

From Pilot to Policy: Operationalizing Landslide Anticipatory Action in Nepal

Evidence and Policy Lessons from Gurbhakot Municipality, Surkhet

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Policy Insight

- Nepal currently lacks a comprehensive, nationally operationalized landslide early warning system that provides systematic location-specific warnings and triggers for anticipatory action.
- Community rainfall monitoring alone, without scientifically validated thresholds, susceptibility/risk information and agreed decision protocols, is insufficient as a standalone trigger for anticipatory action.
- Geohazard assessments should become a core component of municipal disaster risk management. They identify priority settlements, guide land-use planning, support preparedness, and inform mitigation and relocation decisions.
- Stronger institutional coordination is required. Closer collaboration among the Department of Hydrology and Meteorology (DHM), the Department of Mines and Geology (DMG), the National Disaster Risk Reduction and Management Authority (NDRRMA), and local governments is essential to operationalize landslide anticipatory action.
- Evidence from local pilot initiatives should inform national policy. The Gurbhakot experience demonstrates practical approaches that can support implementation of Nepal's National Anticipatory Action Framework and strengthen resilience in landslide-prone municipalities.

Introduction

Landslide hazards are among Nepal's most frequent and devastating disasters. Each monsoon, intense rainfall triggers slope failures that cause deaths, damage homes and infrastructure, disrupt services, and isolate communities.



*A house collapsed by landslide in Gurbhakot.
Image: Dilli Pun*

Climate change, fragile geology, unplanned roads, deforestation, and expanding settlements in hazard-prone areas are increasing the risk.

Between 1971 and 2025, Nepal recorded more than 8,000 landslides, causing over 6,600 deaths, leaving more than 1,000 people missing, and affecting over 616,000 families. These losses underscore the need to act before impacts escalate.

Ground Realities from Gurbhakot Municipality

Geohazard assessment helps identify how local geological and physical conditions influence landslide risk, providing evidence to inform Anticipatory Action.

A geohazard assessment of nine vulnerable settlements in Gurbhakot Municipality classified them into three risk categories based on geology, slope stability, drainage, road construction and land use. The findings help prioritize monitoring, preparedness, mitigation, land-use planning and, where necessary, relocation.

Risk Category	Settlements	Implication for Anticipatory Action
High Risk (Category III)	Timure/Bhitri Khola and Pokharipata	Prioritize close rainfall monitoring, early warning, pre-agreed evacuation and relocation where necessary to protect lives and critical infrastructure.
Medium Risk (Category II)	Kalche, Hile, Khola Dhab, Tilkeni/Sindure Khola Gau, Lekh Kurile, and Betine/Belgaura/Hileni	Strengthen rainfall monitoring, warning dissemination and readiness for early action during high-risk rainfall periods.
Low Risk (Category I)	Lekh Malarani	Maintain monitoring and preparedness, with action taken if rainfall or local conditions indicate increasing risk.

The Gurbhakot pilot combined community rainfall monitoring, geohazard assessment, municipal preparedness and local warning networks. Communities actively monitored and shared rainfall data, strengthening awareness and monsoon preparedness. However, the key lesson was that rainfall monitoring alone cannot determine when to act. Scientifically validated, location-specific thresholds are needed to trigger readiness, evacuation and other anticipatory actions.



Property including farmland at risk of landslide in Surkhet. Image: Raj Pariyar/WHH

Nepal has advanced flood forecasting and early warning and endorsed the National Anticipatory Action Framework in 2026. However, landslide preparedness and anticipatory action remains limited. Rainfall advisories rarely identify where landslides may occur, which settlements face the greatest risk, or when early action should begin.

What is missing is an operational system that combines weather forecasts, geohazard data, localized trigger thresholds, and institutional coordination.

Under the PRARAMBHA Project, Welthungerhilfe (WHH) Nepal and LI-BIRD (Local Initiatives for Biodiversity, Research and Development) piloted landslide anticipatory action in Gurbhakot Municipality, Surkhet. Drawing on community rainfall monitoring, geohazard assessment, and municipal preparedness planning, this brief identifies implementation gaps and recommends actions to strengthen landslide anticipatory action nationally and locally.

Closing the Implementation Gap in Landslide Anticipatory Action

Nepal has strong disaster risk reduction and anticipatory action policies, but implementation for landslides disaster remains limited. Unlike floods, landslides result from complex interactions among rainfall, geology, slope stability, drainage, land use, and human activity.

A key gap is the absence of location-specific trigger thresholds. Municipalities receive weather forecasts but lack clear guidance on where landslides disaster may occur and when readiness for anticipatory action or evacuation should begin. Coordination also remains fragmented: DHM provides weather forecasts, while DMG holds geohazard expertise, but their systems are not fully integrated.

Stronger coordination among DHM, DMG, NDRRMA, provincial governments, and municipalities is essential to establish reliable landslide forecasts, warnings, and early-action protocols.

Key Learning

The Gurbhakot pilot's key challenge was determining when rainfall should trigger action. This requires an operational system integrating weather forecasts, geohazard assessments, local thresholds, and institutional coordination.



Community based rainfall measurement.
Image: Prakash Neupane/LI-BIRD

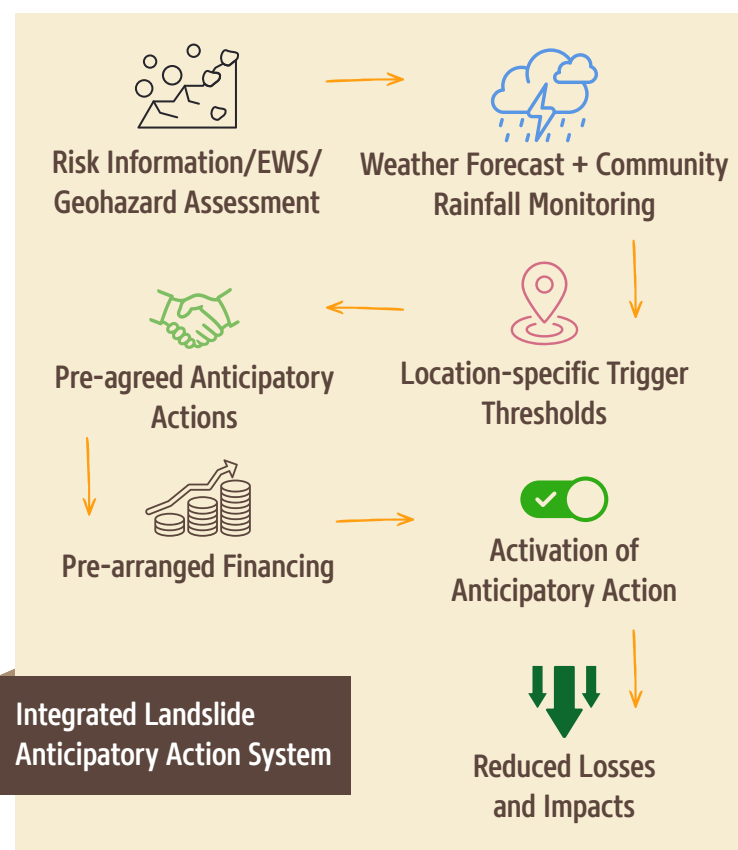
From Pilot to Policy: A National Landslide Anticipatory Action System

The Gurbhakot pilot shows that landslide anticipatory action is feasible: communities can monitor rainfall, municipalities can strengthen preparedness, and geohazard assessments can guide decisions. However, local initiatives alone are insufficient. Scaling up requires national leadership, stronger technical systems, and coordinated integration of weather forecasts, geological data, and municipal preparedness within existing disaster risk management mechanisms.

Towards an Integrated Landslide Anticipatory Action System

An effective landslide anticipatory action system should combine scientific information, institutional coordination, and community engagement.

This integrated approach enables municipalities to move beyond monitoring rainfall towards taking timely, evidence-based actions before disasters occur.



Policy Recommendations

Establish a National Landslide Early Warning System: DHM and DMG, coordinated by NDRRMA, should develop and validate spatially differentiated/local rainfall-landslide thresholds for landslide-prone warning zones, and translate these into municipality-level decision-support products.

Develop Local Rainfall Trigger Thresholds: DHM and DMG should develop and regularly refine municipality-specific rainfall thresholds using local rainfall, geological, slope, landslide and field data, supported by research institutions.

Institutionalize Geohazard Assessments: Municipalities should routinely integrate geohazard assessments into disaster management, land-use and infrastructure planning to guide preparedness, safer settlements and risk-reduction investments.

Strengthen Impact-Based Forecasting: DHM should provide 24-, 48- and 72-hour municipality-level rainfall forecasts, combining them with geohazard data to communicate likely impacts and recommended preparedness actions.

Operationalize Landslide Anticipatory Action: NDRRMA should develop national guidance defining roles, triggers, procedures, pre-agreed actions, financing and coordination for timely landslide anticipatory action.

Way Forward

Nepal can build on its leadership in flood anticipatory action by extending it to landslides hazard. Evidence from Gurbhakot shows that communities and municipalities are ready to act. A coordinated national system, combining weather forecasts, geohazard assessments, localized triggers, and community preparedness, can enable timely action, strengthen disaster risk governance, and protect lives, livelihoods, and infrastructure.

Priority Actions for Government and Development Partners

Government of Nepal	Development/Humanitarian Partners
Establish a national landslide early warning system through DHM and DMG.	Support research and validation of localized trigger thresholds.
Strengthen institutional coordination among DHM, DMG, NDRRMA, and municipalities.	Invest in geohazard assessments, forecasting systems, and early warning technologies.
Integrate geohazard assessments into municipal planning and disaster risk management.	Strengthen technical capacity of government agencies and municipalities.
Develop operational guidelines for landslide anticipatory action.	Support scaling of successful pilot initiatives and knowledge generation.
Strengthen impact-based forecasting and preparedness planning.	Promote long-term investment in anticipatory action as part of climate resilience programmes.

References

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Anticipatory Action Pilot Project Collaborators