



Technical Assistance: Real-time mapping of flood risk based on weather forecasting, remote sensing and deep learning algorithms

Location: Selected communes in Mali, with initial focus on Koula in the region of Koulikoro, in the Malian part of the Niger Basin

Solution: Development and implementation of real-time flood risk mapping and monitoring system using deep learning, satellite data, and low-cost technology

UNEP CTCN grant: USD 160,000



Weather forecasting technology to map flood risk © UNEP-CTCN

Frequent and severe flooding, exacerbated by climate variability and change, poses significant risk to communities and infrastructure in Mali. This project develops a real-time flood risk mapping system using precipitation forecasts, remote sensing, and deep learning techniques. The initiative aims to enhance the existing early warning system by improving the accuracy and timeliness of flood predictions, ultimately reducing the impact of floods on vulnerable communities in selected rural areas.



Objectives

- The primary objective is to strengthen Mali's existing flood early warning system by integrating advanced hydrological models and real-time data collection.
- Specifically, deployment of integrated field and satellite-based monitoring systems and deep learning techniques to predict and map flood risks accurately.



Social Impact

- The project supported a total of 36,962 beneficiaries, including 5,324 direct beneficiaries and 31,638 indirect beneficiaries.
- Among both the direct and indirect beneficiaries, 51% are women, and 65% are youth.
- A significant reduction of risk to lives and property, particularly benefiting women and youth in vulnerable communities.



Adaptation Impact

- **Improved Flood Risk Management and Community Resilience:** The project is contributing to enhanced capacity to manage flood risk by providing accurate and timely flood predictions. This will lead to better planning and response, reducing the impact of floods on vulnerable communities and infrastructure.
- **Enhanced Water Resource Management:** The project will contribute to better water resource management by improving the understanding of flood dynamics and providing data that can be used to develop more effective water management strategies.
- **Increased Resilience to Climate Change:** By providing real-time data and improving the accuracy of flood predictions, the project helps communities adapt to the increased frequency and severity of extreme weather events, particularly floods, thereby enhancing overall resilience to climate change.



Other Co-Benefits

- Improved water resources management.
- Reduced economic loss from floods.
- Enhanced data availability for other climate adaptation strategies.



Innovation & Technology

- **Deep Learning Models:** Application of deep learning algorithms to improve the accuracy of flood predictions and risk mapping.
- **Satellite Data Analysis:** Use of satellite data to monitor weather patterns and water levels, providing real-time information that can be used to predict flood events.
- **Low-Cost Monitoring Systems:** Deployment of low-cost sensors and automatic transmission systems to collect real-time data on water levels and flood risks.



Replication Potential

- The project's technology is conducive to replication in areas where the risk of flooding is not well-managed. As the project uses advanced and accessible technologies, it is likely to enhance flood preparedness and flood risk management in locations of deployment.



Key Figures

- USD 160,000 project budget
- 36,962 people benefitted in total
- 9 different experts engaged to support the project activities
- More than 15 different national institutions and agencies engaged in the project activities
- The project contributed to the following SDGs:

