



Assessment of vulnerability in a rapid urbanising ecosensitive Terai region, India

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Urbanisation is subjected to economic, social and political forces along with the geomorphology of the metropolis. The geomorphology is often neglected in response to the constant population pressure as the city expands to accommodate the urban growth.

India post-independence has undergone massive uncontrolled unplanned development neglecting the ecology and geomorphology. Such developmental pressure has led to environmental crisis such as increased occurrences of landslides and flash floods in several Eco sensitive areas of the country. The objective of this study is to introduce a Vulnerability Index based on urbanisation and ecological parameters.

The study takes up one such Eco sensitive zone as a case study in India at the foothills of Himalayas in West Bengal where the Siliguri metropolis is still in its growing phase. A similar methodology may be adopted for similar other growth nodes. The unplanned expansion has led to massive deforestation. A temporal analysis of the changing pattern of land cover within 1980 to 2019 is mapped using Shannon Entropy. Since the measuring landscape metrics are not enough in addition considering the hilly terrain the DEM data analysis (SRTM 30 m resolution Digital Elevation Model;2011) which includes measurement of the slope stability, altimetry and slope class has been carried out to understand the pressure the land can sustain. Lying in the foothills the vulnerability to floods and flash floods are always predominant but yet the soil permeability can be a determinant to the amount of risk possessed. The groundwater mapping along with precipitation data is used to calculate the Soil Permeability Index. It also falls under the influence zone of the Teesta River Barrage making a detailed study of the watershed a necessity. A weighted overlay of all the analysis done is proposed to measure the Vulnerability Index of the region. The final outcome would indicate the most vulnerable areas in the already developed areas as well the surrounding considering the future scope of development.

Keywords: Vulnerability Index, Shannon Entropy, DEM, Soil Permeability Index, Weighted Overlay