

Influence of Climate Change on Landslides in Northeast India: A Case Study

Authors : G. Vishnu, T. V. Bharat

Abstract : Rainfall plays a major role in the stability of natural slopes in tropical and subtropical regions. These slopes usually have high slope angles and are stable during the dry season. The critical rainfall intensity that might trigger a landslide may not be the highest rainfall. In addition to geological discontinuities and anthropogenic factors, water content, suction, and hydraulic conductivity also play a role. A thorough geotechnical investigation with the principles of unsaturated soil mechanics is required to predict the failures in these cases. The study discusses three landslide events that had occurred in residual hills of Guwahati, India. Rainfall data analysis, history image analysis, land use, and slope maps of the region were analyzed and discussed. The landslide occurred on June (24, 26, and 28) 2020, on the respective sites, but the highest rainfall was on June (6 and 17) 2020. The factors that lead to the landslide occurrence is the combination of critical events initiated with rainfall, causing a reduction in suction. The sites consist of a mixture of rocks and soil. The slope failure occurs due to the saturation of the soil layer leading to loss of soil strength resulting in the flow of the entire soil rock mass. The land-use change, construction activities, other human and natural activities that lead to faster disintegration of rock mass may accelerate the landslide events. Landslides in these slopes are inevitable, and the development of an early warning system (EWS) to save human lives and resources is a feasible way. The actual time of failure of a slope can be better predicted by considering all these factors rather than depending solely on the rainfall intensities. An effective EWS is required with less false alarms in these regions by proper instrumentation of slope and appropriate climatic downscaling.

Keywords : early warning system, historic image analysis, slope instrumentation, unsaturated soil mechanics

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