

# Identification of Coastal Vulnerability to Sea Level Rise. A Tool for Decision-Making

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## Abstract

Studies carried out in the southern coast Caspian sea reveal that some pairs of coastal zone has been severely and increasingly impacted by sea level rise in the last 25 years. Therefore this work can be a start point that supports the coastal zone management program of the southern coast of Caspian Sea through the identification, assessment and classification of the coastal zone. This is achieved by using a geographic information system in order to create a so-called composite vulnerability index (CVI); the CVI includes 5 variables describing two dimensions (Natural and Human-induced dimensions). By means of GIS (Arc Map 9) these variables are classified, weighted and combined to yield a single vulnerability indicator or CVI. The vulnerability index describes 4 classes, from low to very high vulnerability.

The key results of this study are then presented in the three maps, showing the Natural vulnerability, Human-induced vulnerability and the total (=composite) vulnerability for Gilan district. This index now provides a reliable, easily applicable tool for the measurement and description of the coastal susceptibility to sea level rise.

## Key words

Caspian Sea - Coastal vulnerability - Sea level rise - Geographic information system - Coastal zone management.

## Introduction

The model depicted below aims at summarizing the fundamental variables for vulnerability risk evaluation to sea level rise on coastal areas. This evaluation requires the knowledge of the interaction of a high number of natural and human-induced variables. The data matching between the natural and human-induced variables allows the definition in an integrated manner of the environment situation and thus the fundamental basis for the definition of strategies and environmental management tools for coastal area. There are divers methods of coastal zones vulnerability assessment and most of them agree on the following points: (1) the costal zone doesn't behave homogeneously (2) it is necessary to integrate several different kinds of information (3) the results have to provide a valid instrument for proper coastal zone planning and management. The need to easily integrate various complex data sets has given rise to development of numerous indices in order to assess the vulnerability of areas to threats, and presenting information in a simple format (Cooper and McLaughlin, 1998). The one of these methods is CVI. CVI or coastal vulnerability index could be defined as a means to combine a number of separate variables to create a single indicator. In this method, variable may be reflecting natural and human-induced characteristic that contribute to coastal vulnerability to natural hazards (sea level rise).