

## Spatial Analysis of the Socio-Environmental Vulnerability in Medium-Sized Cities: Case Study of Municipality of Caraguatatuba SP-Brazil

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**Abstract :** The environmental vulnerability studies are essential for priority actions to the reduction of disasters risk. The aim of this study is to analyze the socio-environmental vulnerability obtained through a Census survey, followed by both a statistical analysis (PCA/SPSS/IBM) and a spatial analysis by GIS (ArcGis/ESRI), taking as a case study the Municipality of Caraguatatuba-SP, Brazil. In the municipal development plan analysis the emphasis was given to the Special Zone of Social Interest (ZEIS), the Urban Expansion Zone (ZEU) and the Environmental Protection Zone (ZPA). For the mapping of the social and environmental vulnerabilities of the study area the exposure of people (criticality) and of the place (support capacity) facing disaster risk were obtained from the 2010 Census from the Brazilian Institute of Geography and Statistics (IBGE). Considering the criticality, the variables of greater influence were related to literate persons responsible for the household and literate persons with 5 or more years of age; persons with 60 years or more of age and income of the person responsible for the household. In the Support Capacity analysis, the predominant influence was on the good household infrastructure in districts with low population density and also the presence of neighborhoods with little urban infrastructure and inadequate housing. The results of the comparative analysis show that the areas with high and very high vulnerability classes cover the classes of the ZEIS and the ZPA, whose zoning includes: Areas occupied by low-income population, presence of children and young people, irregular occupations and land suitable to urbanization but underutilized. The presence of zones of urban sprawl (ZEU) in areas of high to very high socio-environmental vulnerability reflects the inadequate use of the urban land in relation to the spatial distribution of the population and the territorial infrastructure, which favors the increase of disaster risk. It can be concluded that the study allowed observing the convergence between the vulnerability analysis and the classified areas in urban zoning. The occupation of areas unsuitable for housing due to its characteristics of risk was confirmed, thus concluding that the methodologies applied are agile instruments to subsidize actions to the reduction disasters risk.

**Keywords :** socio-environmental vulnerability, urban zoning, reduction disasters risk, methodologies

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