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Mapping Geohazards in the Churia region of Nepal: An application of remote sensing and geographic information systems to quantify change

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Degradation in the Churia region of Nepal related to landslides, unregulated gravel mining and deforestation are believed to be increasing exponentially in frequency and magnitude in recent decades. Little work has been done in Bara and Rautahat districts to quantify these geohazards and correlate with changes in landuse/deforestation/urbanization in the study area. Other objectives of this project include quantifying the extent monsoon flooding exacerbates the Churia degradation process, quantifying the extent gravel mining exacerbates the degradation process and generating a landslide hazard risk map. Remote Sensing and GIS provided accurate, efficient and cost-effective tools to quantify the degradation of these geohazards using optical imagery, NDVI analysis, unsupervised landuse classifications, lineament detection, landslide detection, temporal change, field investigations, gravel and mining excavation data, historic precipitation data and rock descriptions. GIS and remote sensing analysis spanned 40 years (1976-2016) with field work taking place during summer 2014. The research found that while gravel mining has decreased in recent years, the damage has been done and continues (weakened infrastructure, barren and wider river beds and increased river velocities). Other findings include, deforestation is increasing 1.03% annually, the total area impacted by landslides continues to increase and 70% of the Siwalik has moderate to high risk for landslides. The algorithm modified to detect landslide scars over estimates scars but provides an integral starting point for efficiently detecting landslide scars. Improved understanding of the linkages between these dynamic geohazards and the human dimension are vital for policy makers to develop sound geohazard mitigation.

Biography

Terri Bannister has completed her MSc in Geology from the University of Louisiana at Lafayette and undergraduate studies specializing in Geomatics at the University of Waterloo, Ontario, Canada. She is a Research Associate with the University of Louisiana at Lafayette at the USGS Wetland and Aquatic Research Center. She has seven papers published to her credit. Her research interests focus on remote sensing and GIS as they can be applied to geology. She has been a Board Member of the Lafayette Geological Society for three years.

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