

Bangladesh-First AI Forecasting for Tidal Surges and Loss Reduction

Talked with communities in the coastal regions, particularly in the upazilas of Koyra, Assasuni, and Shyamnagar. They shared that every household has lost their homes at least three times, and the fields they cultivate suffer losses every year due to recurring disasters.

When asked about receiving forecasts beforehand, they said:



“Yes, we get forecasts before cyclones, but that doesn’t help much. The damage

happens because of tidal surges and river erosion when water levels rise.”

This is the reality for millions in coastal areas.

Here, communities face one of the most complex climate risks in the world due to their geographical location, that is tidal surges. Events such as Cyclone Aila (2009), followed by Cyclones Amphan and Yaas, show a clear pattern: tidal surges—not just wind—cause the most extensive damage. Embankment failures lead to rapid flooding, prolonged waterlogging, loss of livelihoods, and long-term humanitarian crises.

Despite improvements in cyclone forecasting, a critical gap has persisted in Bangladesh is that there is no system for location-specific tidal surge prediction and early warning. This has resulted in repeated asset loss, delayed response, and increased recovery costs.

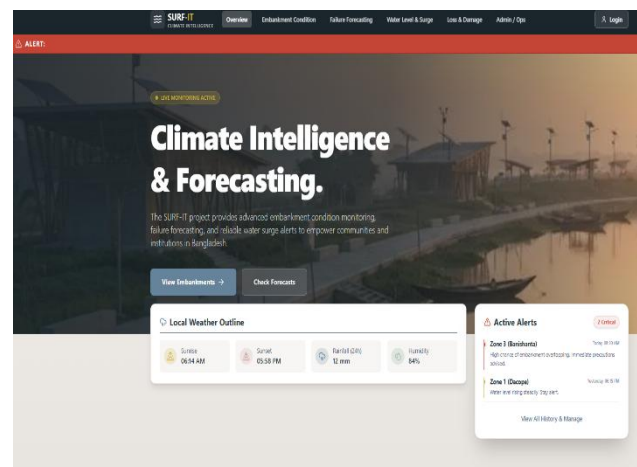
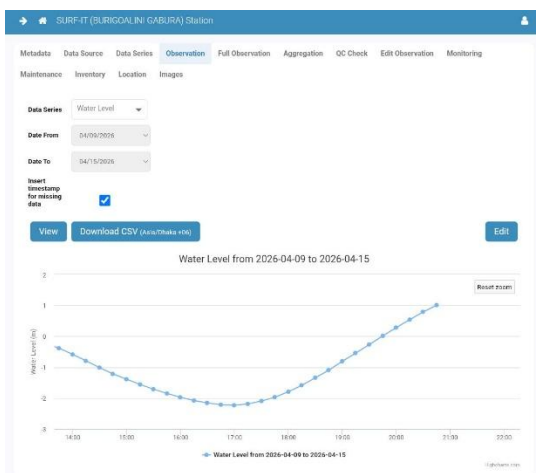
The SURF-IT project directly addresses this gap by introducing a Bangladesh-first model that integrates AI-based surge forecasting, real-time hydrological monitoring, high-resolution embankment mapping using LiDAR technology, and community knowledge systems.



Through this approach:

- 9 water sensors continuously monitor river systems and detect early changes in water levels
- Around 400 km of embankments have been mapped to identify vulnerable sections and potential breach points
- A pilot tidal surge forecasting model has been developed to anticipate surge height, timing, and high-risk zones

A digital dashboard is being developed to translate complex data into clear, actionable alerts. In parallel, an Early Action Protocol (EAP) is being established in collaboration with RIMES, BMD, BWDB, DDM, and CPP, ensuring that forecasts trigger immediate, predefined actions.



Previously, communities relied on generalized cyclone warnings and often responded too late. Now, within the project areas:

27 Ward Disaster Management Committees are operational

54 CPP volunteers are mobilized

27 embankment watch groups are actively monitoring risks

9 sensor management committees are ensuring local sustainability

27 women's groups are engaged in preparedness planning



As a result, communities can now take early action—harvesting crops in advance, securing aquaculture assets, relocating livestock, and supporting timely evacuation of vulnerable people.

SURF-IT is enabling a shift from reactive response to anticipatory action, from generalized warnings to location-specific forecasting, and from repeated loss to informed resilience.

As one member of an embankment watch group shared, with cautious hope:

“Now we feel more prepared than before. The flood season is coming, but this time, we are ready.”



By combining advanced technology with community systems and institutional collaboration, the project is not only reducing immediate risk but also building a scalable model for climate resilience.