flood map was used using a hybrid approach in March 2023. During this period, Cyclone Yaku occurred. The hydrological and hydraulic components were the RRI model and HEC-RAS models. Both models were calibrated using observed data, such as the flow hydrograph and the high-water mark. The LSTM model demonstrated good prediction performance with a 24-hour lead time. This result demonstrates that it is a good forecasting tool and that it could also be included in the early warning system to protect the population of Tambogrande.

Keywords: Rainfall Runoff Inundation, Hydrologic Engineering Center River Analysis System, Artificial intelligence, Long Short-Term Memory, Early warning, Piura River Basin, Deep Learning.

Keywords: Flood Mitigation, Feasible Structural Countermeasures, Hydrological-Hydraulic Modeling, Flood Risk Assessment, Numerical Simulations

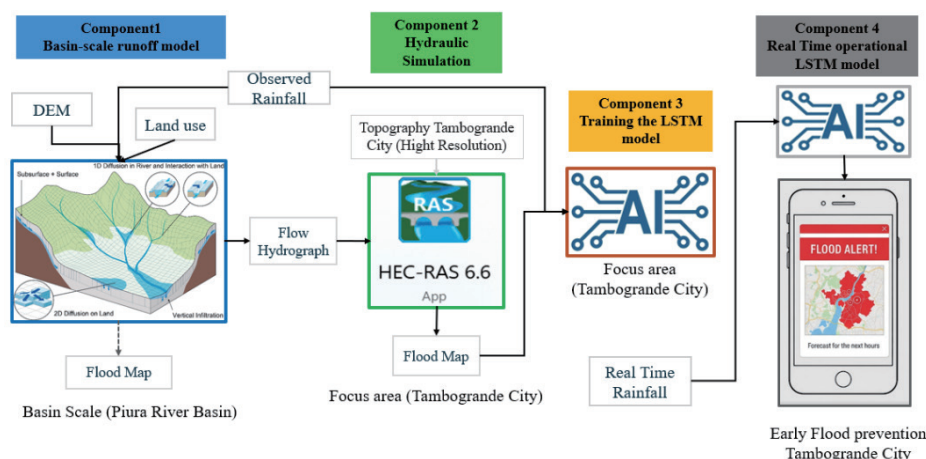
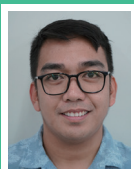


Figure 1. Methodology of the study with flow chart

Upon completing my master's degree in Disaster Management Policy, I can say that this experience in Japan transformed my life. I am James Dean Vidal Moreno from Peru, and my expectations were far exceeded. The highlight was the vibrant community of students from diverse nationalities, where we expanded our perspectives through a shared objective. Practical experiences, like field trips, were crucial for connecting theory with Japan's advanced disaster management.



Living here taught me about respect, discipline, and resilience, and I am determined to apply everything I've learned to face challenges like the El Niño phenomenon in my country. I leave with a renewed sense of purpose and extend my deepest gratitude to JICA, ICHARM, and GRIPS for this opportunity. My sincere gratitude also goes to my supervisors, the staff, and my classmates, whose friendship and support made this journey unforgettable.



ASSESSING CLIMATE CHANGE IMPACTS ON RIVER HYDROLOGY AND DAM OPERATIONAL RESPONSES FOR DISASTER RISK REDUCTION POLICY IN THE PHILIPPINES: THE CASE OF AGNO RIVER BASIN

BADUA Dean Aldrene Omo from The Philippines

Flooding remains a major hazard in the Philippines, as large dams were primarily designed for hydropower rather than flood control, with many now operating under silted conditions and fixed pre-release rules. This study used the Agno River Basin (ARB) as a pilot area to assess climate change impacts on dam inflows and downstream flooding, employing bias-corrected CMIP5 rainfall projections and the Rainfall–Runoff–Inundation (RRI) model. Results indicate that daily rainfall in the Far Future (FF) is very likely to increase by 12.7–24.2%, while the Near Future (NF) projections show a more likely than not increase in daily rainfall, leading to higher inflows and greater flood hazards. Nonetheless, dynamic, forecast-based dam operations can reduce flood depths by over 1 meter in 50% of the affected areas, highlighting their potential for climate-responsive disaster risk reduction strategies across the Philippines.

Keywords: disaster risk reduction, flood, dam operation, climate change, rainfall-runoff-inundation

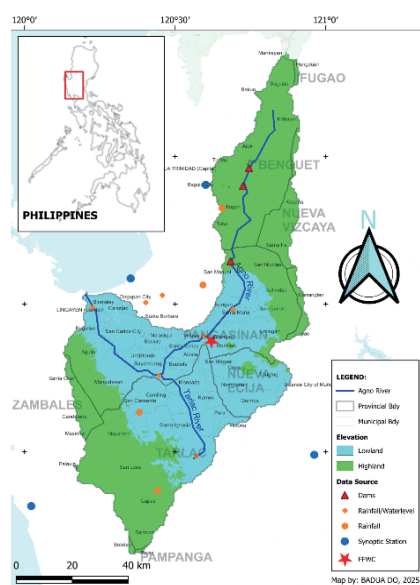


Figure 1. Agno River Basin

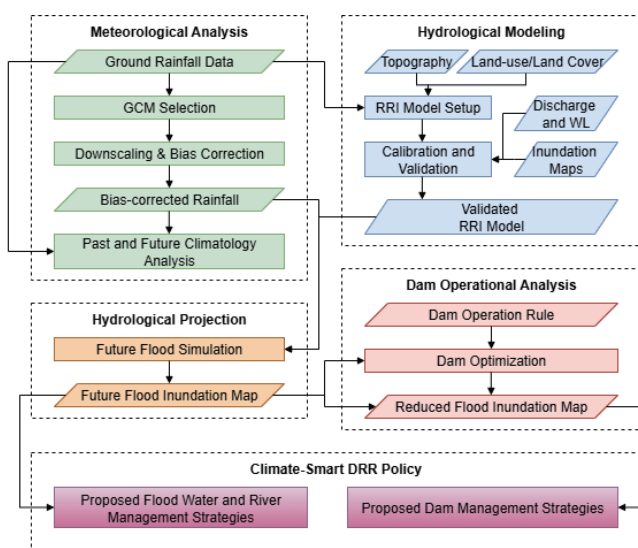


Figure 2. Research Methodology

I would like to express my deepest gratitude to the Japanese government through the Japan International Cooperation Agency (JICA) for granting me this prestigious scholarship, which has allowed me to pursue my studies in Japan and realize a lifelong dream. This opportunity has not only advanced my academic and professional growth but has also broadened my perspective on international cooperation and sustainable development. I truly value JICA's commitment to empowering scholars from different countries and fostering collaboration that addresses global challenges.

I am also deeply thankful to GRIPS and ICHARM for delivering excellent education and training. The one-year curriculum provided invaluable learning opportunities—especially the site inspections—which offered practical knowledge and experiences unavailable in our home countries. Japan's advanced disaster management practices and policies, along with the chance to learn directly from distinguished water scientists, have been truly eye-opening and have strengthened my resolve to contribute meaningfully to disaster risk reduction in the Philippines.

I am very thankful as well to the ICHARM and GRIPS professors who greatly helped in advancing our studies. Their patient guidance, expertise, and constant encouragement molded me into a more informed and meticulous researcher. The lessons I have gained under their mentorship will remain a strong foundation as I continue my career. I will carry their insights and teachings with me as I pursue both academic and professional endeavors.

In the Philippines, where an average of 20 typhoons pass annually and flooding remains a persistent threat, the knowledge and skills I acquired from this program are highly relevant. As an academician, I am committed to applying the technologies, research methods, and strategies learned at ICHARM to develop sound recommendations for policies that can effectively reduce flood disaster risks and promote resilience in vulnerable communities.

The real challenge begins as I return home. I will dedicate my expertise to advancing disaster management practices in the Philippines, particularly in addressing water-related hazards. By sharing knowledge, conducting research, and working closely with policymakers and institutions, I hope to make a meaningful contribution to safeguarding the lives and livelihoods of the Filipino people. This scholarship has given me the tools to pursue that mission, and I am determined to use them in service of my country.



DEVELOPMENT OF EVIDENCE-BASED LAND USE POLICY ASSOCIATED WITH EXTREME FLOODS UNDER CLIMATE CHANGE IN THE BOLGODA BASIN, SRI LANKA

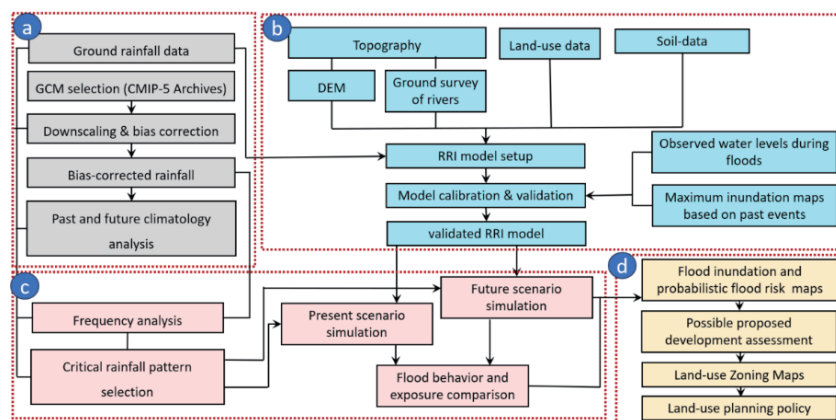
LENORA Robolge Ushali Hasinika from Sri Lanka

Floods are the most common natural disasters in Sri Lanka, primarily due to intense rainfall during the monsoon season. This situation is worsened by climate change and exacerbated by factors such as low-pressure systems in the Bay of Bengal and improper land use practices. A critical gap remains in integrated studies combining climate change projections with current land use patterns to inform risk-based planning and the development of sound land use policies. This study evaluated the impacts of climate change on flood exposure risk by applying probabilistic flood modeling and flood hazard mapping, and it developed land-use policies under climate change in the Bolgoda basin. Bias-corrected climate projections derived from General Circulation Models (GCMs) were used to simulate hydrological responses using the Rainfall-Runoff-Inundation (RRI) model. For a comprehensive representation of flood risk, a three-dimensional (3D) probabilistic risk matrix was constructed based on composite risk index (CRI) values, developed by integrating hazard, exposure, infrastructure sensitivity, and economic loss into a single metric. The analysis indicates that 25% of the basin will be inundated, with most of this area experiencing deep flooding, placing over one-third of cropland, 1.2% of the population, and 35.0% of buildings at significant risk. Ultimately, by informing policymakers, engaging communities, and identifying strategies to reduce future flood exposure, this study contributes to the development of a holistic and integrated climate adaptation framework for Sri Lanka.

Keywords: Flood, Climate change, Rainfall-Runoff-Inundation model, Risk matrix, Land use planning



Figure 1: Map of the Bolgoda Basin

Figure 2: Methodology
(Referred Source: Jayatilaka, 2023)

My name is Ushali Lenora, and I am from Sri Lanka. I am a Chartered Civil Engineer, currently serving as Chief Engineer of the Construction Division at the Sri Lanka Land Development Corporation under the Ministry of Urban Development and Housing. I also serve as Deputy Project Director of a national flood control initiative in Colombo, the Weras Ganga Storm Water Drainage & Environmental Improvement Project.

Japan has been one of my dream destinations since childhood, admired for its stunning natural beauty and rich cultural heritage. I feel truly fortunate to have had the prestigious opportunity to study in the Flood Disaster Risk Reduction Master's Program offered by JICA, GRIPS, ICHARM, and PWRI in 2024-2025. The program has enriched both my academic knowledge and personal growth, strengthening my confidence to face future challenges.

Under the guidance of my supervisors, Professor Mohamed Rasmy and Associate Professor Naoko Nagumo, I successfully completed my research, enhancing my capacity to adopt an evidence-based, end-to-end approach for implementing risk-informed planning and strategic decision-making. This research has enabled me to propose a holistic and integrated climate adaptation framework for the selected study area, with broader applicability across Sri Lanka.

This invaluable experience in flood disaster risk reduction will enable me to contribute meaningfully to improving Sri Lanka's disaster management systems. The dedication and support of the ICHARM professors and staff have been a true inspiration. I extend my sincere gratitude to JICA, ICHARM, and GRIPS for this fulfilling achievement, and I am eager to further explore opportunities to deepen my expertise in this field.

Upon returning to Sri Lanka, I will apply the knowledge and experience I have gained to future infrastructure development projects undertaken by my organization, benefitting the Sri Lankan community at large. I will also actively contribute to decision-making processes to help build a more resilient and prosperous Sri Lanka.





PROBABILISTIC FLOOD FORECASTING AND EARLY WARNING INFORMATION USING ENSEMBLE TECHNIQUES AND HYDROLOGICAL MODEL SIMULATIONS FOR THE COMORO RIVER BASIN AND URBAN AREA OF DILI CITY, TIMOR-LESTE

Pinto Fernandes Flaviana from Timor-Leste

Timor-Leste, particularly in Dili City and the Comoro River Basin (CRB), experiences frequent and dangerous flooding during the rainy season. This study aims to assess the performance of ensemble rainfall in flood forecasting. This is important because it links scientific rainfall predictions from the GEPS of JMA and RRI models. The downscaled 5 km resolution of GFS was used to evaluate the performance of WRF model in generating rainfall forecast delivered by TC Seroja 2021. The downscaled ensemble rainfall forecast from GEPS-JMA at 6-hour intervals result, were simulated in the RRI model to generate water level predicted, ensemble spread, flood onset time, and flood peak time. Furthermore, predetermined water level thresholds were calculated to generate probabilistic warnings at each level. In addition, assessing the effectiveness of ensemble forecasting can improve accuracy and can provide probabilistic forecast information in uncertainty. The ensemble spread shows a high distribution of water levels, particularly around the flood events on April 3 and 4, 2021. This indicates that the ensemble spread encompasses the possibility of major flooding, although the percentile ranges are low, and some were still uncertain. Therefore, the use of probabilistic information is necessary. The probabilistic forecast results for March 30, 2021, show that 44.4% of floods had a high probability of warning level alert, while 34.0% had a flood probability of warning level special attention, and 21.6% had a flood probability of that level. The probabilistic forecast results for March 31, 2021, show that nearly 47% of flood warning levels had a high probability of warning level attention, and 41% confirmed a high probability of warning level alert, 12% of low warning levels occurred during that period. This probabilistic flood forecast, and warning information is a new approach that will be the basis for implementation at the National Directorate of Meteorology and Geophysics (DNMG) to support the development of a National Policy for flood mitigation in Dili, Timor-Leste.

Keywords: Probabilistic Forecast, Rainfall-Runoff Inundation (RRI), Global Forecast System (GFS), Global Ensemble Prediction System (GEPS), Weather Research Forecasting (WRF)

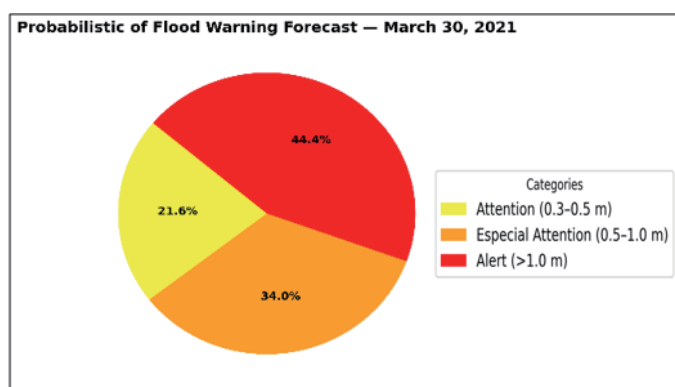


Figure 14. Probabilistic Forecast (20210330)

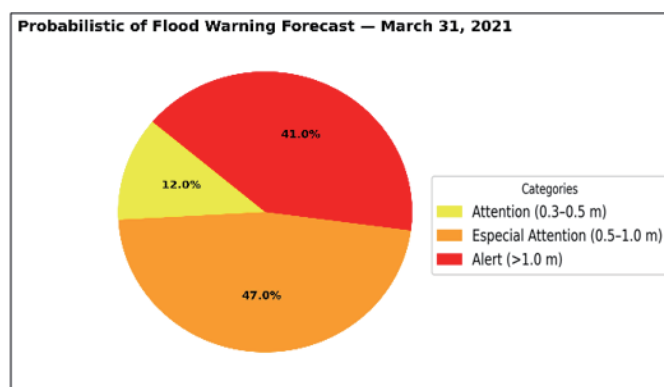


Figure 15. Probabilistic Forecast (20210331)



My name is Flaviana Pinto Fernandes, I am working as a head of meteorology department in National Directorate of Meteorology and Geophysics, Ministry of Transport and Communications, Timor-Leste. It is one unforgettable year study in Japan, a place where I didn't just study Water-Related Hazards, but discovered a way of life that changed me forever. Japan, you gave me quiet Saturday and Sunday, when I could ride my bicycle freely and breathe in the gentle rhythm of your streets. Those peaceful rides became my way of exploring not just new places, but also myself. You let me know through the legacy of Ninomiya Sontoku, whose story reminded me of the power of perseverance and service. You took me to dams across the country, where engineering met nature, and where my academic journey came alive in the most meaningful ways. Sometimes, I took the wrong train but somehow, even those little mistakes felt like part of the adventure. I never felt lost for long, because your people were always kind, always willing to help, even without words. I was constantly inspired by the strength of your society, how even the elderly continues to work with dignity, energy, and pride. And how everyone, regardless of age or role, moves with discipline, order, and a quiet respect for one another. You taught me so much not just through lectures or fieldwork, but through everyday life. The warmth

of a Konbini run, the feeling of safety even late at night. You showed me that being on time isn't just about schedules, it's a way of respecting others. You showed me what it means to live with harmony, patience, and grace. Now that my studies are over, I return home with a heart full of gratitude and a little heaviness too, because saying goodbye is never easy. But I carry you with me. in every memory, in every lesson, in every quiet moment.

Thank you, Japan for the year you gave me, and the version of myself you helped me become. I want to extend my heartfelt gratitude to the Japan International Cooperation Agency (JICA), the International Center for Water Hazard and Risk Management (ICHARM), and the National Graduate Institute for Policy Studies (GRIPS) for allowing me to pursue a one intensive year master's on disaster management policy (DMP), focusing on flood disaster risk reduction.



The 5th ICHARM Alumni Webinar on Meteorology ICHARM 第5回 Alumni Webinar (気象)

The ICHARM Alumni Webinar*, which began in May 2024, is now in its second round. The fifth session was held on September 1, 2025, from 2:30 to 4:30 PM at the Public Works Research Institute's DX Room to discuss meteorological issues. ICHARM researchers and alumni presented their latest research and developments in the field and how they are applying their findings and technologies in real-world contexts. They also shared up-to-date information and engaged in discussions on related issues. The participants were a total of 46 people, including alumni, current students, and former and present ICHARM staff, as well as those from GRIPS and JICA.

Opening remarks were given by Research and Training Advisor SHIMIZU Yoshihiko, followed by presentations from three alumni and a doctoral student (The years in the parentheses indicate when each alumnus graduated from the master's program):

1	Mr. Rashid Bilal (2016), National Drought Management Center, Pakistan Flash Flood Guidance System (FFGS): Capacity Building under WMO umbrella
2	Dr. Rana M. Atif (2012), Pakistan Meteorological Department Flood Forecasting System in Pakistan and Flood Season 2022
3	Mr. Simao Teles Fernandes (2024), National Directorate of Meteorology and Geophysics, Timor-Leste The Impact of Climate Change on Flooding in Dili, Timor-Leste
4	Ms. Jayasekara Sachintha (Ph.D. student), Sri Lanka An Investigation of Tropical Cyclone-driven Extreme Rainfall in Sri Lanka: Historical Trends and Climate Change Projections

After these presentations, Senior Researcher USHIYAMA Tomoki introduced examples of ensemble forecasting applications to overseas river basins, and Research Specialist Ralph Allen Acierto shared cutting-edge research on how climate change affects probable maximum rainfall and the mechanisms behind heavy rainfall in Panama.

Finally, Executive Director Toshio Koike gave a closing speech. He was delighted to learn about the leadership roles two Pakistani alumni are playing in national and international projects, including the participation in a new UN Meteorological Organization initiative called the Flash Flood Guidance System in Pakistan and the

2024年5月からスタートした ICHARM Alumni Webinar * は、第二周目に入りました。

第5回は、2025年9月1日午後2時30分～4時30分、土木研究所DXルームで開催し、気象分野について ICHARM 側と卒業生側から最新の研究や社会実装状況に関して発表し、開発状況や最新情報を共有して意見交換を行いました。ウエビナーには、アルムナイ、現役学生、ICHARM 関係者のみならず、GRIPS、JICA、ICHARM のOBにも参加いただき、合計46人でした。

冒頭の清水義彦研究・研修指導監から開会のあいさつをいただきました。その後、卒業生側から左表の4名（うち1名は現在 ICHARM 博士課程在学中）から発表がありました。

その後、ICHARM 側から、牛山朋来主任研究員からアンサンブル予測手法の海外流域への適用例の紹介、Ralph Allen Acierto 専門研究員から、気候変動が可能最大降雨量に及ぼす影響や、パナマでの豪雨発生メカニズムなどについて、最先端研究の紹介がありました。

最後に小池俊雄センター長にまとめのあいさつをいただきました。パキスタンにおける Flash Flood Guidance System という国連気象機関の新しい取り組みへの参画や、パキスタン気象局が進める気象観測網の進展と洪水予測システムの向上について、卒業生のお二人が責任者となって進めているのを聞いたことは非常に喜ばしいことであると述べられました。さらに、東ティモールが急速に進めているXバンドレーダー

等を含めた早期警戒システムの構築に、2024 期つまり昨年の卒業生 Mr. Simao が大きく貢献していることも称賛されていました。

* 水災害管理に関する最新の動向や技術革新に関する知識と情報を共有し、交流を深めることで卒業生と在校生のネットワークを強化し、ICHARM卒業生の活動を支援することを目的にオンライン開催するもの。

Pakistan Meteorological Department's efforts to expand the nation's meteorological observation network and improve flood forecasting systems. He also praised Mr. Simao, a graduate of the 2024 class, for his significant contributions to the development of an early warning system, including X-band radar, which his country, Timor-Leste, is now rapidly advancing.

* This online event aims to strengthen networking between former and current students of ICHARM's educational programs and, through these interactions, support them in their professional duties by sharing knowledge and insights on the latest trends and innovations in water-related disaster management.



ICHARM staff discussing meteorological issues with online participants at the 5th ICHARM Alumni Webinar

第五回 Alumni Webinar 議論の状況（土木研究所 DX ルーム）

(Written by FUJIKANE Masakazu)

● 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221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を寄稿していただいています。本号では2021-2022年の修士課程を卒業したHanke Titus Lloyd Ndau氏（マラウイ）の寄稿文をご紹介します。

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 221 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. Mr. Hanke Titus Lloyd Ndau of Malawi, who graduated from the master's program in 2022, has kindly contributed the following article to this issue.



Mr. Hanke Titus Lloyd Ndau

Disaster Resilience Officer- Department of Disaster Management Affairs, Office of the President and Cabinet, Malawi

When I reflect on my journey in disaster risk management (DRM) after leaving ICHARM in September 2022, I see a story of how science, engineering, and socio-economic principles can be brought together in policy making and practice to protect lives, livelihoods, and development gains in Malawi. My work has taken me from community flood plains in the Shire Valley to policy negotiation rooms in Lilongwe, and every step has been about applying practical knowledge to build resilience.

During my master's studies in Japan, I modelled the impact of land cover change on flood risk in the Lower Shire Basin. This research helped me appreciate the science behind disaster risks and the importance of data in decision-making.



After returning to the Department of Disaster Management Affairs (DoDMA), I participated in the National Multi-Hazard Risk Assessment, which culminated in the Multi-Hazard Risk Atlas for Malawi, and led the development of the Disaster Risk Management Information System, a central repository of disaster risk management data that can be used to coordinate disaster preparedness, response and recovery and ultimately improve efficiency in building a resilient future. These tools provide scientific evidence that guides national- and district-level planning. I also spearheaded the establishment of community-based flood early warning systems in 41 flood-prone rivers, ensuring that rainfall and hydrological data could be translated into timely alerts for communities.

Engineering principles have also been critical in my work, especially in ensuring that recovery and development efforts are risk-informed. I applied these principles while

coordinating post-disaster needs assessments after the Tropical Cyclone Freddy disaster in March 2023, which affected the entire southern region of Malawi. In collaboration with local and international partners, I ensured that reconstruction after floods and cyclones integrated safer building standards. The same principles were applied in the design and implementation of flagship programs aiming at strengthening climate observation networks, modernizing early warning infrastructure, and utilizing locally conceived engineering-driven interventions to directly reduce risks.

My work has also emphasized the socio-economic dimensions of DRM. This perspective has guided my contribution to risk-informed development (RID), ensuring that economic planning in Malawi takes disaster risks into account. Currently, strides are being made to integrate disaster risk management into housing, agriculture, land management, budgeting, and finance. These efforts are being jointly implemented by different government ministries and departments under the leadership of the President of Malawi and the Commissioner for Disaster Risk Management.

During policy processes, I actively participated in the development of key regulations and guidelines that operationalise the Disaster Risk Management Act of 2023 and the National DRM Policy of 2025, which embed socio-economic principles, such as equity, inclusiveness, and community participation. By training more officers and community leaders in disaster risk governance and management, I have worked to ensure that these policies translate into practice at both national and community scales.

My role has often required bridging the gap between science, policy, and communities. Since returning to my duties, I have organized national symposiums, coordinated multi-stakeholder partnerships, and mobilized resources from development partners, including the World Bank, UNDP, and UN-Habitat. These collaborations have been instrumental in implementing Malawi's resilience agenda under the National Resilience Strategy and attaining the goals set in the Malawi 2063 program.

Through these efforts, I have seen firsthand how technical knowledge, engineering safeguards, and socio-economic considerations must work together if we are to achieve resilience. Building resilience is not just about responding to crises, but anticipating, planning, and embedding risk management into development.

As disasters become more frequent and complex under climate change, my commitment remains firm: to continue applying interdisciplinary knowledge and partnerships to reduce risks and protect development in Malawi and beyond. I believe, as Executive Director KOIKE Toshio declared, that resilience is not built by a single approach, but through the continuous integration of science, engineering, and socio-economic realities into every decision.

To further strengthen disaster risk management in Malawi, I intend to conduct applied research that generates actionable evidence for decision-makers at both community and national levels. This will involve advancing the use of GIS, remote sensing, and statistical modelling to improve local-level hazard mapping and vulnerability assessments, while also conducting socio-economic studies that capture the realities of communities most at risk. By collaborating with universities, research institutions, and technical partners, I will ensure that data collection goes beyond academic exercises and directly informs policy, planning, and early warning systems. My goal is to establish a more reliable and integrated knowledge base that supports risk-informed development and enhances the country's overall resilience.

Alongside research, I will focus on resource mobilisation and partnerships to strengthen Malawi's data and information management systems. This will include engaging with government ministries, the private sector, and development partners, such as the World Bank, UNDP, and the Southern Africa Development Community (SADC), to secure both financial and technical support. I plan to leverage donor-funded flagship programs while also advocating for increased domestic budget allocation for disaster risk management information systems. By

developing clear investment cases that demonstrate the cost-effectiveness of improved data systems in reducing disaster losses, I will mobilise resources that can sustain innovations, such as real-time monitoring platforms, interoperable databases, and digital community reporting tools.

In conclusion, my journey in disaster risk management has shown me that resilience is built through the deliberate fusion of knowledge, practice, and collaboration. From scientific modelling to policy design, from engineering safeguards to community-based systems, each strand contributes to a stronger, safer Malawi. Looking ahead, my focus will remain on bridging research and practice, while mobilising resources and partnerships that anchor resilience in data, institutions, and communities. By sustaining this interdisciplinary and inclusive approach, I believe Malawi, and the wider Southern Africa region, can chart a path where disasters no longer erase development gains, but instead become opportunities to build back stronger and smarter. smarter.



● Miscellaneous

Comments from internship students

インターンシップ生からのコメント

ICHARMでは、CATIPAY Charisse Acabさん（名古屋大学大学院 環境学研究科）をインターン生として、また夏期インターンシップ生として勝田 英里子さん（大阪公立大学）を受け入れました。

ICHARMでの活動を振り返ってコメントをいただきました。

ICHARM welcomed two internship students this summer: Ms. CATIPAY Charisse Acab, a master's student in the Department of Environmental Engineering and Architecture at Nagoya University, who stayed for two weeks from August 25 to September 5, and Ms. KATTA Eriko, an undergraduate student at Osaka Metropolitan University, who stayed for one week from September 8 to 12.

They have kindly shared the following messages reflecting on their research activities at ICHARM.

Ms. CATIPAY Charisse Acab

(Department of Environmental Engineering and Architecture, Nagoya University)

Duration: August 25 - September 5, 2025

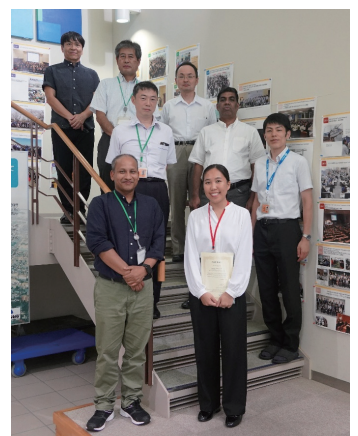
I am truly grateful for the opportunity to have my global research internship at ICHARM, not just for the fulfillment of my master's program requirements, but also because of ICHARM's extensive research on water-related hazards, including studies relevant to my home country, the Philippines.

In my two-week stay, I gained so many insights from Shrestha-sensei into hydrological modeling, particularly the Rainfall-Runoff-Inundation model, covering both the GUI and CUI. His guidance went beyond how to run the software, as he also patiently explained the key concepts and theoretical underpinnings of the RRI model, which helped me better understand the calibration and validation process.

I also had the chance to apply tools and datasets directly useful for my research. These included JAXA's Global Satellite Mapping of Precipitation (GSMaP) with bias correction vis-à-vis observed rainfall; exploring the UN-Spider's Knowledge Portal and utilizing Google Earth Engine to access and process open-source datasets; conducting Gumbel analysis of maximum annual precipitation and simulating a 100-year return-period flood; and a glimpse into Modules for Land Use Change Evaluation (MOLUSCE) on QGIS.

Although I was able to produce only preliminary results this time due to insufficient observed data, but the insights I learned within the short time under Shrestha-sensei's guidance will help me proceed with a clearer direction for my research on the impacts of land use change on flooding and have a better understanding of the RRI model.

I am sincerely grateful to ICHARM for the internship opportunity and the insightful experience, and I hope our paths cross again soon.



Ms. KATTA Eriko

(Osaka Metropolitan University)

Duration: September 8-12, 2025

At ICHARM, I learned about the Virtual Flood Experience System (VFES). It is an effective way to help people perceive disasters as personal experiences and motivate them to take voluntary disaster management actions. Through the experience of creating a Minecraft version of VFES, I found it interesting to learn how to transform data into 3D models. I also experienced firsthand the difficulty not only in conducting research but also in returning the findings to society. I will apply these experiences to my future research. I would like to thank everyone at ICHARM for all the support I received during my internship.

Personnel change announcements

人事異動のお知らせ

New ICHARM Member

A new member joined ICHARM.

He would like to say a brief hello to the readers around the world.

**FURUMOTO Kazushi / 古本 一司**

Director for Special Research / 特別研究監

It goes without saying that the increasing risk of flooding and drought caused by climate variation is now a global issue. Under these circumstances, I am very excited to be involved in international activities for the first time in four and a half years. I will do my best as a part of ICHARM to contribute to addressing the challenging issue of reducing water-related disaster risks around the world with other members of ICHARM.

Leaving ICHARM**- FUKUWATARI Takashi:** Director for Special ResearchRiver Department, Kinki Regional Development Bureau,
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

○福渡 隆 特別研究監

国土交通省 近畿地方整備局 河川部長

Business trips / 海外出張リスト

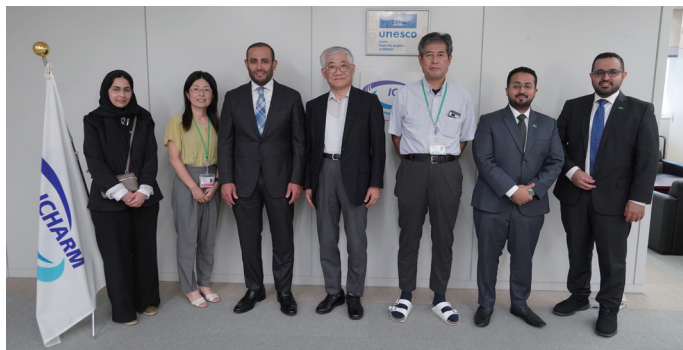
* July - September 2025

- June 30-July 2, KOIKE Toshio, Nairobi, Kenya, to participate in the Inception Workshop for the Project of "Enhancing Flood Resilience in Kenya"
- June 30-July 8, USHIYAMA Tomoki, Abdul Wahid Mohamed RASMY and MIYAMOTO Mamoru, Nairobi and Malindi, Kenya, (1) to participate In the inception Workshop for the Project of "Enhancing Flood Resilience in Kenya" (2) field visit to Tana River Basin
- July 2-6-, KOIKE Toshio (July 3-4) and NAGUMO Naoko, Accra, Ghana, to participate in the Technical meeting for the project of "Strengthening Resilience on water-related Disasters under Climate Change for a Sustainable Society in Ghana"
- July 5-11-, KOIKE Toshio, NY, USA, (1) HELP25 Meeting (on July 7), (2) 7th Special Thematic Session on Water and Disasters (on July 8), (3) 2026 UN Water Conference Preparatory meeting (on July 9)
- August 6-15, QIN Menglu, Ghana, to participate in Meetings on the Detailed Research Plan and the Joint Coordinating Committee (JCC) for the SATREPS Project in the Republic of Ghana
- August 22-26, OKADA Tomoyuki, Stockholm, Sweden, Co-hosting a session at World Water Week in Sweden
- August 22-31, USHIYAMA Tomoki and QIN Menglu, Argentina, to participate SATREPS Joint research organization meeting and site visit
- August 31-September 7, Kattia Rubi ARNEZ FERREL, Barcelona, Spain, to presentation at the 14th Symposium on River, Coastal and Estuarine Morphodynamics
- September 5-8, KOIKE Toshio, Beijing, China, to participate in the special session of the 5th International Forum on Big Data for Sustainable Development Goals (FBAS)
- September 21-26, MIYAMOTO Mamoru, Guam, United States, to participate in ESCAP/WMO Typhoon Committee meeting "The 14th Working Meeting of TC Working Group on Hydrology"
- September 21-24, KOIKE Toshio, New York, United States, to participate in UN highlevel special event
- September 25-27, KOIKE Toshio, New Delhi, India, to participate in Inception Workshop of World bank

Visitors / 訪問者リスト

* July - September 2025

- July 15, delegates of Sichuan University, China
- ICHARM introduce research topic
*See "Visitors from Sichuan University, China" on page 3
3ページ「中国・四川大学からの訪問」参照
- July 18, delegates of Korea University, South Korea
- For joint seminar with ICHARM
*See "Joint seminar between Korea University and ICHARM" on page 3
3ページ「韓国・高麗大学とICHARM との共同セミナー」参照
- August 13, H.E. Dr. Mohammed bin Saud Al-Tamimi and delegates from the National Emergency Management Authority (NEMA), Kingdom of Saudi Arabia



- August 20, delegates of UTM, NAHRIM and UiTM, Malaysia
- Research and technical exchange on water-related disasters
*See "Visitors from UTM, NAHRIM and UiTM, Malaysia" on page 4
4ページ「マレーシア工科大学、国立水研究所、マラ工科大学の来訪」参照
- August 25-29, 19 participants from South Sudan, Malawi, Comoros, Madagascar, and Mozambique—along with representatives from the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and World Bank
- Part of World Bank project "Knowledge Exchange on Flood and Drought Management between South Sudan and Japan"
*See "East and South Africa Flood and Drought Countermeasures Training Program in Japan" on page 21
21ページ「東・南部アフリカ洪水・渇水対策プログラム訪日研修」参照
- September 22, Ms. Paola Albritto, the director of the United Nations Office for Disaster Risk Reduction (UNDRR)
- Under the Strategic Practitioner Invitation Program by the Ministry of Foreign Affairs of Japan
*See "Visit by UNDRR director and officials" on page 8
8ページ「UNDRR 官房長および職員が来所」参照

Publications / 对外発表リスト

* July - September 2025

1. Journals, etc. / 学術雑誌 (論文誌、ジャーナル)

- SAWADA Yohei, FUJII Hideyuki, TSUTSUI Hiroyuki, AIDA Kentaro, SHIMADA Rigen, KACHI Misako and KOIKE Toshio, Ecohydrological Land Reanalysis: Vegetation Water Content and Soil Moisture Data by Land Data Assimilation, Geoscience Data Journal, Volume12, Issue4, August 10, 2025, <https://doi.org/10.1002/gdj3.70025>

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

- Badri Bhakta Shrestha, Wahid Mohamed RASMY and KURIBAYASHI Daisuke, Assessing flood damage to residential areas using building footprint data and contribution of flood-prone households in disaster risk reduction, The 2nd International Sociohydrology Conference, Hongo Campus, the University of Tokyo, July 19-21, 2025
- 龐 朝霞、大原 美保、南雲 直子、Patricia Ann J. Sanchez, SDGsの観点からみた洪水の社会的影響の実証分析—フィリピン共和国の洪水常襲地帯における住民調査を基に—、日本自然災害学会 2025年度学術講演会、北海道教育大学 札幌校、2025年9月18日

3. Poster Presentations / ポスター発表

- Kattia Rubi ARNEZ FERREL, HARADA Daisuke and EGASHIRA Shinji, Morphological changes pre- and post- neck cutoffs in meandering rivers, 14th Symposium on River, Coastal and Estuarine Morphodynamics (RCM2025), Barcelona, Spain, September 1-5, 2025

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)

- 森 範行、江頭 進治、藤兼 雅和、高堀 幸作、2023-2024 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」実施報告書、土木研究所資料 第4464号、2025年9月30日、<https://thesis.pwri.go.jp/files/96871447268c8eb0abb98a.pdf>
- MORI Noriyuki, EGASHIRA Shinji, FUJIKANE Masakazu and KOURBORI Kosaku, Report on 2023-2024 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program", PWRI Technical Note No 4464, September 30, 2025, <https://thesis.pwri.go.jp/files/76880786068c8eebbbbb6bc.pdf>

6. Other/ その他

None / 該当者無し

Editor's Note

編集後記

You might think that ICHARM researchers often work overseas, but that is not true for me. My assignments under the current research project often take me to different parts of Japan. Through many business trips from Hokkaido in the north to Kyushu in the south, I am always amazed that each region has its own climate and natural features, and I have come to recognize these differences more clearly, especially in connection with natural disasters. For example, in Hokkaido Prefecture, where rivers have gentle slopes, floods can spread over a wide area, while in mountainous Nagano Prefecture, the main risk is not flooding but landslides. These differences tell us that disaster measures must be tailored to local conditions.

I have been on the research team that provides disaster education as part of promoting the use of the Virtual Flood Experience System (VFES) in society. In this process, I am convinced that understanding such local characteristics and reflecting them in the lesson content is very important. Even in today's digital age, the "reality" gained on-site through the five senses has incomparable value. Floods cannot be experienced safely in real life, but VFES makes it possible to learn about them in a realistic way. The system helps people see disasters as "their own issue" and raise their disaster awareness for the future.

ICHARM Newsletter Editorial Committee
Yamashita Daiki

ICHARM の研究員は海外での活動が多いイメージがあるかもしれませんが、私は SIP の取り組みを通じて日本各地を訪れることが多いです。北海道から九州まで地域ごとに異なる気候や風土があり、出張を重ねるたびにその違いを実感しています。例えば、北海道では河川の勾配が緩やかで氾濫面積が広がりやすい一方、長野県の山間部では浸水より土砂災害のリスクが高いなど、地域特性に応じた防災対策の違いを感じます。

仮想洪水体験システム (VFES) の社会実装の一環で防災教育に携わる上で、こうした地域特性を理解し授業内容に反映することは非常に重要です。情報化が進んだ現代でも、現地で五感を通じて得られる「リアリティ」は代えがたい価値を持ちます。洪水そのものを体験することは困難ですが、VFES を通じて現実感ある学びを提供し、災害を「ジブンゴト」として捉える契機となるよう、今後も取り組んでいきたいと思っています。

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We welcome your comments and suggestions.

