

Pluvial Flooding Hazard Vulnerability Assessment in an Urban Environment: a Case Study of Margao, Goa

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SUMMARY

Floods are one of the natural disasters increasingly turning severe, unpredictable and causing damage to economy, infrastructure and lives of citizens. Pluvial floods occur when surface runoff generated from rainfall is not able to drain through the drainage network effectively and results in overland flow and ponding in urban areas. The frequency of intense rainfall events is increasing due to climate change. The rapid urban development of Indian cities and intense rainfall events are increasing pluvial floods vulnerability of urban areas. Pluvial flooding is become a major challenge in many Indian cities especially during monsoon seasons. Thus, this study presents a methodology to assess the pluvial flooding hazard and vulnerability of Margao city in Goa, India using high resolution geospatial datasets and 2D overland flow modelling. LiDAR derived Digital Elevation Model (DEM) and Digital Surface Model (DSM) with 1 meter GSD, an orthomosaic with 25cm GSD along with rainfall datasets collected from India Meteorological Department (IMD) and Global Precipitation Measurement (GPM) mission were used as primary datasets. The model simulation results validated using the recent extreme rainfall event took place during the pluvial flooding event in July 2022. The Index of Agreement (W), and Pearson's product-moment correlation coefficient (r) of simulation results are found above 0.9 when compared with the observed values. Thus, model results are found to be satisfactory. The simulation results are used to identify the flooded prone areas to estimate the population under risk. This study results may be helpful to local civic bodies for better management and mitigation of pluvial floods in near future.

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