

Analysis of Coastal Erosion Trends Based on Existing Physical Conditions Along The Southwest Coastal Zone of Sri Lanka

A.K. Wickramasooriya

Department of Physical Sciences, South Eastern University of Sri Lanka.

Corresponding Author: awickramasooriya@yahoo.com

Coastal erosion is a significant issue that can be observed along the Southwest and Southern coasts. There are places within this coastal segment which are eroded more than 30 to 50 meters within last two to three decades. Many natural influences as well as human activities are responsible for acceleration of such significant coastal erosion in this region. Main objective of this study is to demarcate coastal erosion trends in the study area and to clarify whether there is any relationship between available surface materials, coastal accretion and coastal energy and coastal erosion trends.

It has been identified that hard rocks, moderately weathered rocks, weathered overburden, lateritic caps, beach rock (sandstone), limestone, coastal deposits and protection structures are the main surface materials available along the coast from Kalutara to Matara. There are differences in physical and chemical characteristics of these materials. Therefore, surface material has been identified as one of the major factors that determine the rate of coastal erosion. These materials were ranked on the basis of the degree of resistance to coastal erosion using pair-wise comparison method and introduced the surface material index map. According to the introduced ranking system, hard rocks have the lowest rank while coastal deposits and beach sand has the highest rank. Coastal energy index map was introduced using energy zones identified by the Coast Conservation Department. Locations belong to perennially low energy zone were assigned the lowest rank while Southwest monsoon dominant areas were assigned the highest rank. Places having high rate of accretion, tend to negatively impact on coastal erosion. Coastal accretion index map was introduced using accretion rates introduced by the Coast Conservation Department in the coastal zone management plan of 1981. These maps were digitized and were converted to raster format for the convenience of handling spatial analysis techniques.

Available surface materials, coastal energy and coastal accretion do not contribute to coastal erosion in similar manner. Therefore, weightage values were assigned for each factor using Multi Criteria Decision Analysis Method (MCDAM) based on their contribution to coastal erosion. After considering both weightage values assigned for each factor and ranks within factors, Coastal Erosion Sensitivity Indices (CESI) were introduced. Finally a coastal erosion sensitivity map was introduced using overlay analysis method. The study area was classified into six different coastal erosion sensitive classes. According to the map nearly 15% of the study area has high coastal erosion sensitivity while about 20% is low sensitive to erosion. With the comparison of coastline changes within the last two decades in the Southwest coast of Sri Lanka and the erosion sensitivity map introduced in this study, it is noted that there is a

direct relationship between the available surface materials, wave energy and coastal recession on coastal erosion.

Key words: Energy, Weightage values