



ENHANCING DISASTER PREPAREDNESS THROUGH MULTI-STAKEHOLDER COLLABORATION: LESSONS FROM THE STREAM-EWS PROJECT

A Case Study



INTRODUCTION

The Philippines ranks among the most disaster-prone countries in the world, frequently experiencing typhoons, floods, earthquakes, and landslides. According to the 2023 World Risk Index, the country remains highly vulnerable due to its geographic location and socio-economic conditions. With an average of 20 typhoons annually and a history of catastrophic flooding, there is a critical need for robust and localized Early Warning Systems (EWS) to mitigate the impact of disasters.

Despite the efforts of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and the National Disaster Risk Reduction and Management Council (NDRRMC), gaps persist in the country's EWS. Major river basins have been prioritized for flood sensors, while smaller river systems in high-risk communities remain underserved.



Additionally, the localization of EWS remains a challenge, as warnings often lack community-specific relevance, making response efforts less effective.

In response, People in Need (PIN), with support from the GSMA Innovation Fund, launched the Strengthening Resilience through Early Action and Impact Mitigation–Early Warning Systems (STREAM–EWS) project. This initiative leverages mobile technology to enhance disaster preparedness, ensuring that early warnings are timely, localized, and actionable. The project fosters multi-stakeholder collaboration among government agencies, private sector partners, and communities to bridge critical gaps in disaster resilience.

CHALLENGES IN THE PHILIPPINE EARLY WARNING SYSTEM

The Philippines' EWS primarily relies on centralized data collection from PAGASA, which deploys flood sensors in major river basins. However, smaller river systems—where severe flooding often occurs, have been largely overlooked. This lack of localized flood monitoring increases the vulnerability of communities that rely on real-time rainfall data for disaster preparedness (Lagmay et al., 2017).

Another challenge is the effectiveness of communication channels for disaster alerts. While PAGASA provides weather bulletins, their reach and comprehensibility among local government units (LGUs) and communities vary. Often, warnings are too technical, not easily understood, or fail to prompt timely action at the local level.

Connectivity issues in geographically isolated and disadvantaged areas (GIDAs) further hinder disaster preparedness. Many at-risk communities struggle with weak mobile signals, lack of access to digital platforms, and delayed information dissemination, leaving them unprepared for rapidly evolving hazards.



THE STREAM-EWS PROJECT: OBJECTIVES AND IMPLEMENTATION

The STREAM-EWS project was designed to address these challenges through three core objectives:

1. Enhancing the accuracy and localization of EWS by installing telemetered weather stations (flood sensors) in underserved areas.
2. Improving disaster communication through a mobile-based early warning system, developed in partnership with telecommunications providers.
3. Strengthening multi-stakeholder collaboration among government agencies, private sector partners, and communities to ensure sustainability.

People in Need (PIN) in collaboration with PAGASA, PLDT-Smart Communications, and LGUs to create a comprehensive disaster preparedness system. The project integrates real-time rainfall monitoring with targeted mobile alerts, ensuring that warnings are localized, timely, and actionable.

KEY ACHIEVEMENTS AND BEST PRACTICES

Enhanced Accuracy through Calibrated Weather Monitoring

The STREAM-EWS project addressed the gap in flood monitoring by deploying calibrated weather stations and flood sensors in 12 municipalities across Mindanao. This project specifically targeted small but high-risk river systems.

According to Alexander Namoco of PAGASA's Mindanao Regional Services Division, the integration of these stations significantly improved forecasting accuracy:

"Since the installed telemetered stations follow the same standards as PAGASA's instruments, because they ensured for it to be calibrated from us, the weather parameters they capture are consistent and reliable. This helps ensure that disaster warnings are based on accurate and uniform data, reducing the risk of discrepancies that could lead to misinformation."

By aligning satellite readings with real-time, ground-based data, the project strengthened local forecasting, enabling LGUs to make informed decisions on evacuation and preparedness measures.

2. PIN's Early Warning Messaging System and Mobile Alerts

Recognizing the challenges in disaster communication, PIN developed a localized early warning messaging system in partnership with PLDT-Smart Communications. This system ensures that disaster alerts are:

- Timely – Sent immediately based on real-time weather data.
- Localized – Tailored to the specific conditions of affected communities.
- Easily Understood – Messages are in local language and simplified to ensure clarity.

How the Early Warning Messaging System Works

1. Real-time Weather Monitoring – Flood sensor stations track rainfall and river levels.
2. Automated Analysis – Data is analyzed against pre-set risk thresholds.
3. Localized Alerts Dissemination – SMS alerts are automatically sent to registered community members by LGU responders.

According to Roberto W. Suzon of PLDT-Smart:

"The opt-in system improves the efficiency of disaster alerts since it's targeted and customized for users who voluntarily subscribe to receive warnings. Customization limits network congestion, improves source credibility, and ensures recipient attention."

Moreover, PLDT-Smart commits the deployment of quick response teams to maintain connectivity during disasters and sets up mobile cell sites and emergency communication equipment, ensuring that affected areas remain informed even if regular networks are disrupted.

3. Strengthening LGU and Community Capacity

A key component of the project was training LGUs and local responders to interpret weather data and act on alerts. PIN and PAGASA conducted workshops, equipping communities with skills in:



- Risk assessment and early warning interpretation
- Evacuation planning and emergency response
- Community-based disaster risk management

Namoco from PAGASA highlighted:

"Since LGUs are on the ground and directly handle disaster response, access to standardized weather information enables them to monitor conditions effectively and act quickly when needed."

By enhancing local knowledge and decision-making, the project empowered communities to take proactive steps in disaster preparedness.

CHALLENGES AND AREAS FOR IMPROVEMENT

Despite its success, the STREAM-EWS project faces several challenges:

- **Limited Coverage of Small River Basins** – Many high-risk areas still lack localized monitoring systems.
- **Connectivity Gaps in Remote Areas** – Weak mobile signals limit the reach of disaster alerts in some GIDAs.
- **Sustainability Concerns** – Long-term impact requires continuous investment in infrastructure, training, and policy support.

RECOMMENDATIONS FOR SCALING AND SUSTAINABILITY

To maximize the impact of the STREAM-EWS project, the following steps should be taken:

1. **Expand EWS Infrastructure** – Government and private sector partners should prioritize additional weather stations in underserved areas.
2. **Strengthen Public-Private Partnerships** – Institutionalizing collaboration between PAGASA, telecom providers, and NGOs will ensure continued investment in disaster resilience.
3. **Enhance Community-Based Disaster Preparedness** – LGUs and local organizations should be actively involved in EWS maintenance and disaster planning.



CONCLUSION

The STREAM-EWS project has demonstrated the potential of technology-driven solutions in disaster preparedness. By improving forecasting accuracy, strengthening mobile-based alerts, and empowering communities, the project has enhanced resilience in high-risk areas.

However, sustained commitment from government, private sector, and civil society is essential for scaling up these initiatives and ensuring that no vulnerable community is left unprotected.

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