

Resilience to Natural Hazards Requires a Partnership Between Scientists, Policy Makers, and Stakeholders

Natural hazards are inevitable, but disasters are not. Scientific research improves our understanding of the ways in which our society is affected by natural hazards. We create a more resilient society where lives are saved and economic losses are minimized when this information is used in formulating public policy and when we take scientifically informed action towards disaster preparation, mitigation, response and recovery.

Natural processes on Earth and in space create many hazards, including earthquakes, volcanoes, landslides, tsunamis, floods, droughts, fires, heat waves, storms, space weather, and bolide impacts. Some of these hazards are changing with time, in both frequency and magnitude; in such cases, the past may not be representative of the future. Society's hazard exposure increases with time as the world's population rises and is more concentrated in urban areas and in low-lying coastal regions, and with changes in new construction practices and land use. Risk is a function both of hazards and society's exposure and vulnerability. Dramatic evidence of these risks can be found every year in terms of human and economic losses.

To improve resilience to natural hazards, Earth and space scientists, engineers and social scientists together should (i) strengthen basic research into natural hazards, their impacts and their underlying processes via monitoring, observations, analysis, modeling, and forecasting; (ii) analyze the impact of hazards on the built and social environments to determine how to reduce vulnerability, human and economic losses; and (iii) assess our current state of knowledge about risk associated with natural hazards to provide sound information to policy makers and resource managers, and to identify research gaps and future challenges.

Scientists, engineers, policy makers, business leaders, emergency managers, educators, and other stakeholders should work together toward translating research findings into actions; understanding and responding to stakeholder needs¹; and applying new science to improve disaster preparedness, mitigation, response, and recovery efforts through close communication, coordination, and collaboration.

¹ Sendai Framework for Disaster Risk Reduction 2015-2030:
<http://www.wcdrr.org/preparatory/post2015>

A partnership for building a resilient society should be based on:

- **RESEARCH:** scientific research with strong cooperation between scientists, engineers, resource managers, other stakeholders and policy makers at all stages of knowledge production from formulating problem statements to delivery of results and implementation.
- **EDUCATION:** enhanced training and education at all levels by implementing a trans-disciplinary approach to disaster science and risk reduction.
- **AWARENESS:** heightened public awareness of natural hazards and their impacts, and of scientific research and assessments to determine the best options for mitigating risk and increasing resilience.
- **STRATEGY:** cooperation in developing nationally and regionally focused strategies to reduce risk associated with natural hazards, and improve decision support tools, information products and processes to enhance informed decision making and outreach.
- **INVESTMENT:** investments in risk reduction research and measures that mitigate (if not prevent) disasters and promote resilience.
- **PREPAREDNESS & RESPONSE:** enhancement of disaster preparedness and response by implementing scientific knowledge to develop early warning systems and hazard resilient practices.

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