

## **Vulnerability assessment of the coastal zone of Sri Lanka to sea-level rise scenario; A GIS based study**

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Coastal regions are impressionable to human-driven climatic change scenario and it exacerbates the coastal hazards and associated risks. This study therefore aimed at identifying and assessing the coastal vulnerability of Sri Lanka (2020) over the potential sea-level rise and storm surges. GIS-based study was carried out to identify the highly vulnerable coastal areas by using two criteria; coastal geomorphological slope and type of the coastal ecosystems (barrier effect). Google earth pro satellite imagery data with 750m eye altitude were used to extract the shoreline and contour lines at 0m, 2m, and 4m elevations. The image processing with ArcMap 10.3 coupled with field validation and community interviews were carried out subsequently. According to the results, the coastal areas without effective geographical barriers and with low elevation (angle < 5°) were identified as ‘highly vulnerable areas’. In terms of geomorphological slope, 81% of the Sri Lankan coast, particularly in northern and eastern coasts, is highly vulnerable to sea level rise scenario. Only 40% is highly vulnerable, especially southern and western coastal areas when barrier effect was considered. Overall, 1/3 of the Sri Lankan coast is at risk, when future sea level rise (30 cm by 2050: source IPCC) is considered. Some lagoons and estuaries where mangroves were removed, bays, river delta, coastal cities, roads, fishery harbours, industrial regions and ports were identified as places highly vulnerable for the sea level rise. Coastal inhabitants stated that many coastal changes have taken place in recent decades. Construction of mixed barrier models along with the coastal conservation is suggested as the most pragmatic solution for highly vulnerable areas in Sri Lanka.

**Key words:** *Climate change, geomorphological slope, coastal ecosystems, sea level rise, coastal protection*

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