



Citizen-based road monitoring for landslide hazard assessment in tropical highlands of Southwestern Uganda

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Road networks represent critical interfaces where human systems and geomorphic processes interact. In regions with steep landscapes, roads are commonly associated with an increased incidence of landslides. Yet, despite their socio-economic significance, systematic information on the frequency, type, and spatial distribution of road-related landslides remains largely absent. This data gap limits the ability of local authorities to allocate resources effectively, operationalize mitigation efforts, and conduct risk-sensitive infrastructure planning. In this study, we propose an innovative operational citizen-based method that aims to inventory with great detail how road construction, drainage modification, and associated terrain disturbance influence landscape morphology and its related hazards. Focusing on the highlands of Southwestern Uganda, a densely populated tropical region highly exposed to geo-hydrological hazards. We first conducted a detailed systematic baseline survey between November 2025 and January 2026 for road sections of 250-300 m along 254 km of roads of various types across different natural and human-influenced settings. From a total of 937 road section observations, preliminary results reveal various conditions dominated by road cut failure/soil/rock deposit from uphill (22%), active erosion (19%), fresh road cuts (19%), blocked roadside ditches, stone/soil extraction and quarrying of the road cut (7%). To have a detailed systematic temporal and spatial information of these roads conditions, we have established, together with local stakeholders, a network of 15 trained motorcycle-based citizen scientists who, for the next three years, will (i) generate a temporal inventory through systematic bi-monthly monitoring of the roads, and (ii) also report on landslide event occurrences along the road networks. Processes including road cut failures, surface sedimentation, drainage obstructions, pavement cracking, and proximal landslides, are being inventoried. We present here the first results of this operational participatory monitoring framework for understanding a human-influenced hazard in a data-scarce mountainous environment context.

