Assessment of Social Vulnerability of Urban Population to Floods – a Case Study of Mumbai

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Abstract : This study aims at proposing an indicator-based framework for assessing social vulnerability of any coastal megacity to floods. The final set of indicators of social vulnerability are chosen from a set of feasible and available indicators which are prepared using a Geographic Information System (GIS) framework on a smaller scale considering 1-km grid cell to provide an insight into the spatial variability of vulnerability. The optimal weight for each individual indicator is assigned using data envelopment analysis (DEA) as it avoids subjective weights and improves the confidence on the results obtained. In order to de-correlate and reduce the dimension of multivariate data, principal component analysis (PCA) has been applied. The proposed methodology is demonstrated on twenty four wards of Mumbai under the jurisdiction of Municipal Corporation of Greater Mumbai (MCGM). This framework of vulnerability assessment is not limited to the present study area, and may be applied to other urban damage centers.

Keywords : urban floods, vulnerability, data envelopment analysis, principal component analysis

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020