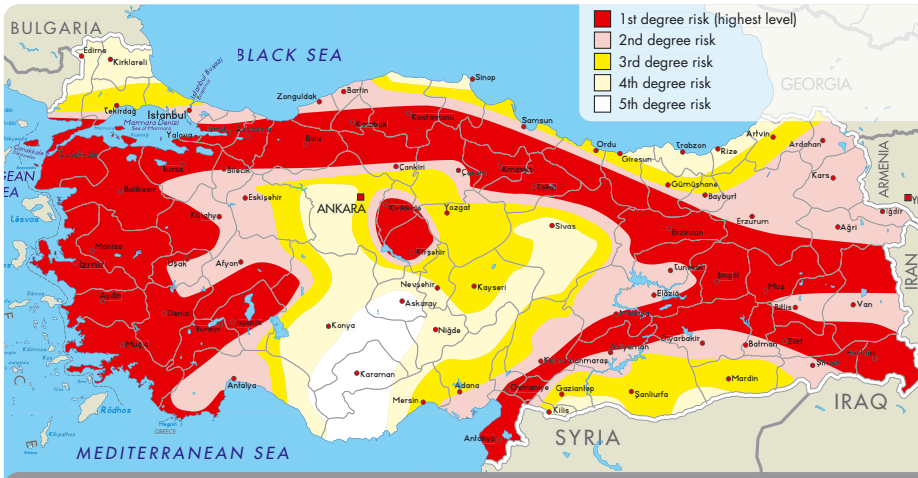
Case study

Non-structural mitigation in Turkey

Turkey's high vulnerability to earthquakes is significantly compounded by socio-economic factors. Following two devastating earthquakes in 1999, the Turkish Red Crescent Society (TRCS), American Red Cross (ARC) and Bogazici University began a series of collaborative activities aimed at community risk reduction. A Bogazici University study concluded that:

- Of the 18,000 deaths, more than 95 per cent were a result of building collapse while only 3 per cent were due to non-structural causes.
- Of the 50,000 injuries, 50 per cent were a result of non-structural causes.



Turkey regional earthquake risk map
Source: Disaster Research Directorate, Ministry of Public Works and Settlement

Therefore, up to 25,000 injuries could have been prevented by taking basic preparedness measures at the household level – such as securing furniture and other heavy, tall objects likely to fall on people. If people employ simple, preventative measures in future, the drain on limited medical resources and associated economic losses would be dramatically reduced.

Technical expertise + social mobilization → community effectiveness

The intervention

Based on the results of this study and the low level of risk awareness among people hit by the 1999 quakes, the university developed a non-structural mitigation (NSM) education programme, with support from TRCS and ARC. The programme aims to promote a nationwide culture of mitigation, by providing people with basic information on earthquake risk, demonstrating how to secure potentially dangerous objects in homes, schools or workplaces, and outlining key safety actions in the event of disaster. Key to the programme's success are its collaborative spirit and its basis in sound research and development:

- The partnership merged the scientific and technical expertise of Bogazici University with the Red Cross Red Crescent network's ability to disseminate critical safety information to exposed communities.
- To ensure the accuracy of their advice, team members conducted laboratory tests using a 'shake table' to validate both techniques and the quality of materials available commercially across Turkey. Based on the results, the team developed recommendations for how people can most effectively reduce their non-structural earthquake risk.
- The university invited Turkish product manufacturers to observe the laboratory tests, to encourage the production of inexpensive and user-friendly devices for NSM (e.g. door latches, L-shaped securing brackets).
- The university developed, tested and refined a variety of training aids, including CD-ROMs, table-top models, display cases with sample NSM materials and presentation charts.

With key safety messages identified (see Steps you can take today, below), the university and TRCS produced a training of trainers (ToT) programme to develop a cadre of community instructors across the country. In June 2003, the programme was tested on 26 TRCS staff members in the Marmara region, who were asked to apply NSM measures in their own homes and work places. Once the ToT programme has been thoroughly tested, TRCS and Bogazici University plans to extend training to 800 trainers who have been working in Community Education Centers of the Ministry of Education – one for every district in Turkey. The eventual aim is to collaborate with the Ministry of Education to introduce the NSM programme into the school system nationwide.

Steps you can take today!	Secure heavy furniture	Move heavy items to lower shelves	Secure gas appliances and important electronic equipment
	Latch cabinet doors	Secure light fixtures	Keep beds away from windows

Changes stimulated by the experience

Following the trial training programme:

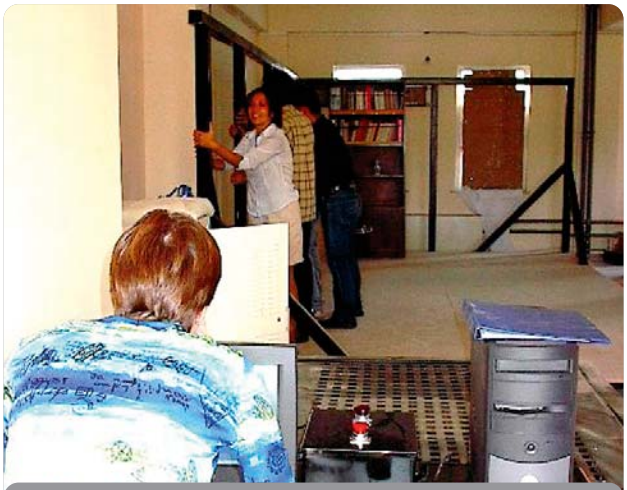
- The TRCS has begun to develop a 3-year plan for community-based NSM education programmes.
- TRCS branch representatives have recommended options to implement and expand the programmes, especially ways to utilize volunteer resources.
- A web-based tool was created to share experiences among community disaster education trainers and supporters.
- TRCS are planning to apply NSM in its headquarters, branches, blood centres, health clinics, retirement homes and warehouses, especially in high-risk areas. This will develop local communities' disaster preparedness capacity, improve technical familiarity among TRCS staff and strengthen TRCS' disaster response capacity.

Issues that still need to be addressed include:

- Application of NSM in rented houses and offices – a challenge, since owners and renters have different incentives to make NSM changes.
- Application of NSM in public facilities such as hospitals, health clinics, schools and public offices, and in the homes of vulnerable communities.
- Reluctance of people to make NSM modifications due to concerns about aesthetics or the ability to move furniture easily for cleaning and maintenance.

Implications for the role of the Red Cross Red Crescent, government and universities

- Various Turkish organizations (some with international support) are implementing disparate types of community-based disaster training. It is vitally important to ensure that risk reduction messages are standardized and consistent. The Red Cross Red Crescent National Societies could seek to promote consensus among different actors on this issue.
- The Turkish government could provide more resources and technical leadership to ensure that NSM training becomes an obligatory part of the educational syllabus for architects, engineers and builders – as well as for public servants in risk-prone areas. This should be in addition to ongoing efforts to develop and enforce appropriate building codes.
- The programme highlights the important role of research and development in validating information resulting from laboratory tests and lessons learned from earthquakes. Turkish universities could play a more proactive role in embracing NSM within their courses and collaborating in the research and development of NSM measures.



Bogazici University researchers use a shake table to simulate an earthquake and to identify best practices for NSM.

Conclusion and recommendations

- NSM provides a critical set of first steps towards risk reduction that ordinary people can begin applying today.
- Governments, universities and Red Cross Red Crescent National Societies need to collaborate and combine their strengths. Each has a unique role to play.
- In Turkey there is tremendous diversity in types of building and lifestyles, especially between urban and rural areas and between different regions. These factors must be considered when creating targeted training materials for specific audiences and when researching and further refining NSM education programmes.
- It is critical that universities and related institutions continue to conduct research to strengthen and develop the training and educational aspects of NSM. TRCS, universities and other partners should continue evaluations to ensure that materials are easily understandable and appropriate for dissemination to the general public.

The maps used do not imply the expression of any opinion on the part of the International Federation of Red Cross and Red Crescent Societies or National Societies concerning the legal status of a territory or of its authorities.

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