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Increased Socio-economic Vulnerability in the Floodplains of Brahmaputra Basin, India

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Floods are a recurrent natural phenomenon in the Brahmaputra basin, India's one of the major river basin. The government employed flood mitigation strategies that have mainly been focused on structural measures that involve the construction of dams, embankments, dykes, and anti-erosion structures. Consequently, the economic investments in Flood Protection Structures (FPS) have significantly increased over time. However, despite significant FPS investments, the socio-economic losses due to floods are reportedly intensifying. In this study on coupled human flood systems, our aim is to resolve this paradox through a stepwise methodology. Firstly, land use land cover (LULC) changes are investigated before and after the completion of 74 FPS units, constructed over the past two decades. The proximity to settlement used as a proxy measure of socio-economic characteristics shows a consistent land-use growth pattern. Secondly, a socio-vulnerability index (SoVI) is developed based on the population density, distance from the river, vegetation, soil type, and LULC changes. Furthermore, SoVI maps are developed by integrating the weighted maps of the above socio-economic factors. A significant increase in the socio-economic vulnerability is observed in the floodplains of Brahmaputra, possibly due to the provision of a false sense of security. This study, hence, establishes a causal relationship between the increase in social vulnerability index and the increased FPS investments. These results are expected to help the stakeholders to identify the critical characteristics that escalate the social vulnerability in the flood plains and thereby to strategize the investments in FPS.