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Disaster Risk Reduction & Resilience
in the Education Sector

Child-Centred Risk Reduction Research-into-Action Brief:

Best practices in community-based school construction

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Statement of purpose

The Research-into-Action Brief series provides concise summaries of academic and grey literature on a range of topics for practitioners working in the fields of child-centred risk reduction (CCRR), climate change adaptation (CCA), and school safety. This purpose of this brief is to provide a concise review of research findings for practitioners on the topic of community-based school construction.

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Abstract

Community-based approaches to school construction can improve local livelihoods, increase community satisfaction and expand children's access to education. Yet many development partners and government bodies fail to ensure that community-based school construction results in safer schools. These groups also miss opportunities to engage local people in ways that would help build a community's capacity for disaster risk reduction (DRR). These kinds of failures can have wide-ranging impacts, from educational disruption to injury and even death.

Program managers can support *safer* school construction and increase community capacity through community-based *safer* school construction. They also need to ensure communities understand their hazards, engage with communities and technical experts, and provide community training during all five stages of community-based school construction. These steps will not only lead to the construction of safe schools, but to an increase in community capacity in construction and leadership, and knowledge of hazards. Communities will learn that safety is achievable in both schools and a wider context.

Glossary

Term	Definition
Community-driven development	A decentralised approach where governments empower communities to monitor and implement small-scale infrastructure projects.
Safer schools	Schools that are located in safe environments, and that are well maintained and have been designed and constructed to minimise the risk of damage from hazards.
Structural engineers	Structural engineers are qualified to design structures and certify their safety, although many may not have specialised training in hazard-resistant design. The latter should be an essential skill for anyone providing technical services for school construction.
Retrofit	The reinforcement or upgrading of existing buildings so they become more resistant to, and able to withstand the effects of, hazards.

Introduction

When disasters strike unsafe schools, the results may include injury, death and prolonged school closure. Students can experience intense mental and physical stress, resulting in missed schooling and delayed development. When they cannot attend school after a disaster, they become more at risk of being trafficked and abused (Kagawa and Selby, 2013). Yet studies have found that governments and NGOs overseeing school construction often fail to ensure that new schools are built to rigorous standards and that existing schools are retrofitted to meet those standards (Bastidas and Petal, 2012).

A safe learning facility is the first pillar of the Comprehensive School Safety Framework, strategic framework developed and endorsed in 2014 by UN bodies, international NGOs, and selected regional partners to promote DRR in the education sector. The framework supports universal access to quality education, with a child-centred approach and evidence-based decision processes guiding framework activities—activities aimed at building safer school facilities, engaging in school disaster management, and integrating disaster reduction and resilience into the curriculum (GADRRRES, 2017; Paci-Green, Vigneaux, Jensen and Petal, 2017).

Safe schools are paramount, but policies covering their construction or retrofitting – including safe site selection, accounting for natural hazards in building design and the construction process – are often missing or poorly enforced (Bastidas and Petal, 2012; Paci-Green, Miscolta, Petal, and McFarlane, 2017). Limited resources, corruption and unfamiliar building technologies also impact the quality of construction (Arup, 2013). Even where new schools are built to withstand hazards, many countries lack a framework for addressing the backlog of existing poorly built schools. When relevant government bodies lack sufficient knowledge and skills, and do not have school safety, safer school construction policy tends to flounder (Paci-Green, Miscolta, Petal, and McFarlane, 2017; Pandey, 2013).

Even when policy and practices do fully incorporate hazard risk into planning, design and construction, opportunities for community capacity building and raising disaster awareness are often missed (Bastidas & Petal, 2012; Paci-Green and Pandey, 2015). Without community engagement, hazard-resistant school construction can inadvertently create distrust and skepticism when school construction incorporates unfamiliar construction materials or practices. In turn, this skepticism can erode a community's support for DRR (Paci-Green and Pandey, 2016). However, a community-based approach to construction can not only help to build safer schools *but also* increase the opportunity to support DRR in the community.

Literature Review

Community-based school construction occurs when community stakeholders are involved in site selection, financing, labour and/or overseeing construction (Arup, 2013; INEE, 2009; n.a., 2010; Paci-Green and Pandey, 2015). Traditional community-based school construction is most common in low- and moderate-income countries where

"Community-based school construction occurs when community stakeholders are involved in site selection, financing, labour and/or overseeing construction"

governments do not have enough financial resources, technical expertise or capacity to build schools in every community (Theunynck, 2009). The approach can reduce costs associated with contractor overheads, profit and bank guarantees, though higher project oversight costs may result in similar overall construction costs (NSET, 2013). It can also increase community stewardship of the school. Communities prefer to be involved in the entire process rather than see construction handed over to outside contractors (Mustasya, 2012; n.a., 2010; Theunynck, 2009).

Despite its benefits, community-based approaches can still result in unsafe schools (Paci-Green and Pandey, 2016; Bastidas and Petal, 2012). This is primarily because stakeholders may not be properly educated in how to create safe schools (Pandey, 2013). For example, a local population may not be aware of infrequent hazards and their impacts (Dixit and Pandey, 2003); Other times, stakeholders may have priorities that inadvertently undermine school safety. For example, a local stakeholder may donate unsafe land for school construction, retaining more highly valued land for private uses (n.a., 2010; Luna, Bautista and Guzman, 2008). Development partners and government bodies may seek to stretch education dollars by approving less stringent design and construction requirements; they also may be wary of the costs associated with closely monitoring safer school construction (Wisner, et al., 2004; Bastidas & Petal, 2012). Policy-makers may also have few incentives for ensuring school safety: for example, by providing post-disaster aid they might get better political leverage (Paci-Green and Pandey, 2015).

Community-based approaches work best where community involvement is already culturally engrained, and communities are familiar with both construction materials and building techniques. Even then, it's essential that communities are educated and trained in all aspects of the project (INEE, 2009; Arya, Boen and Ishiyama, 2013; Theunynck, 2009). How much the community engages in safer school construction projects may depend upon many factors, including the community's understanding of hazards, their traditional involvement in community projects, and the skills the program manager has in partnering with communities (Pandey, 2013; Paci-Green and Pandey, 2015).

In many countries, existing schools are ageing and poorly constructed. There, the focus is on retrofitting, or strengthening, these schools. If the retrofitting process costs more than half the cost of new construction, these schools are often rebuilt instead (INEE, 2009). In some countries, a community-based approach has been used for school retrofitting or rebuilding projects (Paci-Green and Pandey, 2016).

Case Study

In Nepal, communities often build schools with little government involvement. Bal Bikash Secondary School, located on the outskirts of Kathmandu, is an example of this. In 1984, local masons built a fragile adobe brick school building and added a second storey to it seven years later. As awareness of the region's seismic risk grew, studies concluded that most schools in the region could be heavily damaged or collapse in large earthquakes. In 2001, development partners and the local government provided funds to retrofit Bal Bikash. The National Society for Earthquake Technology-Nepal (NSET) served as the program

manager and technical expert, adding hazard awareness, technical guidance and community training into the project.

NSET treated the retrofit as a community learning opportunity. It provided an initial community orientation to discuss natural hazards, the project and good construction practice. During construction it also held curated tours of the site, allowing residents and especially parents to ask questions about the retrofit process.

Trained structural engineers developed a design that used locally available materials and techniques the community could also adapt to housing construction. NSET trained and certified local masons in retrofit techniques and employed an engineer to oversee the process. At crucial stages of the build, more experienced masons were brought in to guide the local masons. Interest in earthquake-resistant construction was so high that the village government funded further community demonstrations and a five-day training for 30 local labourers.

At completion, the principal and school community celebrated and developed a school disaster management plan that included regular drills.

All these efforts paid off. Local masons began incorporating earthquake-resistant techniques into their work and residents were confident that these techniques could save their lives. In the 2015 Gorkha earthquake, Bal Bikash was undamaged. Several families used it for emergency shelter; they even stayed inside during frequent aftershocks. Immediately after the earthquake, other residents started retrofitting their houses using the same techniques used in the retrofit (Paci-Green and Pandey, 2016).

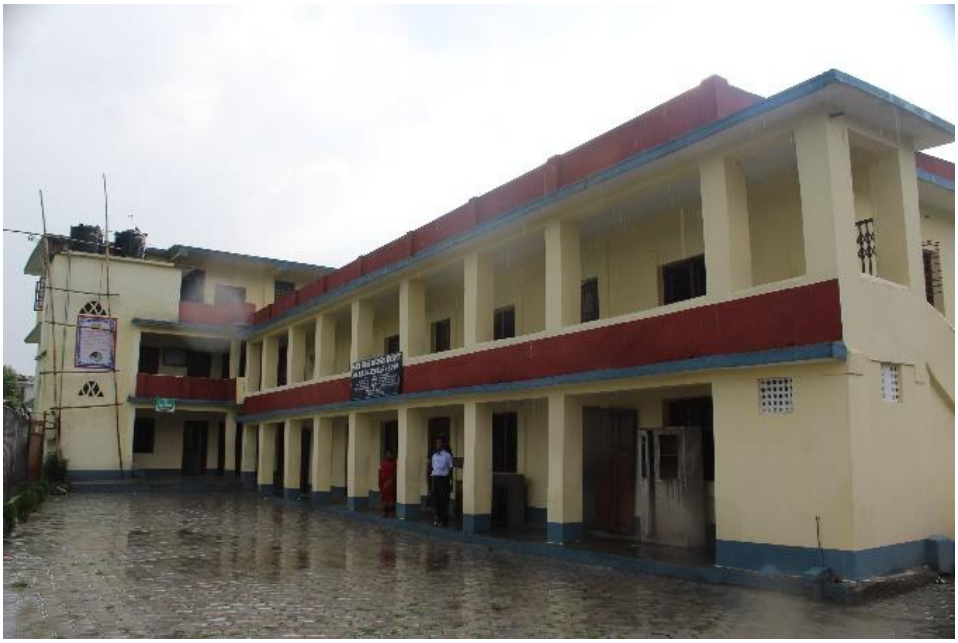

Figure 1. In Nepal, Bal Biskash secondary school (left) was retrofitted through a community-based process. Local masons trained in the earthquake-resistant construction techniques even applied the concepts to local housing repair (right) after the 2015 Gorkha earthquake.

The five stages of community-based school construction:

1. *Prepare and mobilise community support*
2. *Plan for community engagement and select safer school site*
3. *Design safer school with community involvement*
4. *Construct and monitor safer school with community engagement*
5. *Safely maintain and operate the safer school*

Practical Applications

To ensure that community-based school construction results in safer school construction, program managers should fully integrate hazard awareness, collaboration with technical experts and community training in each of the following stages:

1. Prepare and mobilise community support

Before school construction begins, program managers need to mobilise stakeholders to support safer school construction by helping them understand hazards and how risk reduction strategies can work. Program managers should partner with, or form, school management committees to champion and guide the project. School principals often make highly motivated committee leaders (Mustasya, 2012). For retrofitting projects, communities should be involved in assessing the vulnerability of buildings, the school site itself and access routes. During this preparation stage, the program manager should engage with architects and engineers to help investigate the suitability of local building materials and to assess if the community is equipped to undertake the construction (Paci-Green and Pandey, 2015).

2. Plan for community engagement and select safer school site

School buildings should be constructed on land that is not normally exposed to hazards, such as flood plains, tsunami inundation zones, wildfire zones and land located below unstable slopes. If possible, areas with risk of earthquakes and high winds should also be avoided (INEE, 2009; Mustasya, 2012; Bastidas and Petal, 2012). Broader concerns such as improperly managed chemicals and unsafe transportation routes may also pose risks (Luna, Bautista and Guzman, 2008; Seki, 2009).

All sites need to be evaluated for hazards, even land that has been donated. Especially important is evaluating soil stability and safe access to the site (Luna, Bautista and Guzman, 2008).

Site evaluations should pair the community and government officials with technical experts (Arup, 2013). Local residents understand frequent local hazards; technical experts may have expertise in infrequent high-impact, hazards, as well as climatic shifts. Where it is impossible to avoid all hazards, the school design should address the risks that remain. As such, the program manager should work closely with a qualified design engineer and ensure they make the final decision about site safety (For basic site guidance, see INEE, 2009; Paci-Green and Pandey, 2015).

For existing–schools, the program manager should work with technical experts to assess and prioritise weak schools for retrofitting or replacement.

Throughout all of these processes, the program manager should work with the architect or engineer to also assess community knowledge. The community may need training in hazard-resistant construction techniques, accounting, or how to monitor construction quality. It is important to plan for these activities before any work begins (Paci-Green and Pandey, 2015).

3. Design safer schools with community involvement

The program manager must engage a technical expert – either a structural engineer or architect that is trained in hazard-resistant design and construction– in the design process. These technical experts will be able to incorporate hazard-resistant and child-friendly design techniques. They should also ensure that the chosen design builds on local knowledge and follows local practice, making only moderate adaptations to ensure safety, disabled access and gender appropriateness. Design decisions such as material choice, roof shape, building orientation and drainage routes also impact maintenance; the program manager should ensure that the community has enough resources for ongoing maintenance of the design selected.

The design process should allow for plenty of communication between the technical experts and the community, so people understand both the school's hazard-resistant and child-friendly elements (UNICEF, March 2009). Ideally, the community should be allowed to select from multiple design options to increase their sense of ownership. At the same time, technical experts may be unfamiliar with how to engage communities and may need training.

4. Construct and monitor safer schools with community engagement

Where hazards are infrequent, or where local construction practices have changed rapidly, local construction workers and the unskilled labour force may be unfamiliar with hazard-resistant construction (NSET, 2013). In such cases, community involvement should be restricted to non-structural components (Anwar, 2013; NSET, 2013) or technical facilitators should train the community in hazard-resistant construction techniques (Mustasya, 2012). Hands-on demonstrations, pictorial design drawings, being paid during training and certificates of completion have improved the success of community construction (Arya, Boen and Ishiyama, 2013; Paci-Green and Pandey, 2015).

Program managers must hire a trained professional to oversee construction. However, the local community should also be part of this process. Construction checklists and a system where complaints can be heard help enhance accountability and increase the community's confidence in the school (Seki, 2009; Bhatia and Miscolta, 2017).

5. Maintain and operate the safer school

Following construction, the program manager should ensure communities maintain the school. Community members should be trained in all aspects of building safety and maintenance. Operations manuals can explain the primary safety issues and when it might be necessary to contact an engineer. Maintenance schedules can help ensure the building does not deteriorate and become unsafe.

Once the school is open, the school management committee should develop a disaster management plan and ensure that all occupants participate in regular emergency drills and commemorative activities, like safety days and anniversaries of large disasters. Such activities strengthen the culture of safety that started with the commitment to build a safer school.

Conclusions

Schools provide an entry point for community-wide learning about hazards and risk reduction. Where community-based approaches are used, those funding and managing school construction should ensure:

- All projects build safer schools or strengthen existing ones;
- School management committees and local officials are partners in decision-making;
- The technical oversight of construction;
- That local knowledge, materials and techniques are incorporated; and
- Those projects develop capacity and bolster livelihoods through training and participation (Paci-Green and Pandey, 2015).

When a community-based approach is combined with careful consideration of safety, the approach builds both safer schools along with community capacity. Locals increase their awareness of hazards and safer construction practices, then put these techniques into practice elsewhere. Through community engagement, community stakeholders learn that safety from hazards is achievable, at school and beyond.

Follow-up questions

1. Where is community-based school construction most common?

2. In community-based school construction, what aspects of the project are communities are involved in?

3. What are the advantages and challenges of community-based approaches to school construction?

4. True or false: community-based approaches are inappropriate for retrofitting projects.

5. To ensure safer school construction, _____ awareness, technical _____, and community _____ should be integrated into the project.

6. What actions can you take to ensure your school construction or retrofit project achieve safer school buildings and a more resilient community?

More information

See http://saferschoolconstruction.com for a manual, case studies and short films on community-based safer school construction. The material is intended to support program managers, but is also appropriate for engaging donors, education sector policy-makers and program leaders. Other resources for construction standards in humanitarian crises – including the https://www.sheltercluster.org/working-group/construction-standards-working-group and https://resourcecentre.savethechildren.net/library/save-children-construction-policy-benchmark-standards-and-tools – may also be of use.

Readings

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All the references cited in this Research-into-Action Brief, can be found in the Child-Centred Risk Reduction and Comprehensive School Safety Bibliography at:

https://www.zotero.org/groups/1857446/ccrr__css

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The complete series of case studies can be found at http://www.gadrrres.net/resources