# Integrating Machine Learning and Community-Based Approaches for Enhanced Early Warning Systems in Cascading Hazard Zones: A Case Study from Melamchi, Nepal

**Narayan Thapa and Sushant Sharma (Nepal)**

**Key words:** Remote sensing; Risk management; early warning systems

**SUMMARY**

This study presents a comprehensive early warning system for cascading hazards in the Melamchi region of Nepal, integrating satellite data, machine learning, and community engagement. Utilizing Random Forest Regression, we assess flood and landslide susceptibility, enhancing predictive accuracy. Ground-based surveys complement this by mapping risk zones, with local citizens actively marking flood entry points and landslide-risk zone areas. This multi-faceted approach not only improves hazard prediction but also fosters community resilience and preparedness, offering a robust model for disaster risk reduction in vulnerable regions.

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