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Geohazards: Basic science for disaster risk reduction

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Despite major advancements in knowledge on natural extreme hazard and disaster risks, yet we are not seeing a concomitant decline in disaster impacts and losses. Greater efforts are needed to communicate knowledge on disaster risks via integrated co-productive research and assessments. A way of integration and co-production could be through the maturation of hazard and disaster science and through transdisciplinary approaches aiming at in-depth investigations using a system analysis and at recommendations for actions to reduce risks and to improve resilience of society [1]. Basic natural sciences can provide a deeper understanding of hazardous events (*e.g.*, occurrence of large earthquakes and induced tsunamis; lava flow patterns due to volcanic eruptions; triggering of landslides etc.); natural and social sciences, psychology, and engineering can contribute to understanding social and physical vulnerabilities; and (re)insurance industry and emergency management agencies can assist in mapping of exposed values. The integrated research into three basic components of disaster risks may serve as a firm foundation for co-productive research to increase societal resilience.

A co-production scheme is much complicated, but could be expressed by the following flow-chart:

- scientists provide a "menu" of the knowledge available to help for decision making;
- policymakers express their need and order a "meal" from the scientific "menu"; a limited budget usually imposes significant limitations on the willingness of policymakers to pay for disaster reduction due to extreme natural events;
- scientists and engineers together with other stakeholders work ("cook the meal") with the principal aim to assist policymakers in reduction of disaster risks at local, national, regional, and global levels;
- the "meal", that is, new knowledge, risk assessments, and recommendations, is utilized by preventive measures [3] to mitigate disaster risks.

Such an approach offers a practice- and policy-oriented knowledge to reduce potential disasters. Based on comprehensive research on disaster risk, a baseline risk assessment is needed to produce a clear and unambiguous scientific view on the current state of knowledge in disaster risk, the potential socio-economic impacts of natural hazards, and the ways to reduce significant human and economic losses. Comprehensive risk assessments would provide the catalyst for the advancement of not only the science but policy ([1], [2]). The need for such an effort is more critical now than ever before, because such an effort would provide scientific results to support disaster policy across governments, contribute to the Sendai Framework for Disaster Risk Reduction 2015-2030, and present a cross-cutting action in policy and practice related to climate change and sustainability (*contribution to RSF-14-17-00520*).

References:

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