A Research Framework for Disaster Risk Reduction

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Social and economic losses caused by natural hazards – such as earthquakes, floods, and storms and volcanic eruptions – are increasing in many regions of the world, despite scientific progress and community efforts to enhance disaster risk reduction (DRR). The UN International Strategy for Disaster Reduction (ISDR) currently spearheads international cooperation on DRR, and it aims to anticipate and plan for reducing economic losses and fatalities caused by natural hazards based on knowledge about the underlying drivers of risk. Yet, climate change, globalization, urbanization, social isolation, and increased interconnectedness between natural, social, and technological systems challenge our ability to plan appropriate risk reduction measures. Here we critically discuss two main paradigms that have dominated the assessment and management of disaster risks: the hazard-based paradigm and the vulnerability-based paradigm. We then argue that there is a need to integrate both of them to enhance evidence-based DRR policy-making. To this end, we propose a new integrative framework recognising the complexity as well as the spatial and temporal evolution of both socio-technical vulnerabilities and natural hazards. Our framework acknowledges careful treatment of individual cases as tightly coupled socio-natural systems and it emphasises the role of reciprocal feedback mechanisms between socio-technical vulnerabilities and natural hazards. An application to a flood risk example is shown to demonstrate the potentials (and limitations) of the proposed framework.