



Enhancing urban resilience in face of complex hazardous events: from a conceptual framework toward operational tools

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Literature in disaster field and past events highlight that urban disasters are more and more complex: since the end of Nineties, the complexity of modern disasters [U+F02D] due to changes of hazards, exposure and vulnerability of territorial systems and to the interactive mix of such changes [U+F02D] has been stressed and the fact that, namely in large cities, hazards were shifting from individual phenomena towards an interactive mix of natural, technological and social events has been underlined (McEntire et al. 2002). Urban disasters, as demonstrated by events like the Kobe earthquake or the Katrina hurricane, are often characterized as complex chains of hazardous events, impacts and damages, difficult to prefigure, in face of which cities are less and less resilient.

With respect to these events, the need for a “revolution” in approaching the “disaster problem” and its relevance for a future sustainable development of urban areas has been largely recognized.

Resilience seems currently represent the key concept for a “shift in thinking” in the field of disaster analysis and management, due to the opportunity that it provides for dealing with concepts like surprise, cross-scale effects, non-linearity, change, which are very relevant in complex urban disasters.

According to the ISDR glossary on Disaster Risk Reduction (2009) resilience refers to “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”.

Nevertheless, although research in the field of natural hazards has largely evolved in the last decades, focusing more and more on vulnerability and more recently on resilience [U+F02D] both of them currently invoked as basic means for supporting risk mitigation strategies [U+F02D] up to now a shared theoretical and operative approach to resilience is still missing. A nourished scientific literature has been developed according to the idea that reducing vulnerability in face of a given hazard should have surely led to enhance resilience and reduce the overall risk. Nevertheless, past disasters analysis clearly reveals that mitigation measures addressed to reduce vulnerability do not necessarily result in an enhancing of resilience.

Thus, based on a research work developed within the 7°FP Ensure Project, this paper is addressed to provide a conceptual framework for interpreting and analyzing resilience, as a key tool for driving risk mitigation strategies toward an enhancement of urban resilience in face of complex hazards.

In detail, starting from the evolutionary path of the resilience concept and the variety of definitions and specifications up to now provided (Paton and Johnston, 2001; Godshalk, 2003; Bruneau et al. 2003; Adger et al. 2005; Norris et. al. 2008), the main attributes, properties or capacities able to make an urban system resilient in face of complex hazards have been identified. Then, by integrating different approaches and disciplinary perspectives, these capacities and their mutual influences have been arranged into a three-ring model in respect to the main phases of the disaster cycle. Finally, based on the conceptual framework, the main indicators for assessing, in quantitative and/or qualitative terms, urban resilience in face of complex hazards have been provided.

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