



Preparation of landslide catalogue (1970-2019) of Nepal

Background

Nepal's steep slopes and the still growing Himalayan range coupled with heavy monsoon rainfall patterns lead to a wide range of geological and hydro-meteorological hazards across the country (MoHA, 2019). For protection of loss of property and human resources, assessment of hazards is very important. Landslide hazards mark at the top position out of different hazards in Nepal. Availability of the historical data of landslide is the key input in assessing the landslide hazards.

Objective

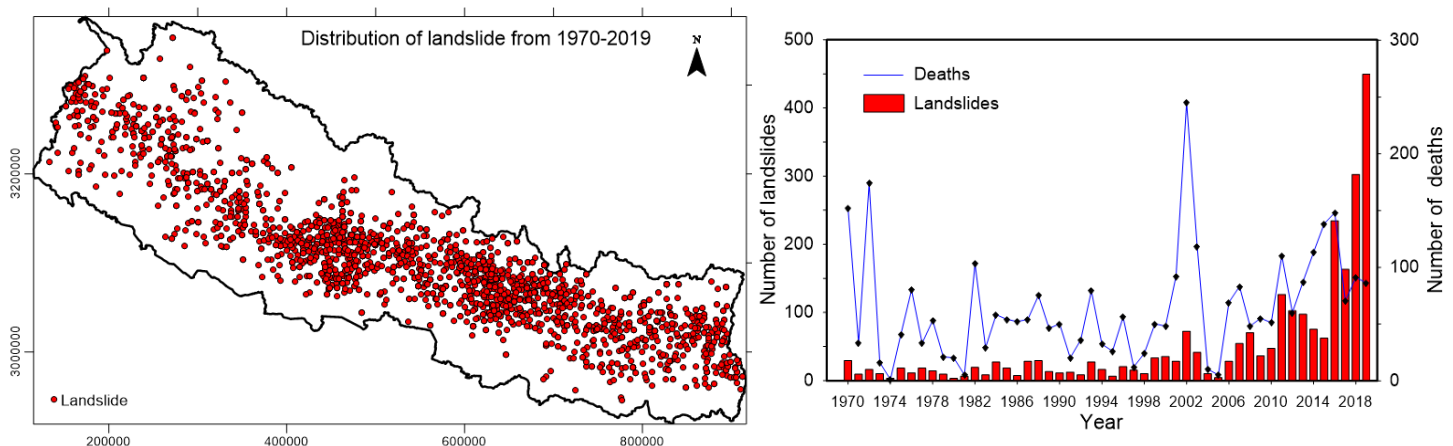
Data supplied by historical sources are a basic element for natural hazard assessments and early warning. Since no such data are available in any organizations in Nepal, it is very much important to collect these data. The aim of the study reported here is to compile and evaluate data regarding the temporal trends in landslide occurrence in Nepal in the period 1970–2019 and to apply these data in understanding the underlying causes of changes in landslide impacts through time.

Conceptualization and compilation

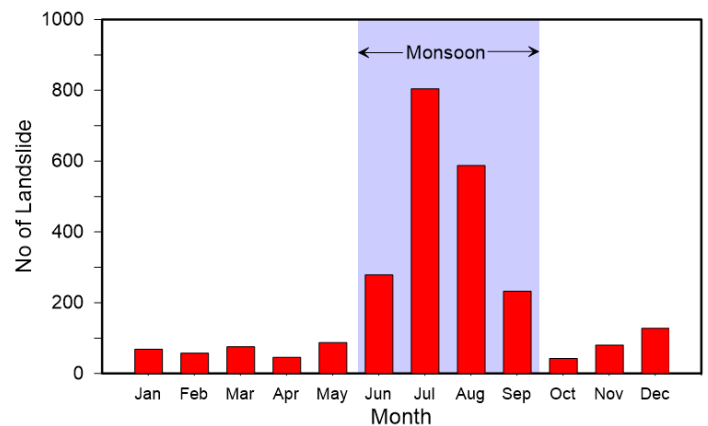
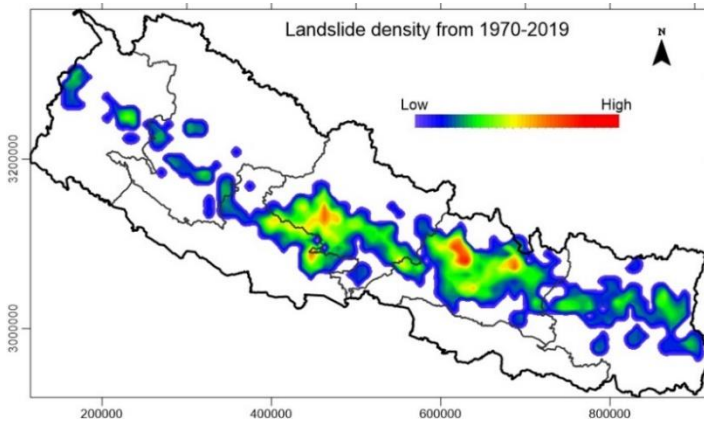
For this study we have compiled a database of landslide occurrences and fatalities in Nepal for the period 1970–2019. This database was constructed using a variety of sources, including newspaper reports, government datasets, NGO documents, scientific papers and, where reliable, personal accounts. The most consistently available data for a landslide events provides the date of occurrence, location, trigger mechanism, number of fatalities, number of injuries and the number of people missing. The catalogue compiled for all landslide events that are clearly triggered by rainfall conditions, the co-seismic landslide events have not been included in this catalogue.

Spatial and temporal distribution

In the complete dataset for the period 1970–2019, we have recorded a total of 2488 fatal landslides in Nepal, which caused 3212 recorded fatalities, representing an average of about 36 deaths per year. Further, it is speculated that the occurrence of fatal landslides in Nepal has increased in recent years.



The distribution of fatal landslides across Nepal is very uneven. The density is highest for the hilly terrains, especially in the central and eastern parts of the country. Frequent occurrences of landslide in Nepal are due to rugged terrain, fragile geology, intense rainfall and improper land-use planning.



This is not surprising given that most of the recorded landslides are strongly influenced by seasonal rainfall patterns. Reported landslides are particularly abundant between June and September. There is a marked peak in landslide occurrence in July, with slightly lower but still notable totals in June, August and September. During the dry months, however, the number of landslides is not negligible.

Remarks

Landslides cause a comparatively large numbers of fatalities in Nepal, most of the landslide deaths in Nepal being concentrated in the hilly districts of the Middle Himalayas. Our data shows that the impact of landslides is increasing with time, but is strongly controlled by variations in the strength of the monsoon. The monsoon conditions change the distribution of precipitation on a regional scale such that in years in which the region-wide monsoon is weak, the level of rainfall, and thus the occurrence of landslides is low.

Catalogue uncertainty

It is extremely challenging to compile a regional catalogue of landslide events due to limited data availability and heterogeneous reporting at this scale. Consequently, the landslide database is severely limited in its accuracy and completeness. Variations in landslide reporting frequency and accuracy represent the most challenging and unquantifiable component of this study.

Reference

MoHA, 2019. Nepal Disaster Report 2019, Government of Nepal, Ministry of Home Affairs, pp. 73.

FOR FURTHER INFORMATION:

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