LESSONS LEARNED FROM ELE STUDIES IN EARTHQUAKE-PRONE DEVELOPING COUNTRIES

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Earthquake loss estimation (ELE) studies are obtained using analytically-based loss computation tools such as the SELENA–RISe Open Risk Package (Lang et al., 2010; Molina et al., 2010). Since more than 20 years, NORSAR, often in close collaboration with other international partners, initiates and actively conducts cooperation projects on earthquake hazard and risk assessment in many parts of the world with a strong focus on developing countries. Examples can be found in Erduran et al. (2012); Lang et al. (2008, 2011, 2012); Molina and Lindholm (2005; 2007); Molina et al. (2010) among others. The purpose of these projects is on building up local capacities on earthquake-related research while assessing the regional hazard as well as estimating seismic risk for selected test beds that may enter long-term disaster mitigation actions.

Recent projects were conducted on the Indian subcontinent, Pakistan, Central Asia, Central America and the Caribbean during which the various stages of ELE process are elaborated, i.e. regional and site-specific analysis of the seismic hazard, site response estimation studies, vulnerability assessment of the prevalent building typologies, deterministic and probabilistic damage and loss assessment studies.

Applying the analytical approach for ELE requires the expertise of various research fields, i.e. seismology, geology, geotechnical engineering, as well as structural engineering. This automatically poses some challenges to the practical conduct and organization of the study as the outcomes of the individual disciplines are to be combined in order to lead to meaningful damage and loss estimates. However, this situation is not only challenging from a technical point of view, but also in terms of non-technical issues. Nontechnical problems are foremost related to the compilation of reliable inventory databases. In most cases, building stock inventories do not exist and hence need to be compiled through cost- and time-consuming walk-down surveys, partly using remote sensing techniques. Given that inventory databases exist, i.e. collected during a recent census, these databases mostly do not cover the type of data relevant for ELE studies or are not openly accessible due to data security issues. Other non-technical issues may arise from political, sociological, ethical or even religious conditions that can have significant impact on not only data collection, but also on the resolution, details and completeness of an ELE study or the uncertainty of damage and loss estimates. Finally, these aspects may even hamper the practical implementation of results and the initiation of mitigative actions.

The present paper addresses the challenges faced during the various stages of a risk assessment. The discussion of these both technical and non-technical issues will be based on experiences and lessons learned from worldwide earthquake-prone regions.

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