



Individual systems managing own (and others') vulnerability to hazards by means of resilience

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Despite the long dated studies on the terms and concepts of "Vulnerability to hazards" and "Resilience", the operational dimensions and spatio-temporal evolution of these properties and their interactions have not been clarified yet. Regarding Resilience in particular, the term is defined in the scientific literature in three ways: (a) in relation to Vulnerability, (b) as a process of self-organization and self-change in an attempt of a system to retain essential functions or structure under circumstances of perturbation and (c) in terms of the material and immaterial resources needed for the realization of the process towards persistence despite the impact of a stress. However, fundamental queries remain unanswerable:

- What is the impact of Resilience on Vulnerability or how do they interact?
- How is Resilience activated, by whom and under which conditions?
- How and where the needed resources (for Resilience activation) are to be found?

The basic assumption of this paper is that a whole series of individual systems, i.e. social, institutional, economic, political, socio-ecological ones, have a great potential for the reduction and management of own Vulnerability through Resilience which is used as a "managerial tool". These are systems which are endowed with a potential, to learn by experience, to process information and adapt accordingly, i.e. to obtain a kind of "consciousness" of their vulnerability and then behave as "Vulnerability Actors" (VA) or managers. The basic means or managing capacities of a V Actor are the so-called by the author "Resilience functions". These are:

- Internal rebalancing of own Vulnerability facets (physical, social, economic, ecological, institutional) meaning control and restriction of certain facets leaving others to deteriorate;
- Transformation and transfer of Vulnerability to other Actors;
- (Re)-distribution of Vulnerability to the disaster cycle stages (current and future) and re-balancing between exposure and response capacity;
- (Re)-distribution between current and future hazards;
- Receiving Vulnerability from other Actors.

A V Actor operates by considering always the real multi-hazard context and not single-hazard, abstractive theoretical frameworks. This is why assessment of Vulnerability and Resilience versus a specific hazard is difficult if not impossible to attain. For the purpose of activating the Resilience functions, a V Actor develops inherent resources and means usable to response but extracts also additional ones from the social, economic and ecological environment, i.e. resources for which other V Actors also struggle. The result is uneven distribution of Resilience, Vulnerabilities, Exposures and Response capacities in the social, economic, political and geographical space.

The validity of the above arguments and suggestions is tested (a) with connections and references to the relevant international literature; (b) by means of documentary evidence from case studies of real experiences and responses to natural hazards and disasters globally and (c) by the potential of the proposed theoretical model to offer satisfactory answers to open theoretical queries and feed policy-making.