



Community-Based Early Warning Systems for Landslide Risks in Mozambique's Mountains: An Engineering Perspective

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Abstract

The study focuses on the application of early warning systems for landslide risks in Mozambique's mountainous regions, emphasising community-based initiatives. A mixed-methods approach was employed, combining quantitative data analysis with qualitative interviews to gather insights from local communities and experts. Statistical models were utilised to identify patterns and trends related to landslide occurrences and early warning system efficacy. Early warning systems in the studied areas had a detection accuracy rate of 85% for landslides within a 12-hour timeframe, with significant variability across different mountain ranges due to varying geological conditions and community engagement levels. Community-based early warning systems significantly enhance landslide risk mitigation efforts, particularly when combined with robust data collection and dissemination mechanisms. Recommendations include enhanced training programmes for local communities and improved stakeholder collaboration. Develop comprehensive training curricula tailored to the specific needs of local communities in mountainous regions. Strengthen partnerships between government agencies, NGOs, and academic institutions to ensure effective implementation of early warning systems. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographical Information Systems (GIS), Remote Sensing, Participatory Mapping, Risk Assessment, Community Empowerment, Sustainability Planning, Geotechnical Engineering*

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