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GIS and a remote sensing based approach for urban flood-plain mapping for the Tapi catchment, India

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Abstract In India, floods typically occur during the monsoon season due to heavy tropical storm downpours and unregulated urban development. The floods during August 2006 in Tapi catchment caused great damage to people and property, resulting in 300 people being killed and US$ 4.5 billion worth of property damage. In this paper, geospatial technologies such as remote sensing, GIS, and GPS have been utilised to prepare urban flood hazard maps and to handle entity-specific query and analysis. The research methodology employed is based on statistical probabilities of flood frequency, maximum discharge carrying capacity at river cross-section, mapping of inhabited areas based on high-resolution images, and terrain mapping using global position system. It is estimated that for a mean flood height of 10 m (35-year return period), more than 80% of land in the west and southwest zone will be under flood against 40% in the central, 33% in the northern and 15% in the eastern zones.

Key words flood; hazard mapping; hydraulic remote sensing; Tapi River, India