



STRENGTHENING DISASTER RISK MITIGATION THROUGH AUTOMATION: A CASE STUDY ON STREAM-EWS IN MINDANAO

A Case Study



OVERVIEW OF THE PROBLEM

In just eight hours, Typhoon Yolanda (Haiyan) reshaped the landscape of Visayas and the way the Philippines understood disaster preparedness (ASEAN & NDRRMC, 2014). The vast destruction of that supertyphoon in 2013 made it painfully clear how the country needed stronger, faster, and more reliable early warning systems.

Since 2011, the Philippines has consistently ranked as the most at-risk country according to the World Risk Index. Based on the 2023 report, the country scored 46.86 on a risk index scale of 0 (very low risk) to 100 (very high risk), an increase from 46.82 in 2022 (CEDTyClea, 2023).



Because of its geographical and physical characteristics, the Philippines is devastated by numerous disasters yearly that pose great risks to its people and destroy the community where they live. Among the most destructive disasters affecting communities are floods, and their impacts are even aggravated due to rapid urbanization, environmental degradation, industrialization, and climate change.

Despite the continuous effort to strengthen disaster risk reduction, critical gaps remain, especially in flood-prone areas.

Access to timely and accurate information can save lives, yet many remote disaster-prone communities lack reliable communication systems. Too often, traditional methods, such as public announcements often fall short when rapid response is needed.

For years, one of the biggest challenges in disaster preparedness has been the absence of real-time, tech-based early warning systems. A 2022 study by People in Need (PIN) found that many local governments in the Philippines still lack the technology for automated hazard alerts. Without it, communities remain vulnerable, unable to take precautions before disaster strikes.

That's where the Strengthening Resilience through Early Action and Impact Mitigation – Early Warning System (STREAM-EWS) project comes in. Led by PIN and funded by the GSMA Innovation Fund this project provides local governments in Mindanao with cutting-edge tools essential for disaster preparedness to help communities act faster, communicate better, and ultimately, save lives.

FROM MEGAPHONES TO MONITORS:

Enhancing Disaster Preparedness at the Local Government Level

The Municipality of San Miguel, Surigao del Sur is nestled within the Tago River Basin making it highly susceptible to floods and landslides during heavy rainfall. Despite its vulnerability, the town only relied on bandilyo (public announcements) to inform the residents about the Tago River's water level.

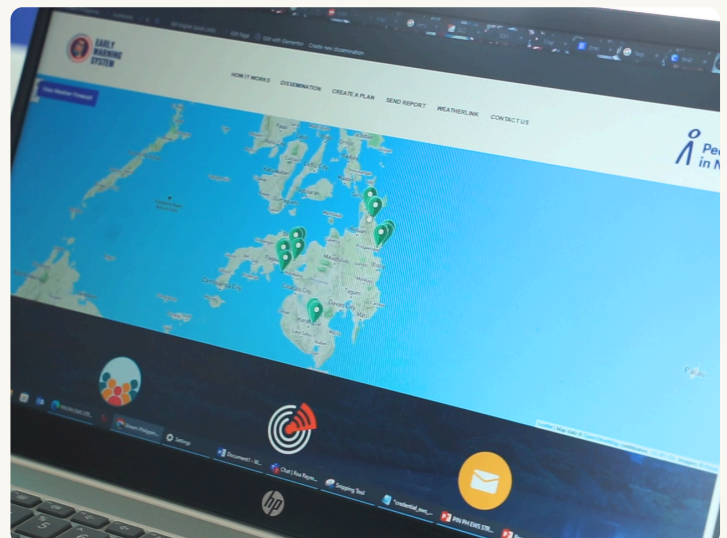
Monitoring the river required the local disaster officers to physically inspect the river, a process that was both time-consuming and dangerous, often delaying the timely dissemination of critical information.

This posed a challenge as local governments are the closest to the communities and serve as the primary source of information during emergencies. Without real-time data, decisions about evacuations often came too late.

"Before, we had to go to the river just to see how high the water was. Now, we just look at the screen," Alexander D. Dapar Jr., San Miguel, Surigao del Sur's Disaster Management Officer narrated.

Using Internet-of-Things (IoT)-enabled early warning instruments, including solar-powered and mobile data-enabled flood gauges, they are now able to generate real-time risk data. Now, instead of sending teams out in the middle of a storm, disaster officers can track the river's status from their computer screens.

Furthermore, through contingency plan assessments and tabletop simulation exercises, the local officials stated that they now have the confidence to take proactive steps as they are better equipped to act swiftly and efficiently during crises.





"Before, we didn't have a pre-emptive evacuation policy. But because of what we learned from the training that PIN conducted, we saw the need for it. Now, we've passed a municipal ordinance mandating pre-emptive evacuation to ensure our residents stay safe," Dapar said.

By institutionalizing these changes, San Miguel town isn't just reacting to disasters anymore, they are planning, making risk reduction a built-in part of governance.

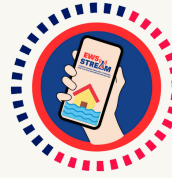
PROVINCIAL-LEVEL POLICY AND PLANNING ENHANCEMENTS

In Surigao del Norte, provincial disaster officials were also heavily reliant on manual monitoring systems. While they had rain gauges and water level markers, they lacked a streamlined way to collect and interpret the data.

"Before STREAM-EWS, our system was entirely manual," Edgar B. Catulay of the Surigao del Norte Provincial Disaster Risk Reduction Management Office (PDRRMO) noted. "We had rain gauges all over the province, but they weren't calibrated to provide real-time, automated readings. Now, we have a system that not only automates the process but ensures our data is scientifically accurate—thanks to calibration by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)."

Beyond monitoring, the project is also changing how LGUs coordinate evacuations and suspensions. Before, each municipality had to rely on word-of-mouth updates or make decisions in isolation. Now, with shared real-time data from STREAM-EWS, they can act faster and more efficiently on matters like calling for evacuations, suspending classes, or mobilizing emergency responders.

Even disaster preparedness plans are becoming more inclusive. Provincial officials emphasize the importance of multi-sectoral participation, ensuring that vulnerable populations, private sector representatives, and even religious groups have a seat at the table.



"When we create disaster plans, we make sure every sector is engaged. That way, the plans are realistic and truly meet the needs of the community. We also ensure that these protocols are in layman's language so we write them in Surigaonon," said Catulay.

SUCCESS STORY – BEYOND TECHNOLOGY, BUILDING A SENSE OF BELONGING

Technology alone doesn't save lives—people do. The biggest success of the STREAM project would be for nothing if not directly felt by the community.

In San Miguel, residents no longer feel like passive recipients of disaster response. They feel like active participants in their own safety.

The installed EWS device determines that a particular river has reached a certain threshold, and then, it automatically sends out alert messages via SMS to Local Government Units (LGUs) and then directly to vulnerable communities.

"Thanks to the text blast system, our constituents know they are part of the government's initiative. They are not just bystanders, but instead they belong," said Dapar.

Beyond early warnings, the community has taken disaster preparedness into its own hands. Through tabletop exercises and hands-on training, residents have gained skills that go beyond flood response.





"We've strengthened our barangay-level training. We've conducted first-aid and emergency response drills in every barangay. We even launched firefighting competitions such as the Fire Olympics, so that when a real emergency happens, people don't panic. They know exactly what to do," Dapar added.

With real-time data, LGUs can also pinpoint which areas need evacuation and deploy resources more efficiently, providing a more practical solution, especially for localities with lower disaster response budgets.

"Before, we had to guess where to send aid. Now, we can prioritize the most affected communities, making sure relief goods go where they're needed most," Eduardo C. Milloren, PDRMO, Surigao del Sur said.

MOVING FORWARD

For LGUs across the region, STREAM-EWS is just the beginning. The provincial government is now working to expand and sustain the initiative.

"We're shifting from one-time training sessions to making early warning systems a permanent part of our infrastructure. We need to invest in communication systems that don't fail when disaster strikes," Milloren addressed.

He added that they will scale the initiatives up across more towns and cities, ensuring that no community is left behind.

"When the provincial office invests in communication, LGUs should follow suit. What's the use of having an early warning system if the message can't reach the people? Communication and preparedness must go hand in hand," he emphasized.

STREAM-EWS is proving that preparedness isn't just about reacting to disasters, it's about preventing loss before it happens. And as more LGUs embrace this shift, the Philippines moves closer to a future where communities are not just surviving disasters, but thriving despite them.



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