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Framework For Evaluating The Physical Infrastructure Vulnerability Due To Relative Sea-Level Rise In Coastal Districts Of Kerala: Case Of Alappuzha

Scientific assumptions of climate change-induced sea-level rise seems so convincing and recent projection for sea-level rise by 2050 (Climate Central, October 2019) has estimated 3 times that of the past projections (IPCC). These projections alone are insufficient for planning purposes or to spatially address its impacts. The best methodology would be through a framework that incorporates risk assessment through the estimated probabilities of various sea level rise impacts. Here the study intends to assess the physical infrastructure vulnerability to RSLR using a composite index 'CHVI' (which is a blend of CVI & HVI) and with accessible secondary data which were tried in Alappuzha District to know the most vulnerable ULB and to estimate the efficiency of framework. An approach to evaluate the decadal RSLR was fabricated using shoreline delineation, highest mean elevation, and relative sea-level trend to comprehend the decadal risk areas of RSLR concerning the 2050 projection. Projected decadal RSLR risk to population and land area shows, 6.9%, 12.2%, 22.7% population and 7%, 12%, and 23% land area at risk in 2030, 2040, and 2050 respectively. Damage loss was calculated for the physical infrastructure to decadal RLSR with the current estimation of Indian rupee to reveal the extent/severity of the damages that could be inflicted due to RSLR. The damage loss from RSLR in the year 2050 is estimated to be 2.3 times that of the 2018,2019 Kerala Flood CMDRF. Overall, we conclude that impending RSLR impacts could enormously influence the physical infrastructure and if we combine the other sectors like environment, social, economic, health, etc. the impacts and damage could be a lot bigger. The need to plan and prepare for these impacts is important to reduce the loss and give a head start to the preparation/mitigation process for the risk areas before its past the point of no return. The framework developed assists with evaluating the vulnerability of physical infrastructure to RSLR.

Keywords: CHVI: Coastal Habitat Vulnerability Index, RLSR: Relative sea-level rise, CVI: Coastal Vulnerability Index, HVI: Habitat Vulnerability index, Disaster Preparedness, Coastal Infrastructure vulnerability,