UNESCO Project

a) West Africa: Water Disaster Platform to Enhance Climate Resilience in Africa (WADiRe-Africa)

In recent years, countries across West Africa have repeatedly suffered severe damage, including loss of life, caused by flooding along the Niger and Volta Rivers. These disasters have hindered human security and economic development. In response, UNESCO has identified the urgent need for measures that could be launched quickly, focusing on establishing a flood monitoring and forecasting system covering the Niger River and surrounding areas, and on reducing human casualties by encouraging early evacuation through the timely dissemination of flood information.

ICHARM signed a partnership agreement with UNESCO and established the framework for the "Water Disaster Platform to Enhance Climate Resilience in Africa." Within this framework, ICHARM worked in collaboration with the UNESCO Intergovernmental Hydrological Programme (UNESCO-IHP), AGRHYMET, and the University of Tokyo's EDITORIA to develop a flood early warning system (FEWS) on DIAS for the Niger and Volta River basins.

ICHARM also invited experts from AGRHYMET and VBA to Japan to provide training on FEWS and flood risk management. In addition, an e-learning–based capacity-building program was conducted from August 2020 to February 2021. The following provides a detailed report on the WADiRe-Africa project.

A kickoff meeting was held on June 17-18, 2019, in Lomé, Togo, bringing together representatives from the relevant organizations. At this meeting, with ICHARM playing a central role, participants discussed key issues related to data use for flood management at national and regional levels, capacity development, hydrological model development, and platform building, and consolidated them as the "Key Points of the Lomé Declaration."



Photo 1 Kickoff meeting in Lomé, Togo

ICHARM developed the West Africa version of FEWS under this project. This FEWS was designed to automatically calculate and update the following in real time at one-hour intervals: (1) basin-scale rainfall distribution based on GSMaP; (2) basin-scale rainfall distribution based on GSMaP corrected statistically using ground-observed rainfall; and (3) river water levels and flood-inundation extents at flood hotspots using the WEB-RRI model with the corrected GSMaP data. The system also provides forecasts of maximum inundation depth at flood hotspots. Although GSMaP-based rainfall distribution tends to be overestimated in semi-arid regions such as the project area, this issue was resolved by the statistical correction described in item (2).

This locally-adopted FEWS has been made available to 11 West African countries covering the Niger and Volta River basins, as well as to AGRHYMET, NBA, VBA, and other relevant organizations, enabling broad information sharing.

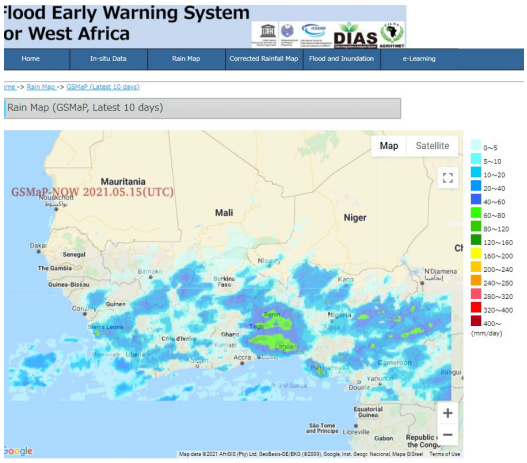
An e-learning–based capacity-development program from August 2020 to February 2021 was conducted

to train local officials and practitioners to use FEWS effectively for disaster response.

Though the training, initially planned as an in-person program in West Africa, was later moved online due to the COVID-19 pandemic. In addition, considering local conditions such as unstable internet connectivity and the fact that many target countries are French-speaking, a dedicated site was created on DIAS, from which participants could download pre-recorded training materials in English and French and study offline at their own pace.

The training consisted of two programs: “Training of Experts (ToE)” for representatives of NBA, VBA, and the 11 countries in the two river basins, and “Training of Trainers (ToT)” for participants selected by AGRHYMET from among the graduates of the ToE training. The ToE training was held four times, with 288 participants, of whom 197 completed the program. The ToT training was held twice, with 44 participants, of whom 30 completed the program.

On December 1, 2021, ICHARM co-hosted an information session on the outcomes of the project with UNESCO. At this session, the ambassador and permanent delegate of Japan to UNESCO delivered opening remarks, and the executive director of ICHARM and experts from VBA, who had come to ICHARM for training under the project, served as panelists and gave presentations.



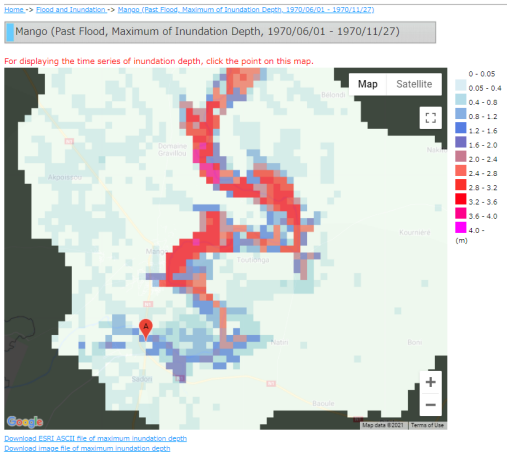


Figure 1 GSMaP-based real-time rainfall distribution provided by FEWS

Figure 2 Forecasts of maximum inundation depth at flood hotspots

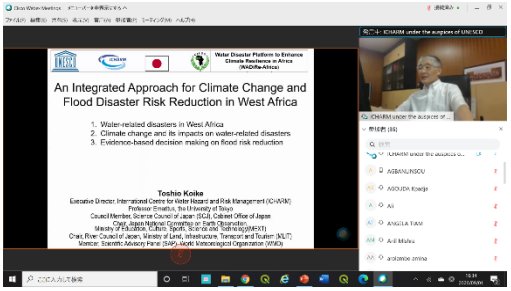




Photo 2,3 Pre-recorded e-learning material, Local staff in an e-learning session

*For more information, see the following issues of the ICHARM Newsletter:

1) https://www.pwri.go.jp/icharm/publication/newsletter/pdf/icharm_newsletter_issue54.pdf
2) https://www.pwri.go.jp/icharm/publication/newsletter/pdf/icharm_newsletter_issue59.pdf

b) UNESCO project "Enhancing flood resilience in Kenya"

Between October 2023 and January 2024, floods linked to the El Niño phenomenon struck Kenya, forcing the evacuation of over 500,000 people and claiming 186 lives. To enhance resilience to such events, ICHARM, in collaboration with the UNESCO Nairobi Office and Kenya's Meteorological Department and Water Resources Authority, was assigned to implement the Flood Resilience Enhancement Project in Kenya in 2025. In response, we started preparations, including contract negotiations and related arrangements in 2024. In this project, we plan to identify flood hot spots in the Tana River basin and then develop a locally-tailored OSS-SR system with a real-time flood warning function while simultaneously providing facilitator training.

On July 2, an inception workshop was held in Nairobi as a kickoff, where stakeholders discussed specific activity plans. From July 3 to 6, a field visit was conducted to the target watershed, the Tana River, including visits to major meteorological and hydrological observation stations and exchanges of opinions with communities living along the Tana River.

From October 27 to about two weeks into November, a facilitator training was conducted in cooperation with the University of Tokyo. For the training, one expert each from the Kenya Meteorological Department (KMD), the State Department for Water and Sanitation, the Kenya Electricity Generating Company (KenGen), and the Tana River County Government was invited, aiming to strengthen cross-disciplinary initiatives. Additionally, one instructor and coordinator from the UNESCO Regional Office for Eastern Africa also participated. The training program consisted of introductory lectures and tests on meteorology, hydrology, and disaster prevention, hands-on training, field visits, and group work. In the hands-on training, participants practiced using forecasted rainfall, hydrological modeling, and risk mapping. In the group work, participants designed specific content and structure assuming the implementation of expert training in Kenya.

Furthermore, on December 9, an expert training on the flood early warning system was conducted in Malindi, Kenya, hosted by UNESCO. A total of 38 participants from 16 organizations, including the Kenya Meteorological Department (KMD), the Ministry of Water Resources, and the Kenya Electricity Generating Company (KenGen), took part. In this training, Kenyan experts who had previously received facilitator training in Japan provided instruction.



Photo 4 Inception workshop



Photo 5 Participants of facilitator training and ICHARM researchers



Photo 6 Expert training works



Photo 7 Award ceremony of certificate

c) UNESCO project "Development of an integrated early warning system for water-related hazards in Ghana"

The repeated occurrence of floods and droughts in Ghana significantly affects socio-economic activities. A key factor underlying this issue is the lack of adequate data and forecasting capabilities related to hazard. To tackle these challenges, ICHARM joined UNESCO project in collaboration with the University of Tokyo, and developed an Integrated Early Warning System for Floods and Droughts (IEWS) for the Volta River basin downstream, which covers most of Ghana's territory.

On July 3-4, 2025, 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. 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). In this meeting, the Ghanaian side showed strong interest in ICHARM's climate modeling and hydrological simulations considering climate change.





Photo 8, 9 Meeting with Director Moukala at the UNESCO Accra office, ICHARM researchers with Ghanaian partners after

In addition, ICHARM provided a training program for governmental officials and researchers in Ghana, in November 2025. This training program included scientific lectures as well as demonstration and hands-on training using the IEWS. The training program composed of preliminary half-day online session and two-day on-site session in Accra. In the on-site session, the lectures of climate change, bias-correction of satellite-based rainfall, rainfall prediction, flood monitoring and prediction, and agricultural drought monitoring and

prediction, and the hands-on training for the use of the IEWS were mainly provided. Out of the 20 participants, 16 took the examination to assess their understanding, and all of them successfully completed the training with a score of 80% or higher. The participants requested further advanced training program, and also confirmed to continue discussions toward coordination and collaboration among related organizations, with the support from Japan.



Photo 10 On-site training



Photo 11 Hands-on training