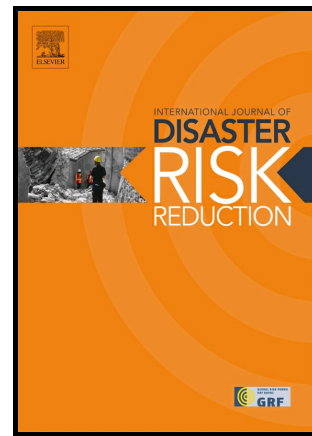


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# A spatially explicit method for identification of vulnerable hotspots of Odisha, India from potential cyclones

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## Abstract

Anticipating future vulnerability to natural hazards requires assessment of present scenario of risk. In this context, identification of susceptible factors and its spatial mapping is essential for evaluation of vulnerable hotspots. The present study assesses societal elements (socioeconomic and infrastructural) of vulnerability from potential cyclones for administrative blocks (units) of Odisha. Principal component analysis was used for reduction of a large number of variables into few indicative factors of vulnerability. Factor scores were mapped, and proximity analysis ascertains highly vulnerable blocks located in contiguity to coast. Additionally, spatial analysis was done using Moran's  $I$  and Getis-Ord  $G_i^*$  to identify hotspots of vulnerability. Results reveal a substantial spatial variation in the distribution of vulnerable factors over space. The exploratory spatial analysis shown in this paper is an attempt to study societal attributes of vulnerability at a block level administrative unit in the Indian context. Further, this method could be used by local authorities to identify existing vulnerable blocks and prepare them to cope with potential hazard threats.

**Keywords:** Cyclones, hotspot, indices, principal component analysis, spatial mapping, vulnerability

## 1. Introduction

Extreme climatic events are threatening coastal regions around the world, thereby increasing the vulnerability of these areas. Disasters occur when the population at risk comes in harm's way. In various vulnerability studies, disasters are considered as a product of social differences and hazard events [5, 26, 41, 56, 72]. They are dependent on exposure to hazard as well as social characteristics of that place [3, 16, 26]. A significant challenge for

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