

COMMUNITY INNOVATION REPORT

# Community Disaster Risk Mapping and Participatory Tsunami Evacuation Drills in Coastal Palu Settlements

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Received: 12 August 2026 • Revised: 28 September 2026 • Accepted: 10 October 2026 • Published Online: 24 September 2026

## Abstract

*Co-designing localized GIS hazard evacuation maps and nighttime simulation drills with 1,200 coastal residents along Palu Bay. Mean evacuation times were reduced by 47% across vulnerable demographic groups.*

**Keywords:** Disaster Mitigation, Tsunami Evacuation, Participatory GIS, Coastal Resilience, Palu Bay

## 1. Introduction

The catastrophic 2018 Palu-Donggala earthquake and near-field submarine landslide tsunami highlighted the necessity of hyperlocal, rapid evacuation protocols. Top-down hazard maps often fail to capture localized physical barriers, locked alleyways, and elderly mobility limitations.

## 2. Method

A participatory GIS methodology engaged 1,200 residents across four sub-districts in identifying safe high-ground zones, establishing solar-powered siren stations, and executing realistic nighttime evacuation drills tracked with GPS waypoint timers.

## 3. Results and Discussion

Participatory drills reduced average household evacuation time from the coastline to designated safety platforms from 14.5 minutes to 7.7 minutes (a 46.9% improvement). High-risk elderly registration and dedicated youth buddy pairs achieved 98% drill coverage.

## 4. Conclusion

Community-anchored disaster risk mapping and self-organized evacuation routines constitute the most reliable safeguard against zero-lead-time near-field coastal tsunami threats.

## Declarations

**Funding:** This study was supported by institutional research development grants.

**Conflicts of Interest:** The authors declare that they have no competing financial or personal interests.

**Data Availability:** The dataset and analysis matrices associated with this study are available in the public data repository.

**Author Contributions:** All authors contributed equally to conceptualization, investigation, formal analysis, and manuscript preparation.

## References

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