



UNISDR Scientific and Technical Advisory Group Case Studies - 2014 A community-based approach for measuring earthquake resilience in cities

The problem

While losses are the outcome most commonly associated with damaging hazard events, it is becoming increasingly clear that some communities will have differing capacities to prepare for, respond to, and recover from events when they occur. As a result, great emphasis is placed on fostering disaster resilient communities. There are various characteristics that make up a resilient community, but it is difficult to measure the concept of resilience, especially in cases where relevant data are lacking. Too often this results in overly simplistic conclusions and policy outcomes. Measuring and understanding resilience is however a first and indispensable step in raising awareness on risk and resilience, and subsequently in taking action in the areas for which resilience estimates are (relatively) low.

The science

Building upon the six elements of the Hyogo Framework for Action¹ and the United Nations International Strategy for Disaster Reduction's *10 Essentials for Making Cities Resilient*², a Risk and Resilience scorecard was developed as a collaborative effort between the Global Earthquake Model (GEM), the Center for Disaster Management and Risk Reduction Technology (CEDIM), and the South Asia Institute (SAI)³. The scorecard is a multilevel and multi-scale self-evaluation tool that empowers stakeholders to quantitatively assess risk and resilience parameters based on qualitatively derived information. Six dimensions are encompassed by the approach to address key areas of resilience that mainstream risk reduction into planning and decision-making processes: social capacity, awareness and advocacy, legal and institutional, planning and regulation, critical infrastructure and services, and emergency preparedness and response.



Ward level officials from Lalitpur Sub-Metropolitan City (LSMC) using the Risk and Resilience scorecard through handheld devices. The tool allows for the results of the participatory process to be immediately displayed.

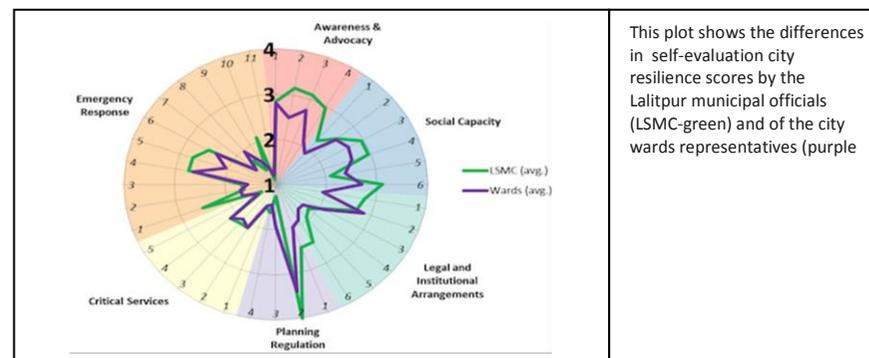
The application to policy and practice

The scorecard was used for the first time as a pilot study to evaluate perceived gaps in resilience during a two-day workshop organized by the National Society for Earthquake Technology - Nepal (NSET) and the Lalitpur Sub-Metropolitan City (LSMC) in Nepal; the 3rd largest city of the country. Designated representatives from 20 of 22 of the municipality's wards were involved in a sub-municipal level assessment; whereas, municipal representatives from departments concerned with disaster risk reduction and management were invited for a municipal-level assessment. Each group conducted the survey with the help of a local facilitator, and the answers were transmitted from participants using remote controllers to a base station in real-time, ensuring

completeness and the facilitation of discussion. At the workshop's conclusion, the two groups were brought together to discuss their results and to discuss steps for resilience enhancement.

NSET concluded that a high level methodology was brought to the community level of Lalitpur where:

- the approach is participatory, and therefore effective for self-realisation,
- immediate action may be stimulated in areas where the tool indicates the municipality can improve resilience,
- the assessment process is simple and makes use of technology that is easy to understand,
- the multilevel design captures perspectives at the municipal-level and also at the grass roots level, and
- decision-makers can incorporate social vulnerability and coping capacities for planning and mainstreaming DRR in development.



This plot shows the differences in self-evaluation city resilience scores by the Lalitpur municipal officials (LSMC-avg) and of the city wards representatives (purple)

Did it make a difference?

The application of the scorecard in Lalitpur is still in the nascent stage⁴. The overall method consists of helping stakeholders to identify gaps within their community resilience, developing detailed assessments based on the identified gaps, constructing resilience management strategies, and creating benchmarks for monitoring and evaluating resilience and risk reduction. Several noteworthy steps towards risk reduction were identified at the time of this writing, however. These include:

- *promoting a common understanding of earthquake resilience among participants*: Prior to the workshop, discussions in the LSMC focused exclusively on building damage, not on characteristics within populations that create the potential for loss;
- *fostering a new direction in resilience enhancement*: The latter starts at the grassroots level and includes two-way communication between Lalitpur's wards and the municipality. Prior to the workshop, 12 years had elapsed since ward and municipal level officials came together to discuss earthquake risk reduction;
- *requests to the municipality based on the gap analysis*: Requests from the wards include updates to building code implementation policies, increased dialog, and the organization of more frequent earthquake risk awareness programs; and
- *the formation of ward level disaster risk management committees (DRMC) for 6 wards*: This completed establishment of DRMC in all 22 wards of LSMC.

References

¹ <http://www.unisdr.org/hfa>

² <http://www.unisdr.org/campaign/resilientcities/toolkit/essentials>

³ Anhorn, J. Burton, C.G., and Khazai, B. (2014) The risk and resilience scorecard: Benchmarking disaster resilience in cities. A monitoring & evaluation tool to engage local stakeholders, ICLEI conference proceedings (<http://resilient-cities.iclei.org/resilient-cities-hub-site/congress-publications/online-proceedings-2014/>)

⁴ LSMC (2014, forthcoming) Participatory Evaluation of Earthquake Risk and Resilience in Lalitpur SubMetropolitan City