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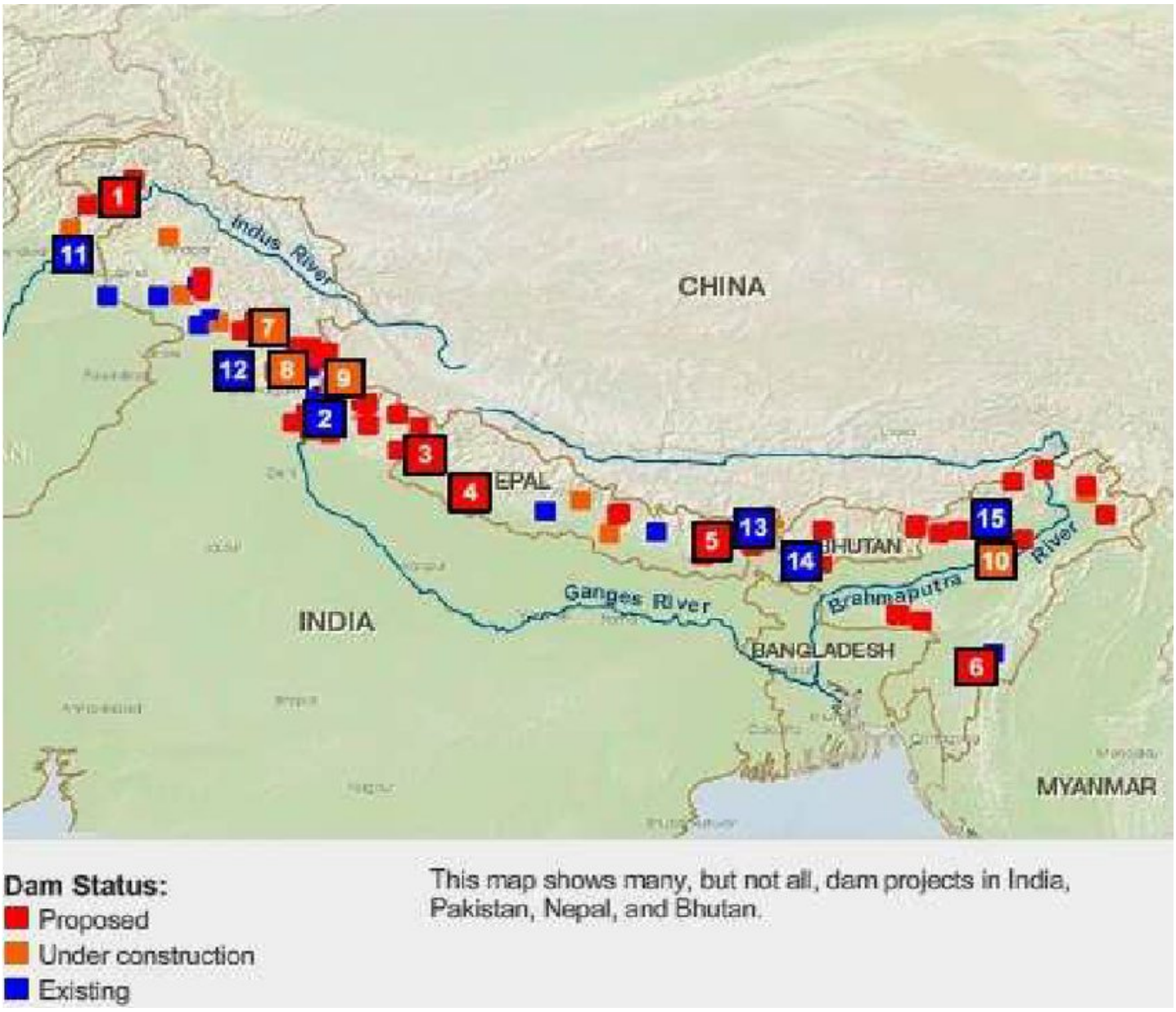
One in four hydropower project sites along the Himalayan Rivers are likely to face severe damage from earthquake-triggered landslides, according to a research. #UttarakhandDisaster #earthquake @nivedita_Him @yamunajiye @Upadhyay_Cavita @Indian_Rivers @hridayeshjoshi



The research was conducted by researchers from the University of Potsdam, Germany, who compiled damages to 41 hydropower projects after Nepal's 2015 #earthquake, and used that data to estimate earthquake-triggered damages to projects in other parts of #Himalayas. @yamunajiye

The model developed by the research team took into account the combined effect of ground shaking (Peak Ground acceleration) & river steepness (Mχ) and was applied to projects in Indian, Nepalese and Bhutanese #Himalayas. @yamunajiye @hridayeshjoshi @nivedita_Him @Upadhyay_Cavita

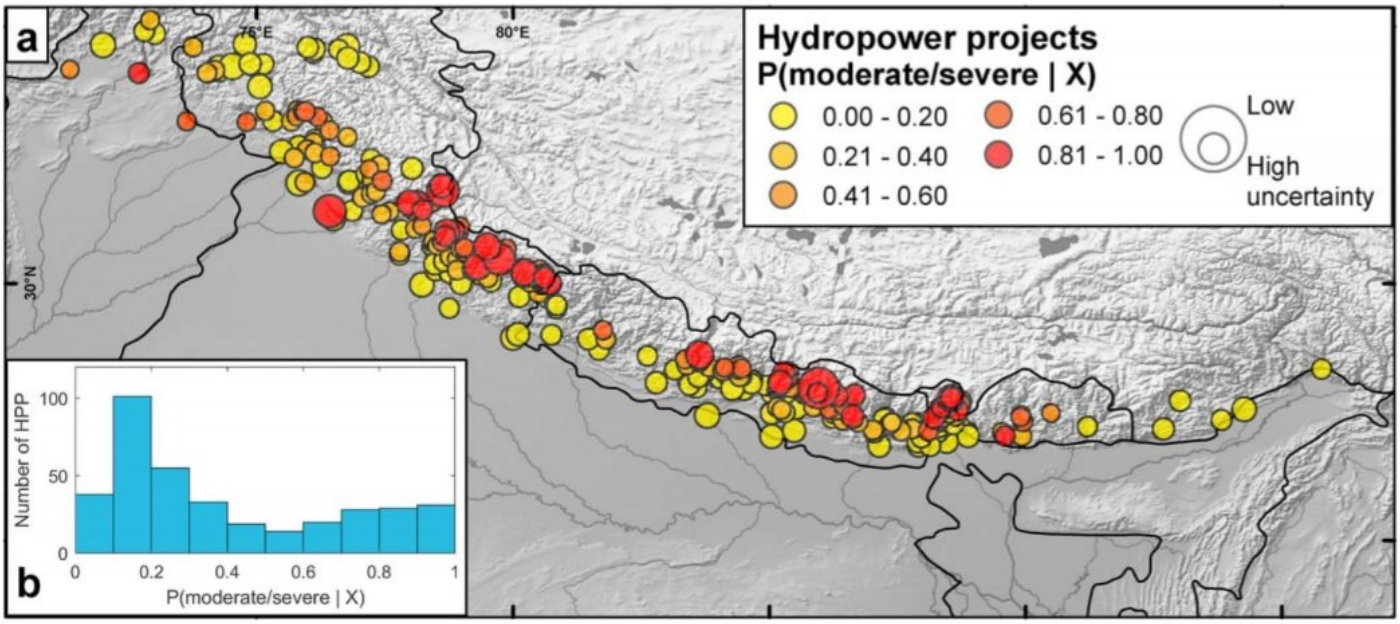


Figure 3. Mean posterior predicted damage of Himalayan hydropower project (HPP) as a function of modeled PGA_m derived from the Global Seismic Hazard Analysis Program and M_χ. (a) Spatial distribution of hydropower projects and mean predicted damages. The mean ranges between 0 and 1, where 0 refers to none/low damage and 1 refers to moderate/severe damage. The bubble size indicates the uncertainty about the mean predicted damage. The bubble size is scaled to the standard deviations of the posterior predictive distributions that vary between 0.1 and 0.5. The large bubble sizes indicate low standard deviations (low uncertainty) and vice versa. (b) Frequency distribution of mean posterior predictions of moderate/severe damage of Himalayan HPPs.

The findings indicate that more than 10% of Himalayan rivers may be unsuitable for hydropower infrastructure given high probabilities of high co-seismic damages and ~25% of Hydropower projects are located along these reaches.
#UttarakhandDisaster
#earthquake

The study points to an urgent need to re-evaluate hydropower development in the Himalayas. The model used in the study would also help in making a more accurate assessment of risks at locations for potential hydropower plants.
#UttarakhandDisaster

Nepal lost at least 20% of it's hydropower capacity in the 2015 Gorkha #earthquake which killed nearly 9000 people and damaged more than 31 hydropower projects. It was not the ground shaking that damaged these HPPs. Landslides triggered by earthquake caused maximum losses.

These hydropower projects survived the earthquake but got wiped out by the debris highlighting that sites located along steep rivers with towering sidewalls were prone to becoming unstable during strong seismic ground shaking.

The study calls for an urgent need to assess the vulnerability of hydropower infrastructure to the risk of nature's extreme events.

To assess individual HPP sites, the results need to be refined by detailed geomorphological seismic hazard appraisals, as well as risk analyses that include site- specific economic considerations such as HPP life-cycle cost assessments.
@yamunajiye

HPP hazard assessment needs to consider the seismic and geomorphic setting conjunctively. To this end, this knowledge will be required to mitigate the impacts of #earthquake on water - energy security in the future.
#UttarakhandDisaster #Tapovan