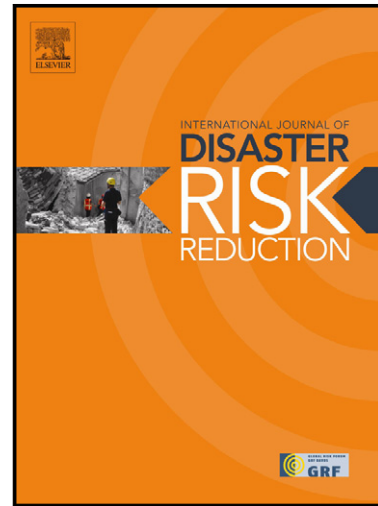


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Urban adaptation planning and climate-related disasters: An integrated assessment of public infrastructure serving as temporary shelter during river floods in Colombia

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ABSTRACT

Emergency reports prove that extreme weather events are overcoming disaster management systems in vulnerable cities. While a number of studies focus on comprehensive and long-term coping strategies to deal with disasters, only few have addressed the challenge of temporary shelter in acute crisis intervention. Experiences in developing countries have shown that local governments have improvised emergency accommodation in sport halls, schools, and similar infrastructure identified as Collective Centres. The aim of this paper is hence to develop and apply an integrated assessment of public infrastructure serving as temporary shelter in case of extreme weather events. We chose the case study of Chía in Colombia in 2011, where erratic rainfalls and river floods led to property loss and damages and the designation of collective centres. We propose a Collective-Centre Suitability Index to evaluate the appropriateness of public infrastructure to serve as transitional shelter through a ranking-based assessment of (i) compliance of humanitarian shelter standards; (ii) the analysis of geographical risks and; (iii) the accessibility of selected infrastructure. Results for the case study suggested compliance of minimum transitional shelter standards on most of assessed locations and infrastructure. Scenarios of flood-risk recurrence intervals indicated higher exposure from the urbanized area along the Frío River. Suitability of Collective Centres near the Frío River was comparably higher than the evaluated shelter near the Bogotá River. The proposed assessment offers a flexible screening tool for transitional shelter and local adaptation planning considering urban changing settings.

Key words: collective centres, suitability analysis, adaptation planning, transitional shelter, disaster management

1. Introduction

Rising and extensive impacts on urban systems associated with climate-related disasters are particularly noticeable in the past 30 to 40 years (IPCC 2007; Re 2012). Losses of human lives and property are increasing, especially in vulnerable cities where different challenges coincide: limited insurance coverage (Hoyois and Sapir 2012), inappropriate planning practices (Bosher and Dainty 2011), rapid urbanization following population growth and migration (Batini et al. 2006; De Sherbinin and Martine 2007; Hunsberger and Evans 2012) leading to land scarcity and informal settlements (Anseeuw et al. 2012; Martine and Schensul 2013; Templeton and Scherr 1997). Decision-makers are asked to increase their efforts in the implementation of early adaptation measures and disaster management plans to recover from climate-related disasters and to deal with the impacts from present and future climate variability (IPCC 2012). One of the priorities of local authorities when confronting the increased number of climate-related disasters entails the provision of safe transitional shelter to the affected population (Aminzadeh 2007).

The challenges of shelter management in times of increasing extreme weather events and the growing number of people living in vulnerable settlements have been highlighted by earlier studies (Saunders 2008; ShelterCentre 2013). Residents who are forced to leave their property temporarily or permanently as a result of natural disasters triggered by environmental degradation, have been identified in the disaster research literature as environmentally displaced people (El-Hinnawi 1985) or climate refugees with a reference to the global climate change debates (Docherty and Giannini 2009). In the following we refer to environmentally displaced people to stress the acute nature of disaster events that are

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