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Identification of landslide-prone zones in the geomorphically and climatically sensitive Mandakini valley, (central Himalaya), for disaster governance using the Weights of Evidence method

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Abstract

The entire Himalayan region is prone to disasters, with many people being vulnerable to hydroclimatic threats such as extreme rainfall-driven floods, glacial lake outburst floods (GLOFs), landslide lake outburst floods (LLOFs), and landslides triggered by rainfall. Landslides and floods are related, as the former cause the lakes that burst, and floods can undercut slopes and cause landslides. During the past 200 years, landslides and floods caused by LLOFs in the Garhwal Himalaya have occurred in 1894, 1970, and 1978; but the most disastrous event, in terms of loss of life and economic impact, occurred in June 2013, which was a result of extreme rainfall in the Higher Himalaya and breaching of a moraine-dammed lake, very short-lived LLOFs, and rainfall-induced runoff and landslides. Outmigration from the area as a result of the 2013 event has caused anxiety about the future of the economy and also concerns about security of a state that has an international border. As a contribution to planning and reconstruction to secure the livelihoods of the local people and to entice migrants to return, this paper identifies zones in the Mandakini valley susceptible to landslides using a 'Weights of Evidence' approach. The roles of climate, geology, and geomorphology of the valley are also

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