

Developing a Coastal Vulnerability Index (CVI) for the North Western coastal belt of Sri Lanka

P.G.R.N.I. Pussella^{1*}, J. Gunatilake², K.R.M.U. Bandara¹, J.A.S. Jayakody¹ and T.L. Dammalage¹

¹*Faculty of Geomatics, Sabaragamuwa University of Sri Lanka.*

²*Department of Geology, Faculty of Science, University of Peradeniya, Sri Lanka.*

The climatic conditions in the world have changed dramatically and it has resulted in some unsuitable conditions for the well existence of the human life and the properties. These climatic changes have badly impacted, specially, the general public and natural eco systems of the coastal areas with low elevations. The predictions on the climatic changes reveal that the impact is severe to the countries such as Sri Lanka, Maldives India etc.

The main objective of the study was to identify, analyze and map the physical vulnerability of the coastal public of the North Western coastal belt, to the impacts of climatic changes. In this study, 10 physical variables; coastal slope, barrier type, rate of shoreline erosion, land use pattern, geomorphology, relative sea level change, beach type, dune height, mean tidal range and mean wave height, were considered to define the vulnerability. Each variable was evaluated for weighted scoring and it was categorized into classes from 1 to 5 (1 for Low Vulnerability and 5 for Very High Vulnerability) based on the relative vulnerability scale. The influences were defined using the rate of erosion and the knowledge of expertise. The rate of erosion was analyzed using a number of satellite images and the DSAS tools. Further, a semi structured questionnaire was used to get the knowledge of the experts and the collected data were analyzed by Pair-Wise Comparison Analysis. The weight values were evaluated through the AHP method.

The Vulnerability Model was prepared using the ArcGIS software. The Multi Attribute Value Theory (MAVT) aggregation function was used to combine the relative importance and their scales to determine the Coastal Vulnerability Index (CVI). The results reveal that the coastal public of the North Western coastal belt is highly vulnerable to the climatic changes and therefore it is recommended for the administration to take necessary actions to reduce the vulnerability of the coastal public of the North Western coastal belt in a proper manner. Further, the hot spots and the weaknesses of the present coastal barriers were identified.

Keywords: CVI, vulnerability, coast, GIS

*Corresponding author e-mail: pgrnip@sab.ac.lk