Threshold rainfall ranges for landslide occurrence in Matara district of Sri Lanka and findings on community emergency preparedness

Author links open overlay panelP.Kalubowila[ab1], E.Lokupitiya[a], D.Halwatura[a], G.Jayathissa[c]

Abstract

The objective of this research was to identify the effects of antecedent rainfall on the probability of landslide occurrence and to analyze the knowledge of the community on Emergency Preparedness.

In this study, recent major landslides events were studied. The rainfall relevant to landslide locations was extracted using a GIS-based interpolation.

From the daily rainfall of two days prior to landslide event (i.e. Day 3) till the daily rainfall of landslide day (Day 1), there was an identifiable pattern. There is more than 90% chance for a landslide to occur, when the rainfall of Day 1, or the day of the landslide event, is close to 300 mm or above with a rainfall of ~80 mm or above on the previous day (Day 2); i.e. There is more than 94% chance for a landslide to occur when the total rainfall received on Day 1 and Day 2 exceeds 375 mm. The majority of the events (>94%) had a daily rainfall of ~80 mm or above on Day 3. The cumulative rainfall of the landslide day up to three days prior to the landslide event shows a significant pattern (Day 1-Day 4). Overall, when there is a rainfall event of ~80 mm or over, people need to be warned/cautioned about a potential landslide within the next three days, if the rainfall continues to be high.

Social survey shows that during 2017, people were more prepared compared to 2003, but still there are many steps to be taken in terms of preparedness.