



JSPS



NEXUS

日 ASEAN 科学技術・  
イノベーション協働連携事業  
Networked Exchange, United Strength for Stronger Partnerships between Japan and ASEAN



Japan-Philippines NEXUS Program  
(Kyoto University (KyotoU) and Isabela State University (ISU))

# NEXUS Skill UP!

## Advanced Workshops and Training Series under the NEXUS Philippines 3SWaRM Project and JSPS KAKENHI Global Flood hazard Mapping Project

**Date: August 18, 2025**

**Venue:** Room S519, Disaster Prevention Research Institute (DPRI), Kyoto University,  
Gokasho, Uji City, Kyoto, Japan  
(Hybrid — On-site for Japan-based participants; Online via Zoom for international  
participants)

Registration Link:

[Registration for Machine Learning Training](#)

Zoom Credentials:

[https://kyoto-u-  
edu.zoom.us/j/83774766648?pwd=T7cbJb3l8zai5HfbNcAlPIfOMaUYcS.1](https://kyoto-u-edu.zoom.us/j/83774766648?pwd=T7cbJb3l8zai5HfbNcAlPIfOMaUYcS.1)

Meeting ID: 837 7476 6648

Passcode: 209967



JSPS



NEXUS

日 ASEAN 科学技術・  
イノベーション協働連携事業  
Network Exchange, United Strength for Stronger Partnerships between Japan and ASEAN



## 1. Project Background

The training is sponsored by two Projects, (1) The NEXUS Philippines Project, titled "Synergistic Strategies for Sustainable Water Resources and Dam Management under Extreme Climate Variability", and (2) JSPS Grants-in-Aid for Scientific Research -KAKENHI, titled "Development a global Model for Flood susceptibility Mapping Using Machine Learning Approaches"

NEXUS Project is a multi-year collaborative initiative between the Disaster Prevention Research Institute (DPRI), Kyoto University, and Isabela State University (ISU), under the ASEAN–Japan Science, Technology and Innovation Collaboration (NEXUS) Program. The project addresses urgent challenges related to floods, droughts, dam operations, and climate change in the Cagayan River Basin, one of the most disaster-prone regions in the Philippines. Increasing typhoon intensity, rainfall variability, and water-related hazards have underscored the need for innovative tools, ensemble-based forecasting, and capacity building in integrated water resource management (IWRM).

KAKENHI Project is mainly to develop a global flood susceptibility mapping based on Machine learning models, especially for the ungauged basins based on the training of models on gauged basins. The main.

The Projects aim to:

- Develop advanced hydrological and AI-based models for flood and drought prediction;
- Optimize reservoir operations at Magat Dam using real-time decision support systems (DSS);
- Enhance risk communication and early warning systems; and
- Empower local stakeholders through training, forums, and knowledge transfer.
- Develop global flood hazard map using machine learning.

As part of its capacity-building strategy, the project organizes technical workshops, such as the NEXUS Skill UP! Training Series—to train engineers, researchers, and decision-makers in modern modeling tools for resilient, science-based water management.

## 2. Concept and Rationale

As part of its capacity-building strategy, the project is launching the "NEXUS Skill UP!" Workshop Series—an intensive training program focused on hydrological modeling and machine learning applications for disaster risk reduction. These workshops, led by international experts, are designed to equip engineers, planners, researchers, and local practitioners with practical knowledge in state-of-the-art tools such as XGBoost, and Memetic Programming, applied to real-world scenarios like the Magat Dam and flood-prone areas in the Philippines. This initiative responds to the urgent need for predictive, data-driven, and integrated approaches in managing floods and reservoirs amid climate variability and land use changes.

## 3. Objectives

The training series aims to:

- a) Enhance technical proficiency in using AI approaches for flood prediction
- b) Introduce machine learning techniques for accurate flood hazard mapping using real datasets
- c) Build capacity in spatial data preparation and GIS-based modeling workflows
- d) Promote cross-sector collaboration among government, academia, and local agencies



JSPS



NEXUS

日 ASEAN 科学技術・  
イノベーション協働連携事業  
Networked Exchange, United Strength for Stronger Partnerships between Japan and ASEAN



- e) Support the integration of scientific tools into local disaster and water resource planning

#### 4. Expected Participants

- a) Civil and environmental engineers from LGUs and national agencies (e.g., DPWH, NIA, DENR, PAGASA)
- b) Researchers and graduate students in hydrology, water resources, and GIS/AI applications
- c) Planners and technical staff from river basin organizations and disaster risk reduction offices
- d) Faculty members and extension specialists from partner universities
- e) NEXUS Project collaborators and affiliated organizations in Japan and the Philippines

#### Training 2: Machine Learning for Flood Hazard Mapping

**Title:** Flood Hazard Mapping using XGBoost and Memetic Programming

**Date:** August 18, 2025 (10:00 to 12:00 – Lectures/13:00 to 16:00 – Training)

**Facilitators:**

Prof. Emad Mabrouk (Assiut University, Egypt, and the American University of the Middle East, Kuwait, is currently a visiting professor at Kyoto University).

Prof. Mohamed Saber (DPRI, Kyoto University)

**Topics:**

- Introduction about the difference between Machine Learning and Traditional Hydrological Modeling (Lecture 1).
- Basic introduction for the Machine learning (Lecture 2)
- Data preparation workflows using ArcGIS for
- Real-case applications using XGBoost and Memetic Programming

#### 5. Expected Outcomes

- Strengthened the technical capacity of Philippine partners in hydrological and AI-based flood modeling
- Locally applicable models and tools for flood forecasting
- Increased integration of GIS and AI techniques into risk reduction planning
- Documentation and resources for future use by academic and government institutions

Documents, will be shared before the training.