

# Safer Schools, Resilient Communities: A Comparative Assessment of School Safety after the 2015 Nepal (Gorkha) Earthquakes



## EXECUTIVE SUMMARY

**BACKGROUND.** Across Nepal, more than 8.5 million students attend pre-school through vocational school. As they learn, they sit in well over 82,000 school buildings at more than 35,000 school campuses. Approximately 75 percent of these campuses are public schools, built by the Ministry of Education and development partners.

Previous school safety studies carried out in the country estimated that approximately 89 percent of school buildings in Nepal are made of load-bearing masonry, a building type that is particularly vulnerable to earthquakes if no earthquake-resistant techniques are incorporated. In hilly regions more than 50 percent are the most vulnerable masonry type – rubble stone construction. A 2011 school vulnerability assessment estimated that because of Nepal’s seismic risk, more than 49,000 schools needed to be retrofitted and another 12,000 needed demolition and reconstruction.<sup>1</sup> This was before the 2015 Gorkha Earthquake and aftershocks struck.

Nepal has undertaken efforts to address the structural vulnerability of schools. School safety retrofit and reconstruction efforts had reached about 160 schools and training had reached almost 700 masons in the Kathmandu valley - only some of these in the area affected by the April and May 2015 earthquakes. Innovative public education and mason training programs over the past two decades have included mason training, community outreach, and shake-table demonstrations as part of training and awareness programs.

On April 25, 2015, a massive M7.6 earthquake struck Western and Central Nepal, with an equally devastating aftershock of M6.8 striking in Central Nepal on May 12, 2015, as measured by Nepal’s National Seismic Centre. According to

the Government of Nepal Ministry of Education, the Gorkha Earthquake caused more than 27,000 classrooms to be fully destroyed by these events, and more than 26,000 classrooms to be partially destroyed. The cost of education sector recovery is estimated at almost \$415m USD.<sup>2</sup>

**PURPOSE & APPROACH.** The effects of the earthquake on Nepal’s educational infrastructure offer a rare opportunity to study whether previous interventions to improve building practices, combined with community engagement, have resulted in safer schools and communities. The primary questions we considered were:

- How did damage at purportedly disaster-resistant public school buildings, whether retrofitted or newly constructed, compare to damage of typical public school buildings?
- What affect, if any, did community engagement around safer schools have on risk awareness and community construction practices?

In Bhaktapur, Kathmandu, Rasuwa, and Sindupalchowk, we compared three, geographically proximal public schools:

- **No intervention** — typical construction
- **Technical intervention only**— disaster-resistant design or retrofit
- **Technical and social intervention** — disaster-resistant design or retrofit, combined with community engagement

At each site, we conducted interviews with school staff and management committees, parents, and lead masons involved in school construction. We also visually assessed school buildings and 15-20 nearby houses for damage.

## KEY FINDINGS

‘Comprehensive School Safety,’ a framework adopted by United Nations agencies and humanitarian organisations in the education sector, seeks to ensure children and school personnel are not killed or injured in schools, and that educational continuity is assured.

It rests on three overlapping pillars of safe learning facilities, school disaster management, and risk reduction and resilience education. Field observations are reported in relationship to these three pillars.

### Pillar 1

#### Safe Learning Facilities

- School buildings retrofitted to be earthquake generally perform better than school buildings built without these considerations.
- School buildings designed or retrofitted to be earthquake resistant, but constructed without adequate mason training or technical oversight, performed poorly; some collapsed.
- Stone walls observed collapsed, even when retrofitted or built with some earthquake-resistant features.
- Unreinforced brick and stone infill walls were the primary damage in areas of moderate shaking. This damage rendered school buildings unusable and posed significant risks to occupants.

### Pillar 2

#### School Disaster Management

- Where schools were retrofitted without community engagement, many students and staff planned to *run out* of their safe schools, causing unnecessary injury and death.
- In schools with load-bearing stone walls, neither evacuation during shaking nor Drop, Cover, Hold would have protected students. Staff now distrust the Drop, Cover, Hold message.
- Some children and adults incorrectly ran *into* unsafe stone buildings to drop, cover, and hold; they were killed.
- Lack of non-structural mitigation in some schools resulted in loss of computers and science lab supplies.

### Pillar 3

#### Disaster Reduction & Resilience Education

- Community engagement built trust in the projects. Without engagement, projects were misunderstood.
- Those at community engagement sites showed better knowledge of risk and earthquake-resistant construction technology. New housing was reported to have incorporated some of these technologies.
- With community engagement, some school staff became advocates for safer construction, but effects were limited where school staff did not share cultural and language ties with parents.
- Impacts of the safer school projects faded over time. Safer school buildings lacked signage or displays to educate new families about the earthquake-resistant retrofit or new construction features.

## RECOMMENDATION HIGHLIGHTS

All children deserve safe, accessible and culturally appropriate school buildings — regardless of class, creed, gender or ability. A community-based approach to safer school construction seeks to achieve the twin goals of safer schools and more resilient communities. It treats school construction as a community learning opportunity to better under-

stand risks, collectively commit to safety, and to learn and apply strategies for safer construction.

A community-based approach builds community capacity in tandem with the laying of foundations and erecting of classroom walls. It also prepares communities to be knowledgeable caretakers of schools, able to maintain the physical safety of the structures and the culture of safety among those who use it.



### MOBILISATION

- Media campaign to promote the idea that schools and housing can be built earthquake-safe
- Mobile technical resource centres in each district to showcase safer construction technology
- and provide technical assistance to school management committees and communities

### PLANNING

- Review and revise school template designs
- Train district engineers in retrofit options
- Limit use of rubble-stone walls in school construction until clear guidance, training and oversight is in place
- Retrofit unsupported brick and stone infill walls

### DESIGN

- Ensure all independently-funded schools are reviewed for safety
- When safe and feasible, choose construction materials familiar to community for better maintenance and technology transfer
- Limit community-level design changes to aspects that will not impact safety

### CONSTRUCTION

- Mason training and certification
- Release school construction funds in stages after verification of construction quality
- Construction process videos for better public understanding of good school construction
- Public notice boards and curated site visits for parents and community
- Community checklists for disaster-resistant construction, with robust mechanism for reporting problems

### POST-CONSTRUCTION

- Establish school disaster management committees and provide them with regular training and guidance
- Integrate safer community planning and construction into curriculum and school-to-community outreach
- Label school safety features prominently for enduring impact