

Giant Attabad landslide dammed the Hunza River, Gilgit-Baltistan, Pakistan

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Abstract

Landslides occur normally in mountainous areas in response to a wide variety of terrain conditions and triggering processes such as heavy precipitation, cloudbursts, earthquakes, floods and human activity. Continent-wise, Asia suffers the maximum damages/losses due to the landslides in general and the south Asian nations, in particular, are the worst sufferers. Further, among south Asian countries, Pakistan among the most affected countries.

In Pakistan, nearly 15 to 20 % of its territory is prone to various degrees of landslide hazard, frequently affecting the human life, livelihood, livestock, infrastructures and natural resources. Landslides are spread over the north and northwestern part of Pakistan particularly in KP and Gilgit-Baltistan (GB). The most sensitive areas are Himalaya-Karakoram-Hindu Kush Ranges.

Attabad is a remote village in Gilgit-Baltistan situated on the right bank of Hunza River at a ground distance of almost 125 km from Gilgit city. The village constitutes over 100 settlements with approximate population of 800 individuals. The 4th January, 2010, landslide at Attabad was a complex failure on a slope with known stability issues, which involved a massive movement of over 50 Mm³ of rocks and that created a blockade on the Hunza River. Previous field work at the site, by the geologists from FOCUS Humanitarian Assistance, Pakistan, allowed evacuation of the potentially unstable area. One mudflow which travelled downstream for about 1.5 km, latter hit a small settlement close to the river at Sarat, killing 19 people. In the Hunza River, closer to the study area, two historical landslide dams have been recorded, though with limited detail. One landslide dam occurred in 1874 in Salamanabad and another was reported further upstream in between Gulmit and Shishkat in 1958. However, the field evidence for lake forming behind a landslide dam indicates a much larger feature than any event reported in historical document.

The natural damming of rivers by landslides is a significant hazard in the seismically active mountainous terrain of north and north-western part of Pakistan. There is increased awareness that river-blocking landslides have been more widespread than the documentary records suggest and that Quaternary sediments traditionally assumed to be fluvial terraces may need to be re-interpreted. The recognition of palaeo-landslides capable of creating very large lake volumes necessitates reappraisal of hazard assessment. Therefore, geological and geomorphologic methods to identify landslide hazard potential are especially important in a region experiencing rapid urban development, wide spread land use change and the construction of water and energy resource projects on major rivers. New GIS and Remote Sensing techniques based on the interpretation of aerial photographs, satellite imagery, digital elevation models and development of spatial database and landslide modeling are enabling more detail about past and present landslide distributions to be generated. The need for vigilance in assessing seismically slope in stability hazards is apparent.