

Preface

Frequent cyclones in the Bay of Bengal cause substantial damage to property and human lives, necessitating regular vulnerability assessments to mitigate their impact. Odisha, a coastal state in India, has faced ten significant cyclones of varying intensities in the last decade, rendering it highly vulnerable within the nation. The study uses geospatial analysis to assess the vulnerability of tropical cyclone Yaas in the Balasore district of Odisha for the year 2021. A total of 16 parameters were used for the assessment, where six physical parameters were used to investigate the influence of intensification of the cyclone, six social parameters to examine the cyclone's impact on the population, and the remaining three parameters for mitigation purposes. The weight of these parameters was determined using the fuzzy analytical hierarchical process (FAHP) method, and weighted overlay analysis was performed to generate the physical vulnerability map, which has high coverage of 28.34%, moderate coverage of 25.15%, and low coverage of 46.51%, social vulnerability map which has high coverage of 36.67%, moderate coverage of 54.79% and low coverage of 8.54% and mitigation capacity map which has high coverage of 33.40%, moderate coverage of 40.69% and low coverage of 25.91%. Network analysis mapped The best route from the outlet to the cyclone shelter. The results indicate that the southwestern and eastern regions of the area are at a greater risk to cyclones with an area coverage of 11.55%. In contrast, the northeastern and southern regions exhibit the least risk covering around 2.79%.

Keywords: cyclone, vulnerability, mitigation capacity, fuzzy analytical hierarchy process, geospatial technology