Assessing Flood Vulnerability and Maladaptive Effects Associated with Embankment-Based Flood Control Infrastructure : Hydrogeomorphic and Socioeconomic Analysis Kosi River Embankment Region, Bihar, India

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Introduction

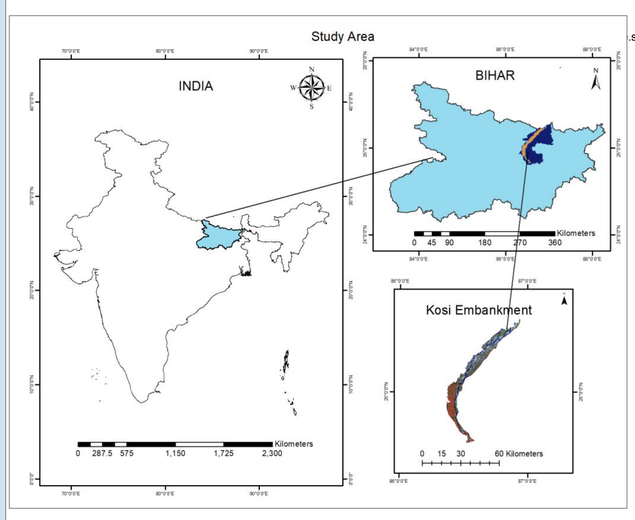
- Kosi River has changed its course westerly and laterally moved nearly 150 kilometers.
- Kosi floods of 1953, embankments were constructed from 1954 to 1956 to protect the region from future devastating floods and channelize its flow between the two decks.
- Nearly 35 lakh people were impacted in 2008 flood led by embankment breach
- Around 1 million people are living inside the embankment region

https://ponce.sdsu.edu/kosi_river_india.html

Maladaptive Effects Associated with Embankment-Based Flood Control Infrastructure

Study Area

Kosi River embankment, located within Supaul and Saharsa districts of Bihar, between 25°20’20’’ North and 136 26°20’40’’ North latitude and 86°0′0″ E and 87°0’0’’ East longitude. It covers 283 villages within the two districts 137 (Supaul and Saharsa) with a geographical area of 899 km



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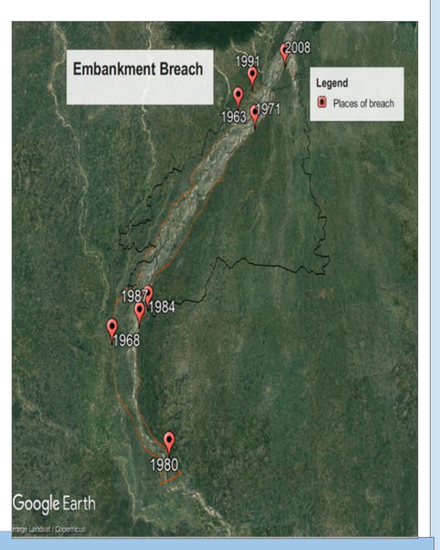
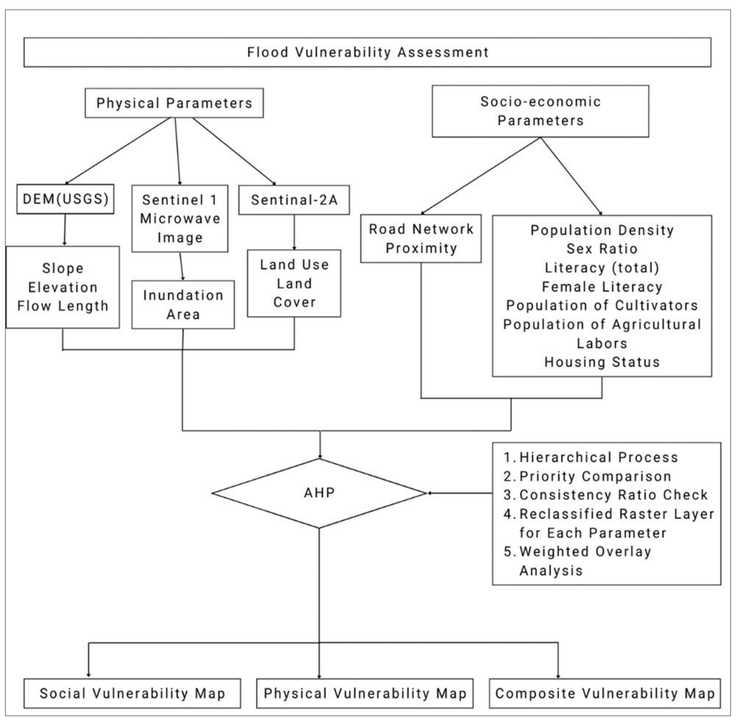
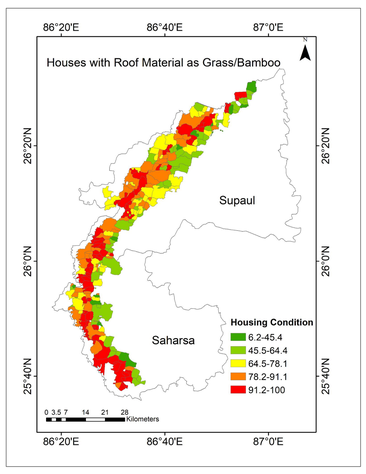


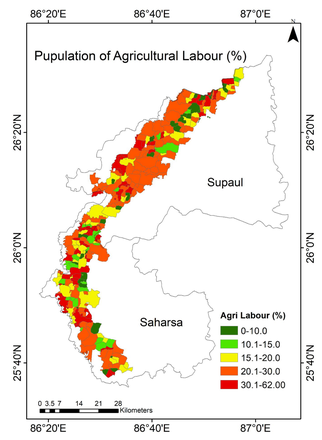
Methodology and Data

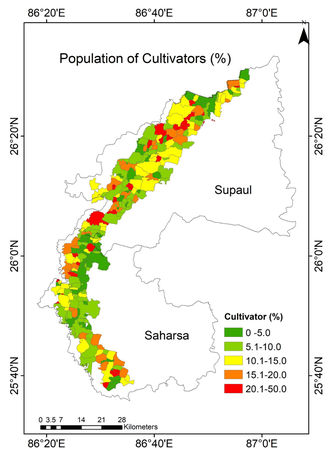


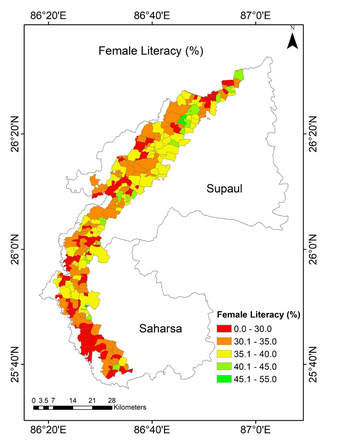
Source	Parameters	Data type	Scale	Acquisition Date
DEM (SRTM)	Slope	Grid	30 x 30	April 2015
	Elevation	Grid	30 x 30	
	Flow length	Grid	30 x 30	
Sentinel 1 image	Flood Inundation area	Point	10x10	2020 (May and July)
Land type	LULC	Grid	30 x 30	2020
Socio-economic and Demographic data	Census parameters	Grid	Village Level	2011
Road Network	PMGSY	Lines	30 x 30	2022

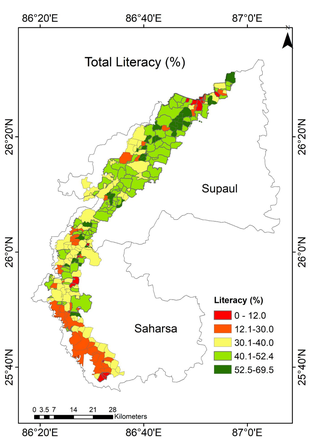
Results

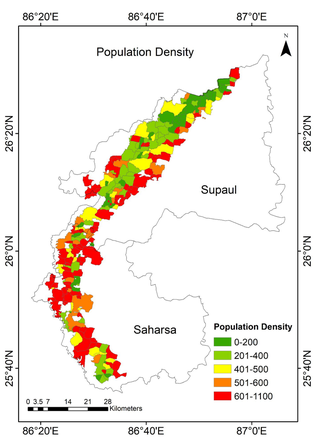


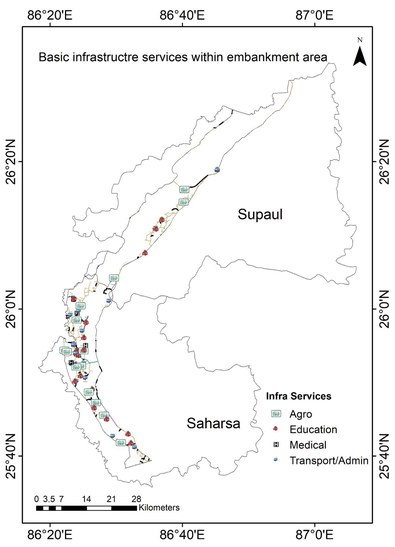


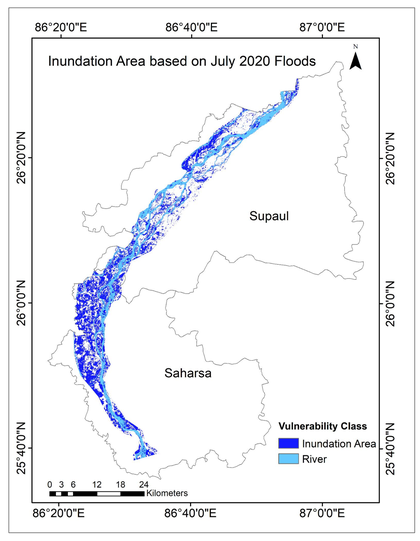


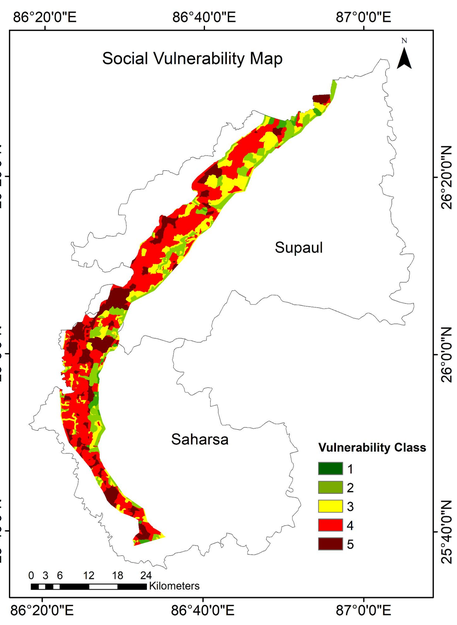


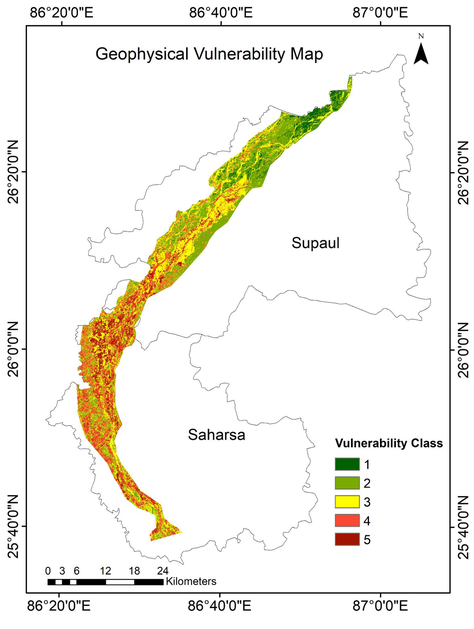












Conclusions

- Nearly one-third of the population was high and very highly vulnerable to flooding
- The socioeconomic vulnerability key findings show that more than 60% of the area within the embankment is under 437 high and very high flood vulnerability
- Field-level qualitative research is needed to assess the 457 socioeconomic effects of flood control infrastructure and guidelines for essential infrastructure services in these 458 regions designed to operate in flood situations

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