

Key hydrogeological aspects of landslides in Western Ghats of Maharashtra

Vaibhav Belhekar* and Himanshu Kulkarni

Advanced Center for Water Resources Development and Management, Pune 411 052, India

The frequency and intensity of landslides in the Western Ghats of Maharashtra, India, have increased. The present study examines the unprecedented series of landslides in the Choravane watershed in July 2021, where 94 landslides were triggered by prolonged and intense rainfall. Many occurred in undisturbed forested areas, indicating that the landslides are not always associated with human-modified slopes. Our findings highlight the role of extended rainfall, distinctive lithology of the Deccan Volcanic Province and groundwater dynamics, particularly subsurface saturation and pore pressure, in landslide initiation. These insights have implications for hazard prediction and mitigation.

Keywords: Antecedent rainfall, disaster, landslide hydrology, remote sensing, Western Ghats.

causative factors contributing to a better understanding of landslide phenomena and facilitating improved predictive capability.

In India, the Geological Survey of India (GSI) serves as the nodal agency for landslide monitoring, tracking and the development of an early warning system. GSI has conducted several landslide investigations in the country, including inventory mapping, landslide hazard zonation, site-specific studies and post-disaster reconnaissance studies.

A review of landslide studies in the Western Ghats of India reveals a focus on susceptibility mapping⁶, past landslide investigations⁷⁻¹⁰, spatio-temporal mapping of the existing landslides^{11,12}, the impact of anthropogenic factors¹³⁻¹⁵ and other related studies such as the influence of weathering on landslide occurrences¹⁶. In general, we find a notable gap in existing studies on groundwater as a crucial factor in landslide occurrences, particularly within the Deccan Volcanic Province (DVP). Subsurface hydrological