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Moving forward to disaster resilience: Perspectives on increasing resilience for future disasters

1. Introduction

The severe consequences of the natural disasters that we have suffered in the last two decades (such as the Indian Ocean tsunami in 2004, the Katrina and Sandy hurricanes in 2005 and 2012, the Haiti Earthquake in 2010, the East Japan Great Earthquake and Tsunami in 2011 and the most recent earthquake in Nepal in 2015), have overwhelmed the response capacity of communities. Moreover, the perspective for the next decades is not satisfactory, since it is expected that the number of disasters will continue increasing due to climate change and dense settlements in coastal and other disaster-prone areas (Haigh and Amaratunga, 2010; Malalgoda et al., 2014). Additionally, the dependency of current society on critical infrastructures may contribute to rapidly escalate the effects, magnitude and impact of disasters. Thus, cities and communities face a big challenge to become disaster resilient (Turoff et al., 2016).

Disaster resilience can be defined as the ability of individuals, communities, organizations and states to adapt to and recover from hazards, shocks or stresses without compromising long-term prospects of development (DFID, 2011). According to the Hyogo Framework for Action (UNISDR, 2015), disaster resilience is determined by the degree to which individuals, communities and public and private organizations are capable of organizing themselves to learn from past disasters and reduce the risks of future ones, at international, national, regional and local levels.

This special issue sheds light on how cities and communities can become more resilient to deal with disasters. This requires more direct involvement of the communities in the area of a disaster, including the public and private enterprises. It also implies coordination and cooperation with all neighboring organizations so that problems shared with a neighboring community can utilize resources across the man-made borders, which do not stop the progress of a disaster. Communication among the stakeholders and sharing information with the citizens of the community are also essential to improve the resilience level of the communities.

This special issue includes thirteen papers that have been classified in three main groups: city and community resilience frameworks, natural hazards and critical infrastructure disruptions, and information management and sharing.

2. City and community resilience frameworks

Governments and organizations are making efforts to increase their resilience level, although the process presents several issues. Addressing the needs and priorities of the large number of stakeholders involved in the resilience building process (e.g., local governments, research institutions, academia, practitioners, international and non-governmental organizations, private sector and citizens) requires strong communication and collaboration among them that leads to achieving the expected results (Malalgoda et al., 2013; White et al., 2014). Participation of all the involved stakeholders including the public is vital to ensure that the interests of all stakeholders are taken into account (Doyle et al., 2014; Kapucu, 2012). Furthermore, proper coordination is essential to guarantee that resources are shared by all members, to prioritize the planning and response activities and to reduce conflicts among the agents (Doyle et al., 2014).

Fostering investment in building resilience should be seen as an opportunity to improve economic and social well-being of the whole society (Aldunce et al., 2014; Bhamra et al., 2011; IFPRI, 2013; Manyena, 2006). As will be explained below, although there are several attempts in the literature, there is still a lack of adequate organizational models, frameworks or technological tools that help to create a foresight capability that enhances the community preparation for emerging challenges (Collier et al., 2013; Whittaker et al., 2015). The resilience literature illustrates the need to involve different stakeholders in the city and community resilience building process and provides frameworks to build resilience. Currently, however, these frameworks present several challenges when they have to be applied in practice since they do not provide a detailed description about how they can be implemented (Jabareen, 2013; Weichselgartner and Kelman, 2014).

This first group of papers deals with the concepts of city resilience and community resilience. Three of them present a model to improve the city resilience and emergency preparedness of cities and organizations. The fourth one highlights the importance of collaboration among the different stakeholders and defines the factors that need to be fostered in these collaborations in order to create resilient communities.

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2.1. A maturity model for the involvement of stakeholders in the city resilience building process (Raquel Gimenez, Leire Labaka, Josune Hernantes)

A majority of the world's population currently lives in cities and there is an urgent need to work towards building cities' resilience to the effects of acute shocks such as floods, droughts, and earthquakes and to chronic stresses such as climate change (100 Resilient cities, 2016).

This paper presents a maturity model with an ideal sequence of maturity stages for involving city stakeholders in the resilience building process. The maturity model consists of five maturity stages — unrecognized, initial, formalized, supportive, and proactive — that can guide local government in how to involve different stakeholders in the city resilience building process. In addition, the maturity model provides a number of policies that local governments need to implement at each maturity stage. These policies are classified into four principles (collaboration and networking, awareness and commitment, learning, and training and preparedness) that need to be fulfilled in order to engage stakeholders in building resilient cities.

The information presented in the maturity model was obtained through an iterative process that gathered the evolution of the resilience building process of six European cities at different maturity stages. In terms of the evolution of the four principles, it was possible to verify that in the cities that are at the more advanced maturity stages, the four resilience principles are fulfilled by an increasing number of city stakeholders. In addition, it was observed that the fulfillment of a principle contributes to the fulfillment of the other principles. Therefore, the maturity model developed in this paper contributes to the existing literature about city resilience by providing guidance for the local governments to assess the current stage of cities and to identify policies for engaging city stakeholders in the resilience-building process.

2.2. From planning to resilience: the role (and value) of the emergency plan (Mª Carmen Penadés; Ana G. Núñez and José H. Canós)

This paper explores the relationship between emergency planning and resilience building. It focusses attention on the emergency plan, showing how the management of the emergency plan can contribute to reinforcing an organization's resilience. They introduce a proposal to make emergency plans more resilient, identify resilience characteristics of emergency plan management and define a maturity-driven framework for resilience building called QuEP + R. QuEP is a quality-based framework for the assessment and improvement of emergency plan management within organizations that was used to find relationships between the QuEP components (mainly maturity levels and principles) and resilient characteristics. Thus, the authors were able to identify a significant number of practices and techniques that help organizations to identify, anticipate, and respond to catastrophic events, reduce the probability of their occurrence, or lessen their impact and duration.

2.3. Community views of the federal emergency management agency's “whole community” strategy in a complex US city: re-envisioning societal resilience (Heather Koch, Zeno Franco, Tracey O'Sullivan, Syed Ahmed and Mia DeFino)

The involvement of the community in disaster planning and response is vital in order to ensure a high disaster resilience level. Community Based Organizations (CBOs) are entities that represent the needs of the communities. Collaboration across CBOs, healthcare systems, and regional disaster response agencies is critical in order to create resilient communities. This research identifies the community factors that contribute to resilience in a mid-sized, socially complex city through collaboration among government, CBOs, and healthcare systems. First an environmental scan was conducted in the city of Milwaukee and then a table-top exercise based on the “world-café” model.

The results show that factors related to resource availability, inter-sector communication, and integration of community ideas into planning efforts are crucial for improving resilience through collaboration across CBOs, government and healthcare. The study also lists potential barriers to CBO involvement in disaster preparedness such as financial constraints, workforce limitations, prioritization of daily crises and lack of sustained relationships between CBOs and government agencies.

2.4. Striving to be resilient: what concepts, approaches and practices should be incorporated in resilience management guidelines? (Bruria Adini, Odeya Cohen, Aslak W Eide, SusannaNilsson, Limor Aharonson-Daniel and Ivonne A Herrera)

This work proposes a holistic framework that includes concepts, approaches and practices that facilitate the development and implementation of guidelines for resilience management, and thus will help in the resilience operationalization process. The target beneficiaries of this framework are European and national agencies, policy makers, service providers, first responders and industry and enterprises. The framework includes 56 concepts, approaches and practices classified in eleven categories: 1) collaboration [11 items]; 2) planning [8 items]; 3) procedures [8 items]; 4) training [6 items]; 5) infrastructure [5 items]; 6) communication [3 items]; 7) governance [3 items]; 8) lessons learned [2 items]; 9) situation understanding (awareness) [1 item]; 10) resources [2 items]; and, 11) evaluation [2 items]. A systematic literature review and a Delphi process have been used to develop and validate the proposed framework. This work has been developed under the umbrella of the DARWIN project funded by the European Commission.

3. Natural hazards and critical infrastructure disruptions

Several case studies presented within this group of papers highlight the necessity to improve the planning for natural hazards and critical infrastructure disruptions, the preparedness level and coordination among the stakeholders, and the proper risk analysis to forecast the future response needs. Especially for communities living in areas under the threat of any kind of natural hazard, it is necessary to have frameworks that can help them to be well prepared for facing these disruptions. However, several authors argue that there is still a lack of proper estimation of the needed resources for response as well as a lack of integration and coordination during preparedness in order to properly respond during crisis.

When a locality is threatened by a natural hazard, the community plays an important role in reconstructing the affected area. Therefore, community based approaches are needed not only to respond and recover from crises but also for preparing and planning to face them. During the recovery, communities should have enough resources to reconstruct their urban area, and the public entities should provide them the required urban facilities for their well-being. Ensuring long-term and sustainable recovery solutions is necessary to resettle the affected areas.

This group of papers covers the improvement of resilience in the context of natural hazards, climate change and Critical Infrastructure (CI) disruptions such as power outages. These papers provide some insights and challenges that communities living under these threats should consider to improve their resilience to recover from these events. One paper, in particular, argues the need for long-term disaster recovery and how the transition