

## Science and Natural Hazards<sup>1</sup>

As the recent tragic events in the Indian Ocean have shown only too vividly once again, natural hazards (earthquakes, tsunamis, floods, hurricanes, landslides, tornadoes, volcanic eruptions, and other geophysical phenomena) are an integral component of life on Earth. These can have disastrous effects on vulnerable communities and ecosystems. Only by understanding how and where such hazards may occur, what causes them, what circumstances increase their severity, and what their impacts may be, will it prove possible to develop effective mitigation strategies. In practice, this requires addressing issues such as real-time monitoring and prediction, emergency preparedness, public education, post-disaster recovery, engineering, land use, and construction practices. Coordinated approaches involving scientists, engineers, policy makers, builders, investors, insurers, news media, educators, relief organizations, and the public are therefore essential if the devastating effects of natural hazards are to be reduced.

In order to reduce vulnerability to natural hazards, the International Council for Science strongly endorses the need for:

- fundamental research on the Earth system and its dynamics,
- integrated research on the impact of natural disasters on social and ecological systems,
- agreement on an international global observation framework for the collection, management and open sharing of data and information on natural hazards,
- mapping of the known exposures of human populations, resources and economic activities to multiple disasters,
- integrated models that combine geophysical, ecological, demographic and economic aspects of disaster scenarios,
- establishment of coordinated international detection and early warning systems,
- building of indigenous scientific and technical capacity in vulnerable regions to take advantage of existing knowledge and stimulate local innovation,
- development and evaluation of prevention and mitigation programs in the most risk-prone areas,
- dissemination of the relevant results to policy makers and the public, and
- a renewed focus on public education, particularly in vulnerable communities.

Science has contributed much to the understanding of natural hazards but, as recent events have shown, the natural environment remains dangerously unpredictable. Scientific knowledge and technologies are not always available when and where they are needed. A new strategic international and interdisciplinary approach to science is necessary to more fully exploit existing knowledge and identify and address the unknown. At the same time more effective strategies for mitigation of the effects of natural hazards need to be developed and deployed. Only when good science and policy making are effectively combined will the world become a safer place.

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<sup>1</sup>This statement is based on material from the American Geophysical Union (1996, 2000: [http://www.agu.org/sci\\_soc/policy/positions/naturalhaz.shtml](http://www.agu.org/sci_soc/policy/positions/naturalhaz.shtml)); the International Union of Geodesy and Geophysics (Jan 2005: <http://www.mitp.ru/georisk/> or <http://www.iugg-georisk.org>); the ICSU Committee on Disaster Reduction (2002: [http://www.icsu.org/Gestion/img/ICSU\\_DOC\\_DOWNLOAD/210\\_DD\\_FILE\\_statem-NDR\\_Apr\\_02.pdf](http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/210_DD_FILE_statem-NDR_Apr_02.pdf)); and, the International Global Observing Strategy *ad hoc* Working Group on Geo-hazards (2002: <http://dup.esrin.esa.it/igos-geohazards/home.asp>). It also draws on some of the recommendations made in a letter from Lerner-Lam *et al* that was published in the Los Angeles Times on 30 December 2004 (<http://www.latimes.com/technology/la-oe-lerner30dec30.1.3003421.print.story?coll=1&ctrack=2&cset=true>).

The statement is endorsed the Executive Board of the International Council for Science (ICSU, January 2005). ICSU is a non-governmental organization representing a global membership that includes both National Scientific bodies (103 members) and International Scientific Unions (27 members). The Council is currently exploring the establishment of a new international interdisciplinary program on natural and man-made hazards. This will build on ongoing plans for the Year of Planet Earth, involving the Geo-Unions and UNESCO (<http://www.esfs.org/downloads.htm>).