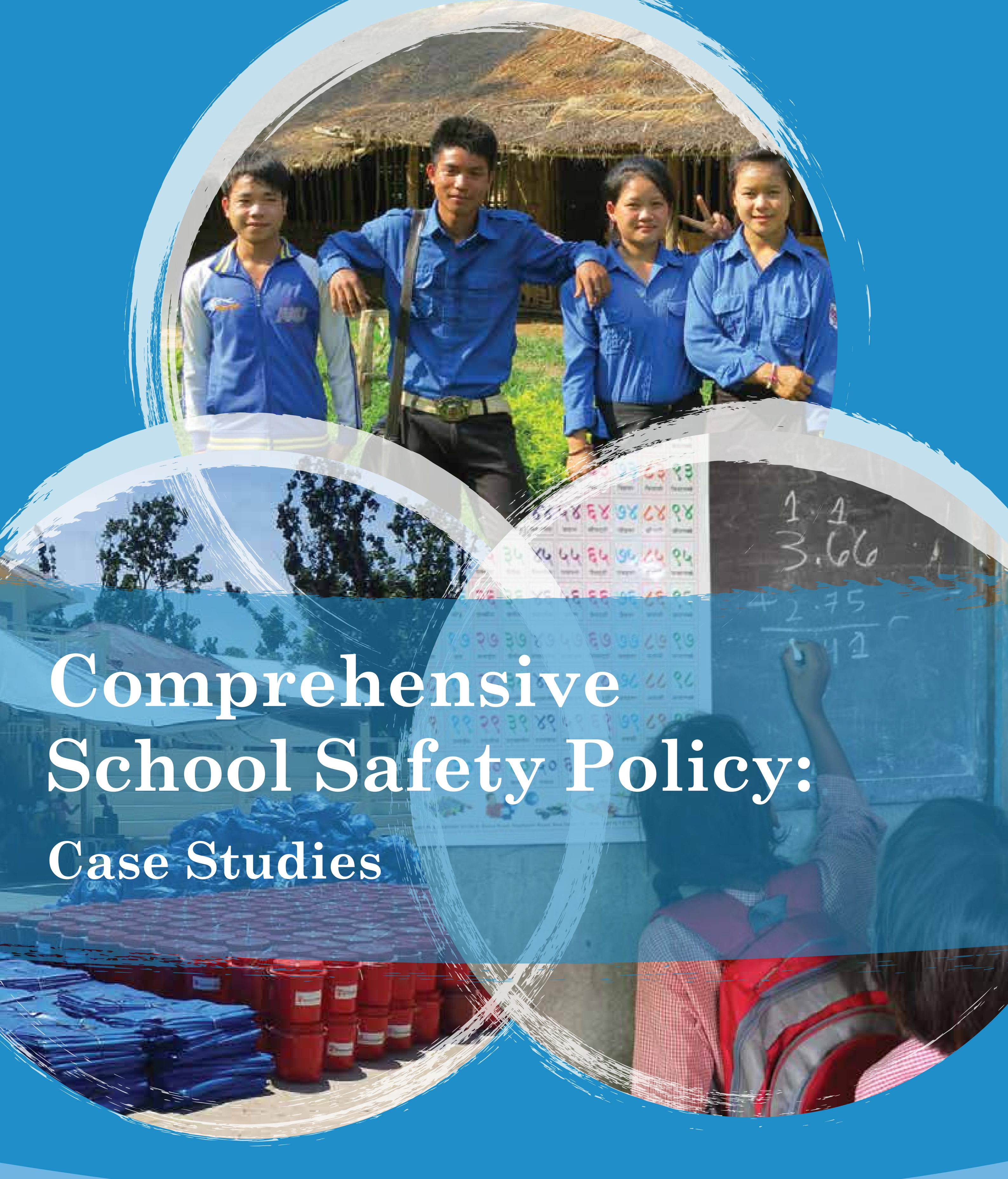

Comprehensive School Safety Policy:

Case Studies

Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

Save the Children

risk RED
risk reduction education for disasters

GFDRR
Global Facility for Disaster Reduction and Recovery

C&A Foundation

Asia Pacific Coalition for School Safety

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GADRRRES CSS Policy Case Studies

CASE STUDIES

Throughout the world, countries have been developing and implementing Comprehensive School Safety (CSS) policies that address safer learning facilities, school disaster management, and risk reduction and resilience education. The following case studies document work in each of these three CSS pillars. Recent efforts have also been underway to scale-up school safety assessments using digital technology.

Pillar 1

China
Assessing and Implementing Structural Interventions for Schools in China

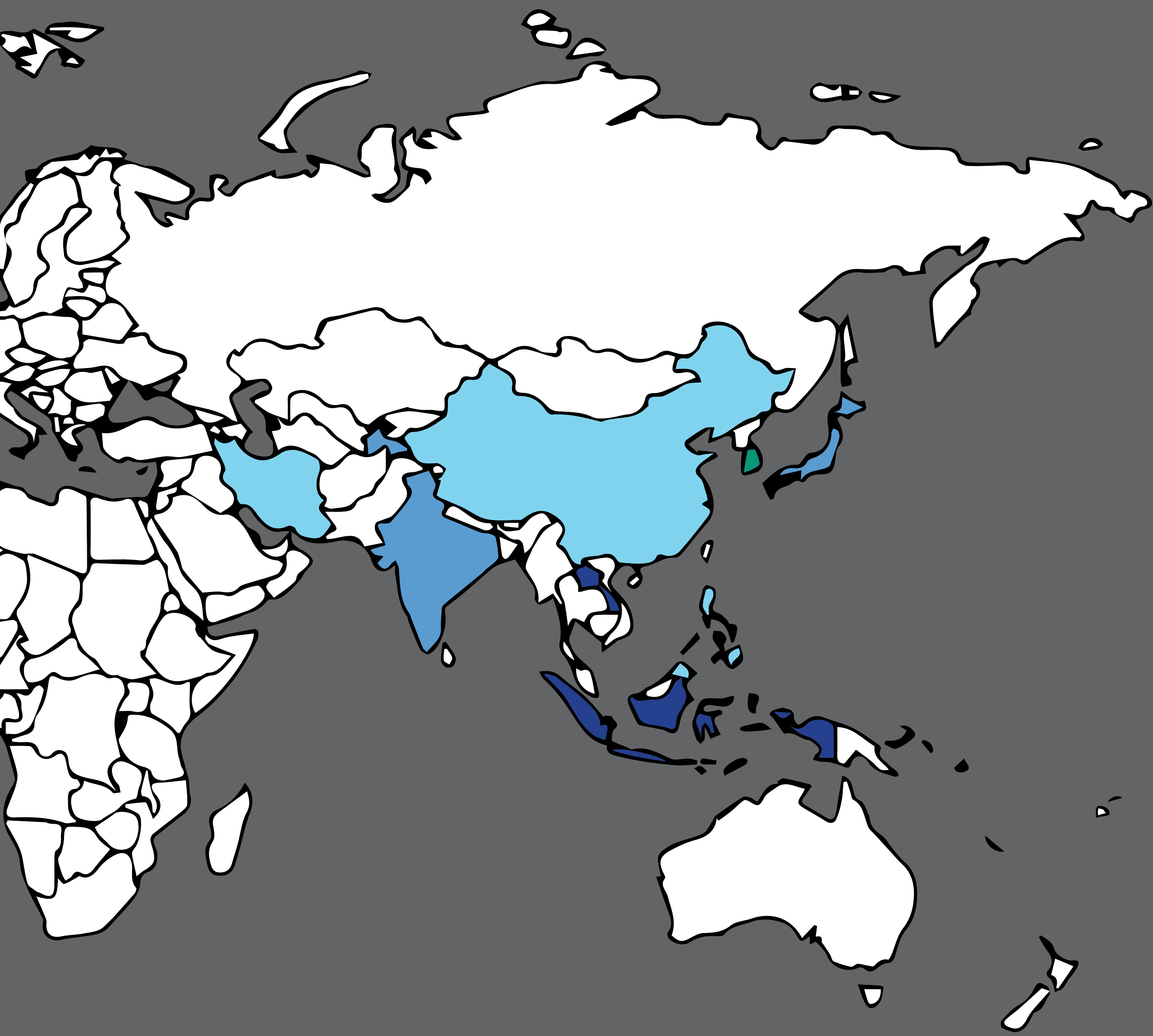
Japan
Guiding Local Governments to Strengthen Unsafe Schools in Japan

India
Designing and Building Earthquake-Safe Schools in Uttar Pradesh

Uzbekistan
Seismic Renovation and Reconstruction of Schools in Uzbekistan

All Pillars

Laos and Indonesia
Scaling-up Comprehensive School Safety Assessment in Laos and Indonesia



Pillar 2

Iran
Nationwide School Earthquake Drills in Iran

United States of America
Developing School Plans and Performing Drills in Los Angeles

Philippines
Protecting Children in Emergencies by Law in the Philippines

Pillar 3

Cuba
Students Leading Communities in Disaster Risk Reduction through Informal Education in Cuba

South Korea
Mainstreaming Road Safety Education for Children in South Korea

Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

Scaling-up Comprehensive School Safety Assessment in Laos and Indonesia

Laos and Indonesia

All Pillars of Comprehensive School Safety

Marla Petal[1], Ana Miscolta[2], Rebekah Paci-Green[2], Suha Ulgen[2], Jair Torres[3], Stefano Grimaz[4], Christelle Marguerite[5], Ardito Kodijat[6], and Yuniarti Wahyuningtyas[6]

1. Save the Children Australia 2. Risk RED 3. UNESCO Paris Office 4. Polytechnic Department of Engineering and Architecture University of Udine, Italy 5.Save the Children Laos 6. UNESCO Jakarta Office

Overview

Beyond good intentions, and even policy declarations, governments need standardised data to identify how well policies are being implemented at the school level, and to adjust course accordingly. The Comprehensive School Safety (CSS) Assessment Suite is a package of methods and three digital tools that can assist governments in monitoring, evaluating, and intervening for school safety. The first tool introduces users to school safety and can be used to build public awareness. The second tool provides a low-cost way for school assessors to collect in-depth, non-technical information about school safety and identify school facilities that may need a more thorough assessment. The third tool allows trained surveyors to conduct a multi-hazard, rapid visual inspection of school structures and facilities. This third tool helps government officials prioritise, which schools need to be rehabilitated, retrofitted, and replaced. The second and third tools have been piloted in Laos and Indonesia, respectively, with great promise. However, governments and users may require training and ongoing support to use these digital tools and integrate the data collected into school safety planning.

Keywords: CSS Suite, school assessment, comprehensive school safety, digital app, retrofit, education sector planning

Global Context

A cohesive global approach to comprehensive school safety evolved out of a decade long process initiated by the 2005 World Conference on Disaster Risk Reduction. Following the conference, several UN bodies and international non-governmental organisations (NGOs) with interest in school safety and DRR education came together to coordinate their advocacy efforts. In 2006, the United Nations International Strategy for Disaster Reduction (UNISDR) formally recognised them as a Thematic Platform on Knowledge and Education. At the 2009 UNISDR Global Platform for Disaster Risk Reduction, member nations highlighted the importance of school safety, and in 2011, committed to assessing the safety of education structures in their countries. In 2013 the coalition became the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES).

After a global consensus process, GADRRRES adopted the Comprehensive

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Introduced by Save the Children as part of the ASEAN School Safety Initiative (ASSI), with support from Australian Aid, DipECHO, and New Zealand Ministry of Foreign Affairs.

Produced by Save the Children, Risk RED, UNESCO, and the SPRINT lab of the University of Udine, with support from the global partnership with C&A Foundation and C&A

School Safety Framework as a foundational document in 2014. The framework was also endorsed as a foundational document for the Worldwide Initiative for Safe Schools (WISS), a government-led global partnership for advancing national level actions on school safety. Many governments have also adopted CSS as a way to align policies and plans between the education and disaster management sectors.

The CSS framework uses a child-centred, all-hazards risk assessment and context analysis for action in three overlapping pillars: Safe Learning Facilities, School Disaster Management, and Risk Reduction and Education. The goals of CSS are to:

1. protect children and education workers from death and injury in schools
2. plan for educational continuity in the face of expected hazards
3. strengthen a disaster resilient citizenry through education
4. safeguard education sector investment.

Whilst the development of the CSS Framework provided global actors in DRR with a common model of school safety, organisations lacked any standardised method of measuring progress within the three CSS pillars. Governments need efficient and standardised methods for collecting data on a host of issues, including:

- a school's exposure to natural and technological hazards
- conditions of school structures and facilities
- the daily dangers students may face on the way to and from school
- how well schools implement disaster management planning
- student exposure to risk reduction knowledge and skills.

Without this information, governments cannot identify and prioritise their interventions to support school safety nor can national progress towards school safety be monitored over time.

Developing Assessment Tools

Even as the CSS Framework was emerging, GADRRRES organisations were simultaneously leading efforts to develop a method for measuring progress towards school safety. In 2009, GADRRRES organisations began a desk review of existing approaches to school assessment to determine whether any existing approaches could be adapted as measurements of CSS pillar progress. Three tools showed promise.

UNISDR was developing a crowdsourcing tool called *How Safe is My School?* and GADRRRES was eager to make sure this tool would provide validated feedback at the national level, and link to more systematic assessment.

Separately, NGOs were using paper-survey methodologies to gather information about local hazards and carry out vulnerability and capacity assessments. Some of these paper surveys assessed action and progress across all three pillars of school safety and generated accurate data, but no one was using it effectively. To be an effective tool for assessing CSS progress, those using paper-survey assessments needed more efficient methods to collect and organise the data. Decision-makers at all levels needed better ways to view the results and use them to make decisions about interventions.

Organisations:

- *Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES)*
- *Risk RED*
- *Ministry of Education and Culture (MoEC), Indonesia*
- *Ministry of Education and Sports (MoES), Laos*
- *Save the Children*
- *SPRINT Laboratory, Polytechnic Department of Engineering and Architecture, University of Udine*
- *United Nations Educational, Scientific and Cultural Organization (UNESCO)*

Problems:

- Governments lacked a way to assess CSS policy interventions.
- Governments lacked a way to efficiently identify high risk schools and select appropriate interventions.

Goals:

- Track CSS policy interventions at school, district, sub-national, and national level.
- Efficiently gather and manage school-level information about hazard exposure, facilities safety, school disaster management, and related education.
- Efficiently identify schools needing interventions.
- Estimate costs for retrofit and replacement of weak school facilities.

Intervention:

- CSS Assessment Suite, three digital tools that can assist governments in monitoring, evaluating, and intervening for school safety.

In Italy, the Safety and Protection Intersectoral (SPRINT) Laboratory of the Polytechnic Department of Engineering and Architecture of the University of Udine was developing a third tool, Visual Inspection for defining Safety Upgrades Strategies (VISUS). Using existing hazard maps and available data on school building typology as a baseline, they were carrying out rapid visual inspections to gather information in several areas of concern: site conditions, structural performance, local structural criticalities, non-structural components and functional aspects. Based upon the gathered information the VISUS team used algorithms to grade a school's safety level. This ensured the method could be feasibly be adapted by governments and used as a technical triage process for defining safety-upgrading strategies. VISUS is available to governments with limited technical capacity yet also provides them with reliable assessment data, allowing them to make well-informed decisions and develop strategies for improving safety conditions.

Though the three tools were being independently developed, GADRRRES members agreed to develop them further and bring them together as part of a harmonised suite of tools. Risk RED, a GADRRRES partner organisation, developed the crowdsourcing app as a tool to increase awareness and stimulate demand for school safety. Save the Children and Risk RED tackled the conversion of paper-survey assessment methods to a digital platform. The United Nations Educational, Scientific and Cultural Organization (UNESCO) partnered with Sprint Lab to expand the VISUS tool.

Out of the harmonisation process came the CSS Assessment Suite. The suite is currently comprised of three approaches designed for different users, using science-based methodologies and making use of mobile applications. Whilst currently focused on school safety assessment, GADRRRES envisions future expansion of the tools to include rapid post-disaster needs and damage assessment, and integration with SMS-based, brief survey tools.

- **CSS First Step** is a simple crowdsourcing tool available as a smart phone app for anyone to use. It requires only that the user – whether a student, teacher, or community member – registers and locates their school on a map. CSS First Step then asks the user to answer basic survey questions about the school site, relevant hazards, and local disaster management strategies. Users can upload photos of the school site or local hazards. Based on the responses, the app automatically generates an e-mail back to the user with recommended next steps for action to improve school safety. The primary goal of CSS First Step is to encourage awareness of and interest in school safety.

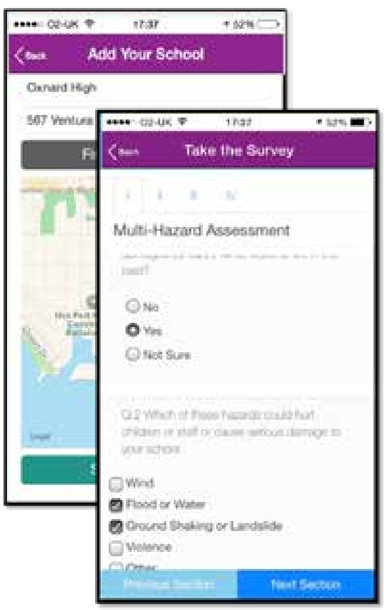

Figure 1. The CSS First Step app functions on smart phones and is intended for all users. It helps raise awareness about comprehensive school safety.

- **CSS School Safety Self-Assessment Survey** (SSSAS) uses a smart phone or tablet to guide school assessors, such as government officials or school management committees, in collecting in-depth, non-technical information on school safety at a low cost. The SSSAS tool asks users questions about student demographics, local hazard risk, school site and structures, school disaster management, and disaster risk reduction education. The SSSAS prompts the school assessors to use the smart phone or tablet to take photos that document their survey responses. Based on input data, users receive a summary report, along with recommendations for action. Separately, authorised government officials can use a web-based data portal to generate reports with summary data for the schools in their jurisdiction. They can use a map-interface to locate information about individual schools and can gain further insights by viewing photos of the school remotely. The SSSAS helps authorities triage those schools that may be in need of the costlier, in-depth school facilities assessment that VISUS offers.

Figure 2. The CSS School Safety Self-Assessment Survey (SSSAS) functions on smart phones and tablets, allowing authorised personnel to gather data on all three pillars of comprehensive school safety. The survey generates summary reports with recommending actions.

- **VISUS CSS**, which stands for the Visual Inspection for defining Safety Upgrades Strategies, is the third and most technically advanced tool in the CSS Suite. VISUS is a multi-hazard school safety assessment methodology that focuses on technical assessment of school structures and facilities. Surveyors using VISUS must be trained and have expertise in construction or engineering. After surveyors have collected data at school sites, the data is sent for remote automated processing; the app returns individual school and collective summary reports, including budget estimations for safety upgrading.

  VISUS is designed to support time-efficient and reliable safety assessments of school sites and structures through a science-based methodology adapted to the local context. VISUS helps government officials prioritize and implement school rehabilitation, retrofit and replacement. While the tool was originally designed for earthquake risk assessment and piloted in Italy (2010) and El Salvador (2013), VISUS was piloted as a multi-hazard tool in Laos (2015) in collaboration with Save the Children; in Indonesia (2015-16) in cooperation with Global Facility for Disaster Reduction and Recovery; in Peru (2016); and in Haiti (2017) in close coordination with the United Nations Development Programme (UNDP) and the United Nations Entity for Gender Equality and the Empowerment of Women. Key stakeholders and subject-matter experts are important to the adaptation of these tools. Important to the VISUS tool is national ownership and contextualisation to local needs. The VISUS developers recommended forming a Technical

"Out of the harmonisation process came the CSS Assessment Suite. The suite is currently comprised of three approaches designed for different users, using science-based methodologies and making use of mobile applications..."

Working Group to guide the translation and adaptation of the survey questions and evaluation algorithms in each new context. This working group would also develop locally feasible approaches for building capacity so that the tool could be adopted at scale. The GADRRRES steering committee decided that all tools in the suite should use a similar approach to local piloting and adoption.

Figure 3. The VISUS app allows trained surveyors to conduct multi-hazard, rapid visual screenings of school facilities to identify structural weakness. VISUS generates summary reports, including budget estimates for safety upgrading.

“Indonesia was the first country in which a large-scale pilot of the multi-hazard VISUS tool took place...”

Pilot Testing in Laos and Indonesia

In Laos, Save the Children – in partnership with the Ministry of Education and Sports (MoES) – carried out pilot testing for the SSSAS tool in March of 2015 and for VISUS in October of 2015 as part of Association of Southeast Asian Nations’ Safe Schools Initiative (ASSI), with support from Australian Aid, DipECHO, and New Zealand Ministry of Foreign Affairs. ASSI, a partnership between member countries and non-profit organisations to improve school safety, began work in Laos in 2014 with a focus on using information technology to achieve its goal of safer schools. The SSSAS tool, which was developed by Save the Children Laos, was piloted in 50 schools in March of 2015 using a paper-based form, and expanded to nearly 100 schools in two additional provinces the following year, using a tablet-based questionnaire.

Provincial reports generated by the SSSAS tool helped authorities understand school safety better. The reports showed many schools were exposed to health, drought and landside risks, with over half of the schools missing more than 11 days each year due to disaster impacts. Many schools lacked potable water and stated they needed early warning systems for fire, high winds, and drought. Schools identified, but had not yet carried out many necessary risk reduction measures assessed by the SSSAS tool. The assessment also showed bright spots: DRR is integrated into curriculum at most of the pilot schools where intervention programs had taken place, and most students and teachers did understand hazards, risk reduction and had some of the basic skills for response preparedness. Teachers and representatives from the MoES indicated use of the visuals within the SSSAS tool makes the tool particularly useful for school management committees, as well as education and disaster management authorities.

Following the pilot testing of the SSSAS tool in Laos, Save the Children conducted a review of the tool to identify areas for potential improvement. They made adjustments to the automated reporting forms and prioritised porting to IOS as well as Android platforms. In the next phase, they want to add drag and drop features and be able to build their own reports.

Figure 4. After completing a SSSAS assessment of schools, the MoES generated school and provincial reports to understand comprehensive school safety issues better.

Indonesia was the first country in which a large-scale pilot of the multi-hazard VISUS tool took place. UNESCO, with financial support from the Indonesian government, conducted 60 VISUS assessments in 2015 in western Indonesia using a paper-based form. In 2016, with support from the World Bank, VISUS-trained surveyors piloted a tablet-based format, translated into Bahasa, at 100 schools in eastern Indonesia.

Representatives from the SPRINT Laboratory, with support from UNESCO and engineering faculty from the Indondesian Bandung Institute of Technology, trained local surveyors from the engineering and architecture departments of local universities and from vocational schools to operate VISUS. Students were eager to participate, because they perceived VISUS training as advantageous and relevant to their own studies and career trajectories. During training sessions, representatives from the Ministry of Education and Culture (MoEC), as well as sub-national authorities, were present so that they too understood the school assessment process. Bandung Institute of Technology helped adapt VISUS to the local geographic context and provided relevant information about the study area, such as pertinent local hazards and building typologies. In each of the pilots, the VISUS reports provided specific recommendations for upgrading school facilities.

"Students were eager to participate, because they perceived VISUS training as advantageous and relevant to their own studies and career trajectories..."

"...before the tools could be adopted, local stakeholders and subject-matter experts needed to be engaged..."

Figure 5. In Indonesia, surveyors from local engineering and architecture departments and vocational schools were trained to use VISUS in order to conduct rapid visual assessments of school facilities. Photo credit: UNESCO Jakarta office.

Prospects for Scaling-Up the CSS Assessment Suite

The CSS Assessment Suite tools are still in early stages of piloting and whilst salience and enthusiasm are high, the effectiveness of these tools for action planning has not yet been systematically evaluated.

In both Laos and Indonesia, project stakeholders identified several challenges to the adoption of these technologies. They noted that before the tools could be adopted, local stakeholders and subject-matter experts needed to be engaged. Local stakeholders needed to be prepared to operate new technologies. Even if stakeholders were prepared to adapt and use the tools, scaling up and implementing the tools across an entire region or nation would require further commitment. It would only work if local organisations were able to sustain the process of data collection, analysis and decision-making.

In Laos, using the SSSAS tool requires familiarity with basic tablet operation, as well as knowing how to maintain current operating systems, upload current versions of the app, and download data collected. District education offices need to be trained in these basic skills before they can implement SSSAS across all of their 147 education districts. The MoES also requires technological and human resources to be able to manage the portal. Organisational partners may need to provide moderate support to the government, even after implementation, to maintain the data collected until the government is able to fully operate such systems themselves. Furthermore, Laos needs a more comprehensive legal framework that codifies school safety measures into law in order to support the institutionalisation and scaling up of tools like SSSAS.

In addition to the technological and human resources needed for SSSAS, VISUS requires a population of trained surveyors. Governments wanting to implement VISUS across an entire nation may need to train thousands of surveyors to use the tool. One strategy for developing a large body of potential surveyors is integrating VISUS training into the curricula within vocational schools and engineering departments of universities. The simultaneous wider adoption of the less costly, non-technical SSSAS tool could effectively triage schools to reduce the number of schools needing the costlier VISUS technical assessment.

Indonesian pilot project stakeholders noted another challenge for scaling-up – the importance of adapting the methodology to local environments. In geographically diverse countries like Indonesia, which is composed of 13,000 islands, adaptation of VISUS parameters to the variety of geophysical and climactic contexts would be challenging and time-consuming. In such cases, national governments would need to rely heavily on local governments for the adaptation and implementation of the methodology, as well as on the extensive network of academic institutions present in the whole country.

Finally, the resources to invest in mainstreaming the use of CSS Assessment Suite tools will necessarily compete with the primary focus Ministries of Education have on providing quality basic education. Until the costs of *not* investing in risk reduction can be assessed and proven, risk reduction and resilience in schools may remain a secondary and neglected goal.

Major Impacts:

- Ministries of Education in Laos and Indonesia use digital tools to gather school-level data.

Greatest Insights:

- Engage local stakeholders and subject matter experts.
- Work with local organisations that can sustain data collection.
- Build capacity of government actors and surveyors.

What's Next:

- Adapt CSS Assessment Suite to new contexts.
- Expand to include post-disaster assessment and SMS-based, survey tools.

Comprehensive School Safety (CSS) is a framework for advocacy and action aligning policies and plans across education and disaster management sectors at all level. It uses child-centred all-hazards risk assessment and context analysis as the evidence base for action in three overlapping areas: Safe Learning Facilities, School Disaster Management, and Risk Reduction and Resilience Education. For more information, see http://www.gadrrres.net/

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Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

Assessing and Implementing Structural Interventions for Schools in China

Ana Miscolta, Risk RED

China

Pillar 1: Safe Learning Facilities

Organisations:

- *Ministry of Education (MoE)*
- *United Nations Children's Fund (UNICEF) China*

Schools Impacted:

- 322,938

Overview

In 2009, the Ministry of Education (MoE) developed a program that mandated the seismic assessment and, as needed, the retrofit or reconstruction of every primary and secondary school in China within three years. The National Primary and Secondary School Building Safety Project was developed a year after the 2008 Sichuan earthquake, also called the Great Wenchuan earthquake, which resulted in the deaths of approximately 87,000 people, including 10,000 schoolchildren (Shuanglin, 2016; Sheth, 2008). The M_s 8.0 earthquake revealed widespread seismic susceptibility among China's school building stock, with 7,444 school buildings damaged or destroyed (Chen & Booth, 2011).

The School Building Safety Project mandated the assessment and retrofitting or reconstruction of weak primary and secondary schools nationwide, including those unaffected by the Sichuan earthquake. (The total number of school construction projects completed is unavailable at the time of publication. However, over 90% of school projects slated for retrofit, repair, or reconstruction have been completed.) The project followed on the heels of the central government's generalised recovery and reconstruction plan in earthquake-affected areas, which involved around 4,600 school reconstruction projects across the three affected provinces of Sichuan, Gansu, and Shaanxi (State Planning Group of Post-Sichuan Earthquake Restoration and Reconstruction, 2008). The School Building Safety Project, which is ongoing, is an example of how states with strong central governments may approach the issue of unsafe school structures where the problem is geographically expansive. Though the project is an initiative of the central government, it has relied heavily upon coordination with provincial and local governments, school administrators, as well as international organisations for planning and implementation.

Keywords: China, school facility assessment, school retrofit, earthquake

Hazard and Education Context

China, a country with vast territory, is susceptible to earthquakes, landslides, floods, droughts, winter storms, and typhoons. China's earthquake risk is especially concerning, with fault zones underlying parts of the country's western and eastern regions, including the capital.

China first established national seismic building codes in 1974, but these were soon revised with higher standards following the 1976 Tangshan earthquake, which killed over 240,000 people (UNCRD, 2009; Chen & Booth, 2011). Since the adoption of the Code for Seismic Design of Buildings in 1989, which was updated in 2001, China's written seismic building code has been consistent with international standards (Ministry of Construction of the People's Republic of China, 2001). The building code rates each region on the Chinese Seismic Intensity Scale (CSIS), a 12-point scale based on ground movement and on

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subjective observations of earthquakes. The code requires buildings in regions with high CSIS ratings to be designed to withstand more intense seismic shaking. In 1997, The Law of the People's Republic of China on Protecting Against and Mitigating Earthquake Disasters – colloquially known as The Earthquake Act – gave the seismic building code national legal status (Ke et al., 2015).

Despite the presence of a robust seismic building code, the Sichuan earthquake revealed gaps between building code standards and building construction practices. The gap was particularly problematic in rural areas, where economic development lags behind that of urban areas. Schools in rural areas often also have insufficient budgets for structural assessment and repair.

Urban students enjoy significant educational and socioeconomic advantages over their rural peers. Urban schools tend to have higher levels of funding for school repairs and educational materials, and urban families often have more resources to support their child's basic needs. Many buildings in rural areas, however, are older than the country's building code and were never subject to seismic regulations. In rural areas of the Sichuan region, many school structures were unreinforced masonry brick buildings with multiple storeys, which were highly susceptible to collapse in earthquake. In some case, buildings lacked any formal engineering design at all, which often led to buildings collapsing and killing or injuring students and teachers inside. The Sichuan earthquake revealed that even newer buildings in rural areas were built far below standard, or with substandard material (Chen & Booth, 2011).

The Sichuan earthquake also revealed inadequacies in the application of the building code. The Sichuan region was assigned a CSIS rating of VII, yet some areas of Sichuan experienced intensities of up to XI during the earthquake. Even buildings built to conform to the legal standard were vastly under-strength for the Sichuan earthquake (Chen & Booth, 2011). The earthquake highlighted major problems with both older school buildings and newer ones constructed without sufficient adherence to seismic building codes or designed to inadequate shaking intensities.

Developing a Process for Nationwide Assessment

Following the Sichuan earthquake, it was clear that China's schools needed to be evaluated for structural safety and that many would likely need to be retrofitted or replaced. In September 2008, China's United Nations Children's Fund (UNICEF) office brought technical experts and policy-makers from the Ministry of Education (MoE) to Japan to study international practices in disaster risk reduction, with a focus on school building safety (UNICEF, 2009). In December of 2008, China coordinated with the OECD to organise an international training conference on post-earthquake reconstruction of public facilities, which drew on international experience with planning and implementing post-disaster reconstruction. Over two dozen Chinese officials from all levels of government attended, bringing their knowledge back to their respective jurisdictions (OECD, 2009). The following year, the MoE established the School Building Safety Project, a nationwide project to 1) assess how well each school building could withstand the hazards to which it was exposed and 2) retrofit or reconstruct public and private primary and secondary school buildings that were assessed as unsafe. The program's focus was earthquake risk, but school assessments also considered other natural hazards such as landslides, floods, fires, typhoons, and lighting. The program received financial and logistical support from UNICEF's China office.

The National School Safety Office supervised the project and managed data on a nationwide scale. However, with nearly 300,000 schools to assess for potential retrofitting or reconstructing, the project coordinated with local governments

Problems:
- High earthquake risk
- Seismically weak existing school building stock

Goals:
- Reduce risk of earthquake-related injury and death in schools

Intervention:
- National seismic assessments of school buildings and prioritisation for retrofit and reconstruction

Major Impacts:

- Reconstruction and retrofit of weak schools

Greatest Insights:

- Use of national school building inventory to aid in prioritisation and monitoring

What's Next:

- Ensure future school construction meets new standards of design, construction, and construction monitoring
- Ensure schools maintain school facilities

to direct their own project management and implementation. Provincial governments primarily played an administrative role, managing data, funds, and helping local governments with school assessments.

Each province was required to submit a project "road map" to the central government, which outlined deadlines for assessments and school construction. City and county governments were responsible for coordinating the assessments with schools and technical teams, collecting and providing school data to provincial authorities, and implementing the retrofitting or reconstruction projects (Ministry of Education, 2009a). The central government allocated approximately 30 billion yuan over three years toward the School Building Safety Project while approximately 350 billion yuan came from provincial governments (Yinfu, 2014).

The devastation of the Sichuan earthquake created high levels of social support for policies aimed to protect adults and children from future earthquake events. There was no notable opposition to the School Building Safety Project. The project had substantial support from outside organisations and universities. For example, the Ministry of Education collaborated with UNICEF to develop the "National Guidelines for Safe School Construction after the Sichuan Earthquake", which was used as a guideline for school design and construction. The MoE also consulted with Beijing Normal University in designing mechanisms for project organisation and data management.

Ensuring Safe School Construction

One of the first steps in the assessment process was the creation of provincial databases for the storage of school assessment data. These provincial databases supported a national database known as the National Primary and Secondary School Buildings Information Management System, also known as the School Building Database. Within three months of creating provincial databases, city and county governments were expected to provide basic data about their school inventories, often in the form of photographs and videos of the schools (National School Security Office, 2010).

Professional teams assessed the schools using uniform technical standards outlined by the MoE. School buildings were compared to their original designs and to current building codes and the teams conducted field tests to assess their structural integrity. Assessment teams then recommended whether the school was safe, or should be retrofitted or demolished (Guo et al., 2014).

Based on these recommendations, the individual school worked with a design company to create a school design plan and accompanying project budget. The school then applied for the necessary funding from the local government (Guo et al., 2014). School assessments, recommendations, and proposed projects were incorporated into the School Building Database. City or county authorities then prioritised school project funding and allocated a specific amount to each school's project. After the local government approved a school's design plan and budget proposal, the school would contract a private company to complete the construction plan.

The Earthquake Act, which codifies the seismic building code, was amended so that schools would be built to a higher standard than other buildings in the region (Chen & Booth, 2011). Furthermore, program guidelines mandated that local governments had to select geologically stable school sites outside of landslide and flood-risk areas (Ministry of Education, 2009). Contractors for school construction were required to not only meet the "National Guidelines for Safe School Construction after the Sichuan Earthquake," but the relevant building codes for schools as defined by their seismic intensity zone.

The central and provincial governments placed great emphasis on construction monitoring to ensure that school buildings were constructed to the standards defined by the MoE's guidelines and by the building codes. While provincial governments carried out formal inspections of school construction projects, a system of "social supervision" was institutionalised whereby private citizens were encouraged to report concerns and complaints about school construction to authorities.

Policy-Enabling Factors and Remaining Challenges

High levels of organisation and coordination between governments and a large budget from the central and provincial governments helped the project develop quickly. Over 90% of schools slated for retrofit, repair, or reconstruction have been completed. Though the School Building Safety Project has already created thousands of safe schools, and can largely be considered a success story, governments struggled to meet the ambitious goal of completion within three years. The division of such a large budget among nearly 300,000 schools was a complex process; some schools navigated the complexity quicker than other schools, either due to the technical state of their buildings or a greater availability of provincial funding.

In the coming years, China will need to ensure that the new standards of design, construction, and construction monitoring continue to be applied to new school construction. New and retrofitted schools, especially those in rural areas, will need sufficient funds for school maintenance and repair to ensure that the successes of the School Building Safety Project are sustained.

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Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

Japan

Pillar 1: Safe Learning Facilities

Organisations:

- *Ministry of Education, Sports, Science and Technology (MEXT)*
- *Japan Building Disaster Prevention Association (JBDPA)*

Schools Impacted:

- 52,000 public schools

Save the Children

C&A Foundation

WORLD BANK GFDRR

Produced by the World Bank, the Global Facility for Disaster Reduction and Recovery, the Japan Hub, Save the Children, and Risk Red, with support from the global partnership with C&A Foundation and C&A

Guiding Local Governments to Strengthen Unsafe Schools in Japan

World Bank and the Global Facility for Disaster Reduction and Recovery, Ana Miscolta, Risk RED

Overview

Between 2002 and 2016, the percentage of earthquake-resistant elementary and junior high school buildings in Japan increased from just 44.5% to 98%. The rapid increase was the result of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)'s Program for Earthquake-Resistant School Buildings. In 2003, MEXT published Guidelines for Promotion of Earthquake-Resistance School Building for local governments. Using the technical and planning guidance from the MEXT guidelines, as well as national subsidies available for school retrofit projects, municipal governments across the country began implementing school retrofits and reconstructions in their jurisdictions. By 2015, approximately 52,000 elementary and junior high schools had been either assessed as seismically safe, retrofitted to be seismically safe, or torn down and reconstructed.

Keywords: school assessments, seismic retrofit, earthquake-resistant school buildings

Hazards and Education Context

Sitting atop a subduction zone at the edges of four continental and oceanic tectonic plates, Japan experiences frequent earthquakes. The country records approximately 1,500 earthquakes each year; however, many of these are minor tremors or imperceptible. More destructive earthquakes are less frequent, occurring several times each century. The most recent destructive earthquake in Japan was the Great East Japan Earthquake of 2011, which had a magnitude of Mw9. The earthquake triggered a deadly tsunami and resulted in nearly 16,000 deaths.

With the high frequency of earthquakes, Japan began mandating anti-seismic construction practices decades before most other countries. Anti-seismic building standards were first incorporated into the building code in 1924 and were revised and improved after every major earthquake. Two major shifts in anti-seismic building standards took place after 1924. The first shift followed the 1968 Tokachi offshore earthquake, which damaged the modern reinforced concrete (RC) building stock. In 1971 the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT), formerly the Ministry of Construction, heightened requirements for shear strength and established protocols for assessing and retrofitting the seismic safety of existing buildings. The second major shift occurred in 1981, when the MLIT heightened building standards to ensure the safety of building occupants even in high magnitude, rare earthquakes. Previously, national building standards had focused on smaller magnitude, but more frequent, earthquakes.

The 1981 revision was a major turning point for school safety. School buildings constructed after 1981 and subject to these standards were considered safe. However, all school buildings that had been built prior to 1981 and not been retrofitted were considered seismically unsafe.

Program Development Process

The national government began allocating subsidies to retrofit elementary and junior high schools located in high-risk earthquake regions in 1978. However, it was not until the Great Hanshin-Awaji earthquake of 1995 that the government began considering school building outside this high-risk zone. Following the Great Hanshin-Awaji earthquake, which damaged nearly 4,000 school facilities, the national government turned its attention to earthquake risk to school facilities nationwide, even in regions where earthquake risk was considered relatively low.

In 1995, MEXT partnered with the Architectural Institute of Japan (AIJ) to survey the damage to school buildings from the Great Hanshin-Awaji earthquakes. Unsurprisingly, the survey showed that school buildings constructed prior to 1981, when strict anti-seismic standards were put in place, were much weaker. The older school buildings were more heavily damaged than those constructed after 1981.

In response to the results of the damage survey, the national government expanded its school retrofitting subsidy program, making funds available to all pre-1981 public and private schools nationwide the same year. MEXT encouraged local governments to address the structural risks of pre-1981 schools by commissioning construction design architects to complete seismic diagnoses, a process in which the architect evaluated the anti-seismic structural capacity of the building using guidelines published by the Japan Building Disaster Prevention Association (JBDPA). Where seismic diagnosis indicated retrofit was necessary, a local government could take advantage of retrofit subsidies. However, many local governments did not comply. MEXT subsidies covered only about a third of the costs. Even with the availability of national subsidies for retrofit, local governments saw planning and implementing a seismic diagnosis and retrofit as complicated and expensive.

Seven years later, in 2002, MEXT conducted a new nationwide survey on the seismic safety of school buildings. They found that few local governments had completed seismic diagnosis, let alone retrofits, after the 1995 AIJ damage survey. Overall, only 44.5% of elementary and junior high school buildings nationwide fulfilled national seismic safety standards and could be considered earthquake resistant. MEXT realised that it needed a new strategy to better equip local governments to address their school building earthquake risk.

In late 2002, MEXT organised a working group of earthquake and planning experts, architects, and local government representatives to develop guidelines for the planning and implementation of school building retrofitting projects. The Guidelines for Promotion of Earthquake-Resistance School Building, which was published and distributed to local governments in 2003, describes the basic concepts of structural earthquake safety in schools, how to prioritise retrofitting projects, and methods for planning and implementing retrofitting projects.

These guidelines directed local governments to:

- Establish a steering committee consisting of relevant stakeholders in school safety and disaster prevention, including administrators, teachers, engineers, and academic experts. The steering committee would help stakeholders understand perspectives and gain knowledge from other professional fields.

- Conduct a baseline survey of school buildings inquiring about the condition of facilities, building design, presence of active fault, school

Problems:
- High earthquake risk.

- Seismically susceptible school building stock.

Goals:
- Strengthen all elementary and junior high school buildings in Japan to resist anticipated earthquakes.

Intervention:
- Development of guidelines for local governments to plan and implement assessment and retrofitting projects.

- National subsidy programme for school assessments and retrofits.

Major Impacts:

- Doubling of the percentage of seismically safe schools from 44.5% to 98% in four years.

Greatest Insights:

- National surveys to monitor program progress and develop additional guidance as needed.

What's Next:

- Increasing subsidies for the assessment and retrofit of private schools.

status as an evacuation centre, and plans for closure or merger.

- Prioritise school buildings for vulnerability assessment and/or seismic diagnosis based on the number of floors, year built, and other estimates of structural integrity.

- Conduct a vulnerability assessment in cases where prioritisation surveys indicate a building was structurally weak or dilapidated. The vulnerability assessment comprehensively assesses the level of building deterioration and if its calculated vulnerability score fell below a certain threshold, it had to be reconstructed. If the calculated vulnerability score was above that threshold, a seismic diagnosis must be conducted.

- Conduct a seismic diagnosis where prioritisation surveys find that a building is structurally average or where a vulnerability assessment resulted in a vulnerability score above the threshold requiring reconstruction. The seismic diagnosis produced two indices: a seismic index of structure and a horizontal load-carrying capacity index. These two indices were then associated with a low, medium, or high risk of collapse in earthquake, and determined the urgency of school retrofitting projects.

- Determine the urgency of projects using the results of the seismic diagnosis. Local governments were told to consider schools with high risk of collapse as cases with high urgency.

- Formulate an annual plan after reviewing the list of school facilities that require structural intervention in their jurisdiction. Local governments were told to consider extent of work, associated costs, and number of high-risk buildings that require urgent attention.

MEXT increased its support for the program at the same time. National subsidies, which MEXT provided in the form of subsidies to local governments, had originally covered approximately one-third of program costs – costs associated with vulnerability assessment, seismic diagnosis, retrofit planning and implementation – yet, new school disasters brought renewed concern.

After the 2008 Wenchuan earthquake in China, in which nearly 10,000 children were killed after school buildings collapsed on them, the Japanese government increased subsidies to cover two-thirds of the costs through the Act on Special Measures for Earthquake Disaster Countermeasures. MEXT also encouraged local governments to allocate tax revenue and issue bonds to further finance these projects.

Implementation

Though MEXT provided guidance for the planning and implementation of school retrofits, municipal governments were responsible for the implementation process because they had authority over the public school facilities subject to retrofit. Following the guidelines developed by MEXT, municipal governments established a steering committee and completed the recommended steps provided in the MEXT guidelines. Steering committees were in charge of coordinating the implementation process; they selected a seismic reinforcement plan, listed in guidelines provided by MEXT; prepared a detailed design of how reinforcement methods would be applied to each part of the building; developed a construction schedule with estimated costs; and implemented the construction work.

Given the scale and complexity of the work, local governments typically contracted this work to the private sector. Construction typically took between six months to several years depending on the extent of the retrofit or if a school was being entirely reconstructed. For longer-term projects, temporary facilities needed to be built and used for school activities until the permanent structure was completed. For small-scale projects in which students remained on site during construction, the construction area was fenced off and stationed with security guards.

Prefectural governments typically played an important role as liaisons between the national government and municipal governments. The prefectural governments typically facilitated the application of national subsidies and reporting municipal progress to MEXT. To ensure the prefectural governments had the capacity to supervise municipal implementation of the Program for Earthquake-Resistant School Buildings, MEXT offered prefectural governors workshops that detailed the programme's guidelines and proper application, and facilitated trainings for prefectural government leaders by experts in academia, such as the JBDPA.

MEXT monitored program progress of municipalities primarily through the collection of survey data. Beginning in 2002, MEXT conducted the Status of Seismic Resistance of Public School Facilities, which was specific to the program. The survey collected basic data on seismic integrity of school building stock and also allowed local governments to indicate their retrofit program progress and define obstacles inhibiting proper program implementation, such as lack of local technical expertise or finances. The results of this survey helped MEXT develop additional resources for local governments to overcome these obstacles, often in the form of additional guidance documents or increased subsidies.

MEXT also conducted the School Basic Survey, which provided data on number of classrooms, students, and school facilities, and the Public School Facilities Survey, which collected quantitative information on school facilities such as building area and condition. Results of survey data collected by MEXT were publicly available, and names of local governments that were reticent or slow to implement retrofits were named in press releases in an effort to encourage local authorities to take action.

Policy-Enabling Factors and Remaining Challenges

By the end of 2015, over 95% of the public elementary and junior high school buildings in Japan were earthquake-resistant as a result of the guidelines and facilitating measures but in place by MEXT as part of the Program for Earthquake-Resistant School Buildings. As of 2016, this percentage was estimated at 98%. The remaining 2% of schools considered seismically unsafe have not been addressed due to planned closure or merger. The success of the program is due in large part to the availability of national subsidies, which reduced the financial burden school retrofitting placed on local governments. In addition, MEXT's development of comprehensive guidelines greatly facilitated program progress by providing local governments with detailed, step-by-step information for program planning and implementation. Furthermore, the collection of data through national surveys allowed MEXT to monitor program progress at the local level and develop solutions where local governments indicated obstacles in program implementation. This data, which was published by MEXT, also served as a mechanism for encouraging noncompliant jurisdictions to take action.

An ongoing challenge is the lower rate of private schools implementing school retrofits. In 2015, over 15% of private schools were awaiting needed retrofit or reconstruction due to lack of funds. Though national subsidies were available to private schools, municipal budgets were not responsible for covering the remaining costs, and private school budgets were not always sufficient to make up the difference. In response to this challenge, MEXT increased subisidies available for private schools and expects that the rate of private school retrofitting projects will soon increase.

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Designing and Building Earthquake-Safe Schools in Uttar Pradesh

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Uttar Pradesh, India

Pillar 1: Safe Learning Facilities

Organisations:

- *India's national and state governments*
- *United Nations Development Program (UNDP)*
- *Sarva Shiksha Abhiyan (SSA)*
- *World Bank*

Schools Impacted:

- 6,844 school buildings in 2006
- All new school construction

Save the Children
risk RED
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Overview

Most of Uttar Pradesh, India's most populous state, sits within high seismic hazard zones, a location that is especially problematic because many buildings are poorly constructed and prone to collapse during large earthquakes. After the 2001 earthquake in the state of Gujarat, the Uttar Pradesh government developed a proactive approach to earthquake risk reduction in the education sector. In 2006, the government partnered with United Nations Development Program (UNDP) Disaster Risk Management Program and Sarva Shiksha Abhiyan (SSA), a national programme aimed at expanding basic education access, to incorporate earthquake-resistant designs into all future school building plans. The new designs were developed in time to apply to 6,850 school buildings and 82,039 classrooms planned for construction the following year through a World Bank-financed SSA initiative. To ensure proper construction, SSA held training workshops to teach thousands of masons about earthquake risks, show them new school design concepts, and give them hands-on practice at building the new designs. Between 2006 and 2007, over 6,844 buildings were built using the new earthquake-resistant designs (Umrao, 2007).

Keywords: Uttar Pradesh, India, earthquake, school construction, mason training, seismic-resistant design

Hazard and Education Context

India is susceptible to several hazards, including cyclones, floods, droughts, landslides, and earthquakes. In 2001, up to 20,000 people died after a M_s7.7 earthquake struck the state of Gujarat. Most of those deaths resulted from collapsed buildings. The impacts to the education sector were devastating. The Gujarat earthquake damaged or destroyed over 11,600 schools, which lacked earthquake-resistant designs (World Bank and Asian Development Bank, 2001). An estimated 947 elementary and secondary students died in the earthquake, a number that may have been higher if the earthquake had not struck on Republic Day, a national holiday. The high mortality and school damage highlighted the need to prepare and mitigate for earthquake risk at state and national levels.

Uttar Pradesh is the most populous Indian state with over 200 million residents. It has an overall higher earthquake risk than Gujarat. In 2005, the government of Uttar Pradesh passed a state-level Disaster Management Act (UPDMA), which was its first policy addressing disaster mitigation and prevention. The UPDMA marked a fundamental change in the way the state government dealt with disasters. The act's creators wanted to take a more proactive and preventative approach to earthquake risk, recognising that investing in disaster prevention and mitigation would save lives and reconstruction costs in the long term. One of the provisions of the act was that all government buildings, including school buildings, should be seismically safe. The UPDMA formed the basis of the National Disaster Management Act, which passed later that year.

Prior to 2006, no earthquake-resistant measures were incorporated into school designs, despite the region's high earthquake risk. On average, the government was constructing 30 new elementary schools per day in Uttar Pradesh as part of a large-scale public works initiative aimed to increase access to basic education. In India, state governments manage school construction through coordination with village governments, which contract construction work to local masons. While the school initiative expanded educational opportunities for children, it also expanded a seismically weak educational building stock. These new buildings put the students at risk of death and injury if an earthquake struck during school hours (Umrao, 2007).

The national government developed the SSA program in 2001 to expand access to elementary education by constructing new schools and improving existing school facilities and functionality. Sarva Shiksha Abhiyan (SSA) was developed to support the goals outlined in the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Education for All movement, which encouraged governments to achieve the learning needs of their populations by 2015. World Bank loans funded the program. The central government distributed loan money to state governments for implementation. At the time of SSA's creation, elementary enrolment in India was at 81.6 percent (Ministry of Human Resource Development, 2014), yet the nationwide literacy rate for people over 7 years old was at only 64.8 percent (NITI, 2017). SSA worked with state and local governments to develop initiatives for school construction and other educational goals, generally receiving 85 percent of its funding from the national government and international organisations and 15 percent from state governments.

In 2001, seeking to expand education access for children and youth in Uttar Pradesh, SSA began working in 16 districts across the state. Five years later, SSA was operational in all 70 districts of the state. Because of its existing work in school construction, the state government and United Nations Development Programme (UNDP) saw SSA as an excellent way to incorporate earthquake resilience designs into schools.

Developing Earthquake-Resistant School Designs

In December 2005, in response to the recent passage of the UPDMA, the UNDP Disaster Management Program met with the Uttar Pradesh Disaster Management Authority to discuss integrating earthquake-resistant design into government buildings. The programme also called on other government departments to participate in the initiative. The state's Elementary Education Department answered the call with a proposal to integrate earthquake-resistant measures into the standardised elementary school designs in time to apply to the nearly 7,000 school buildings and over 82,000 classrooms planned for construction the following year through SSA. The proposal was ambitious, given that school construction plans for all 70 districts of Uttar Pradesh had to be submitted by April 2006. This left four months to design and incorporate appropriate earthquake-resistant measures into official blueprints for government-constructed schools. However, with support from the UNDP and state officials, six new designs using stronger materials and additional reinforcement measures were submitted within the necessary timeframe (Umrao, 2007).

Problems:

- High earthquake risk
- Seismically susceptible school building stock
- Lack of knowledge about earthquake-resistant training among local mason population

Goals:

- Reduce risk of earthquake-related injury and death in schools
- Train local masons and engineers in earthquake-resistant construction

Intervention:

- Develop and incorporate earthquake-resistant school designs into government construction plans
- Train local masons and engineers in earthquake-resistant construction

“To ensure the new seismic designs were properly constructed, UNDP and SSA developed training workshops to prepare education officials, engineers, and masons...”

The earthquake-resistant features of these new designs included:

- Moving doors 60cm from vertical joints
- Adding rebar to tie foundations and slabs together
- Placing three horizontal ‘earthquake’ ring beams along the walls at the foundation, below the window, and above the window
- Increasing the proportion of cement to sand and stone blast in the foundation (Paci-Green and Pandey, 2015).

Each new design came with a detailed construction manual and cost estimates, which were provided to education officials in each district. After the National Seismic Advisor and state officials evaluated and approved the designs, the Uttar Pradesh government revised its school construction budget to reflect the additional cost of incorporating earthquake-resistant design in schools. Adding earthquake-resistant design features caused only an 8 percent cost increase per unit. This translated into a total budget increase for school construction in 2006-07 of between Rs 1.1 billion and Rs 1.5 billion (Umrao, 2007). The central government covered the cost increase by supplementing the state’s SSA funds —provided by a World Bank loan — with its own funds.

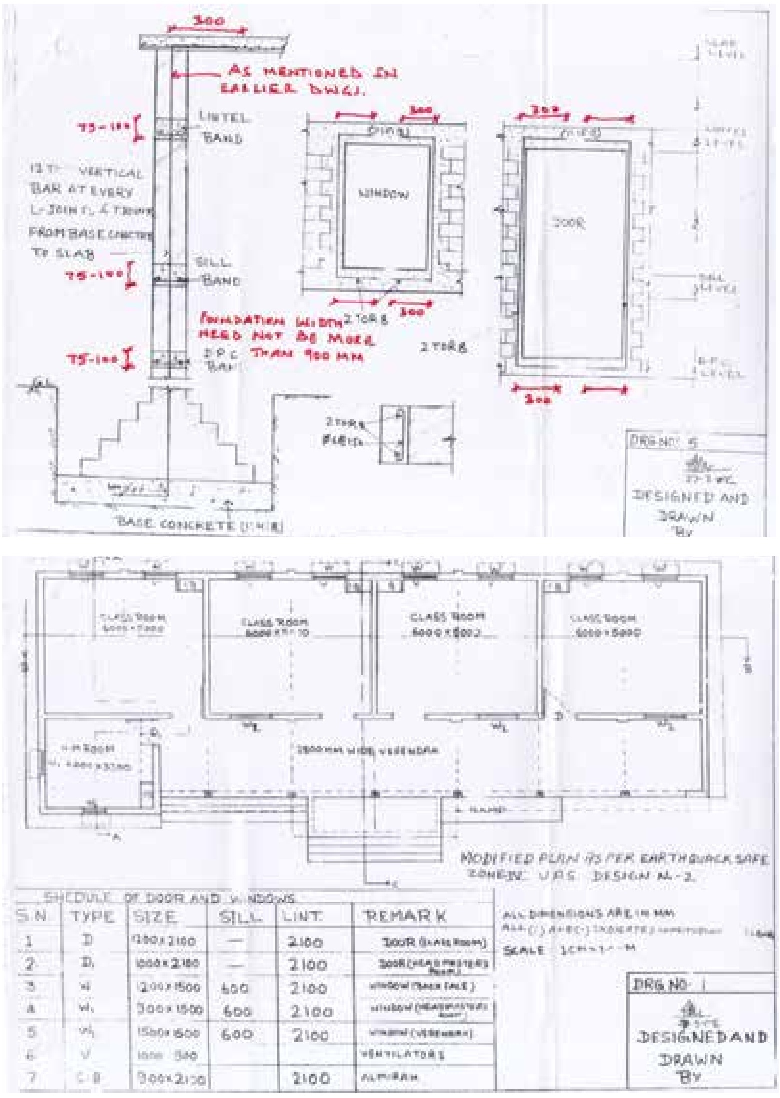

Figure 1: The Uttar Pradesh Elementary Education Department proposed modified earthquake-resistant school construction designs that incorporated window and door reinforcing and earthquake bands at the foundation level and above and below the windows. Photo credit: Sanjaya Bhatia.

To ensure the new seismic designs were properly constructed, UNDP and SSA developed training workshops to prepare education officials, engineers, and masons to build the new school designs on the ground. Because the new school designs applied to all 70 districts of Uttar Pradesh, UNDP and SSA designed a cascade approach to training designed to reach as many local masons in the state as possible.

In May 2006, UNDP introduced district-level education officials in all 70 districts to the new school designs and briefed them on earthquake risk in meetings so that they understood the importance of proper design implementation. In June and July 2006, UNDP held master training workshops for engineers and education officials, with support from Orissa Development Technocrat's Forum, a project dedicated to developing disaster-resistant building stock in India, primarily through mason training. Four representatives came from each district. A month later, the master trainers taught training sessions in their respective districts with education officials, engineers, and local masons. Those sessions were facilitated by UNDP and funded by the State Office of the Relief Commissioner and the Elementary Education Department of Uttar Pradesh. District training sessions lasted two days. The first half focused on earthquake-resistant construction theory and methodology using photographs and manuals. In the second half, participants built their own earthquake-resistant models using techniques from the class.

To encourage participation in the local trainings, masons were compensated lost wages for each day of training they attended. In total, 10,000 masons participated in the trainings and received certificates, which gave them credibility for obtaining future work.

"In total, 10,000 masons participated in the trainings and received certificates, which gave them credibility for obtaining future work..."

Major Impacts:

- Permanent incorporation of safe school designs into government school construction

Greatest Insights:

- A small increase in construction cost ensures school building can resist earthquakes

- Train and certify local masons in earthquake-resistant construction through cascade approah

What's Next:

- Continue safe school construction

- Retrofit or reconstruct existing weak school buildings

Figure 2. Before masons could build earthquake-resistant schools, they participated in training that included hands on activities where masons built their own earthquake-resistant models. Photo credit: Sanjaya Bhatia.

Safe School Construction across Uttar Pradesh

Between 2006 and 2007, Uttar Pradesh planned to construct 6,850 school buildings, or 82,039 classrooms (UPEFA, nd). Construction began in September 2006 after the monsoon season. To ensure the construction plans adhered to the standardised designs, each construction site received copies of the designs and construction manuals for engineers and masons to reference. Trained masons worked each construction site, under the supervision of a trained engineer. The engineers were required to be present during crucial phases of construction, including laying the foundation, casting seismic bands, and setting the roof. The supervising engineer also monitored the general construction quality. Both SSA and local non-profits set up monitoring mechanisms for quality control, working with village governments to audit construction processes. In total, 6,844 buildings, corresponding to 82,025 classrooms, were completed within between 2006 and 2007, which was just below the state's original goal (UPEFA, nd).

Policy-Enabling Factors and Remaining Challenges

The rapid development and implementation of the initiative to integrate earthquake-resistant design into new school buildings in Uttar Pradesh can be attributed to strong governmental support at the state and local levels, as well as the financial and logistical support of organisational partners such as UNDP and the World Bank.

The state government took a proactive approach to earthquake risk reduction, acknowledging that investment in prevention saves both lives and capital. They, therefore, embraced the additional costs of constructing earthquake-resistant schools. One of the most successful aspects of the SSA initiative was its engagement and training of local masons, engineers and education officials. Training occurred over the span of just a few months due to excellent planning and interorganisational cooperation. Project coordinators planned training sessions well; they had the forethought to provide lost wages to participants to ensure attendance and they used both theory and application in their training approach to ensure comprehension and retention. Furthermore, participants received certificates to advertise their training in earthquake-resistant construction, which many used to organise into worker’s associations.

While the permanent adoption and implementation of earthquake-resistant school building and classroom designs can be considered a success, substantial challenges remain. Most notably, around 125,000 pre-existing elementary schools in Uttar Pradesh remain susceptible to earthquakes and await retrofit. Yet a lack of funding impedes the implementation of a large-scale school assessment and retrofitting initiative through SSA (Umrao, 2007). Furthermore, the state has limited funding for the maintenance of earthquake-resistant schools, which could lead to substandard school structures in the long term.

Uttar Pradesh was able to implement earthquake-resistant school designs in a relatively short period of time because the government already had a large-scale school construction programme in place. One of the most challenging aspects of the SSA initiative was developing a labour force capable of implementing earthquake-resistant designs on the ground. However, using a cascade approach in which the government relied on master trainers to train others in their respective localities, 10,000 masons were trained and certified within a period of a few months. Where funding is already available for new school construction, governments may consider investing in the adoption of earthquake-resistant designs and in the development of mason training programmes; both measures are invaluable investments to existing school construction initiatives and require proportionally minimal additional funding.

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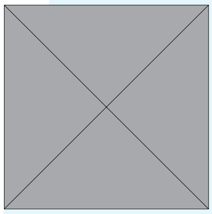

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GADRRRES Comprehensive School Safety Policy Case Studies Series

Uzbekistan

Pillar 1: Safe Learning Facilities

Organisations:

- *Ministry of Public Education (MPE)*
- *Uzbek Research and Design Institute of Standard and Experimental Design of Residential and Public Buildings (UzLITTI)*
- *United Nations Centre for Regional Development (UNCRD)*

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Seismic Renovation and Reconstruction of Schools in Uzbekistan

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Overview

Old Soviet-era buildings are widespread and seismically unsafe in Uzbekistan. For post-Soviet states with substantial earthquake risk, many school buildings are prone to damage or collapse in an earthquake event. In 2004, Uzbekistan established the National Programme on School Education Development for 2004-2009, which required unsafe school buildings be retrofitted or rebuilt. In response, the Cabinet of Ministers of Uzbekistan organised a working group of government agencies to oversee the project. The group — which included the Ministry of Public Education (MPE) and the State Committee of Architecture and Construction — oversaw over 10,000 primary and secondary school building assessments nationwide during a three-month period. The assessments revealed that an earthquake could seriously damage 25 percent of school buildings and cause another 10 percent to collapse. Over a six-year period, the national government worked with national, provincial, and local agencies to retrofit, repair, or rebuild 8,501 school buildings according to new anti-seismic school designs.

Keywords: Uzbekistan, earthquakes, school assessment, school retrofit

Hazards and Education Context

Uzbekistan is located on a tectonically active region of central Asia. The capital, Tashkent, sits above the Karzhantau fault system, putting the city at high seismic risk. The city was the epicentre of a devastating magnitude-5.3Mb earthquake in 1966, which destroyed many traditional adobe buildings and damaged brick and unreinforced concrete buildings (Mavlyanova, 2004). After the 1966 Tashkent earthquake, Soviet authorities rebuilt schools using masonry and reinforced concrete frame designs (UNDEA & UNCRD, 2008). Many of the reinforced concrete frame systems were of the Soviet RC IIS-04 series. This style of building eventually proved seismically weak and experienced heavy damage and collapse in earthquakes in other parts of the Soviet Union during the 1980s.

In 1996, the United Nations International Decade for Natural Disaster Reduction secretariat launched the Risk Assessment Tools for Diagnosis of Urban Areas against Siesmic Disasters (RADIUS) to promote seismic risk reduction in urban areas. A RADIUS study of Tashkent's building stock generated increased awareness of the seismic fragility of Tashkent's building stock, including its school buildings (Mirjalilov, 2000). This study stimulated the national government to make earthquake risk mitigation a policy priority.

Studies found that many schools in Uzbekistan had been constructed without geological studies examining the integrity of the soil beneath and with poor construction material. Schools in Tashkent sometimes had been built on alluvial deposits, a soil often found in former riverbeds and canals. This soil can liquefy during earthquakes and severely damage buildings constructed on it (UNDEA & UNCRD, 2008). Outside of Tashkent, in rural areas of Uzbekistan, many schools also had been built without engineering or geological studies, and had been built with earthquake-vulnerable materials like adobe, raw brick, adobe blocks, or natural stone.

The national government has taken several policy measures to address its disaster risk since the mid-1990s. In 1996, a presidential decree established the Ministry of Emergency Situations, an agency responsible for organising emergency response. The same year, the Uzbek Research and Design Institute of Standard and Experimental Design of Residential and Public Buildings (UzLITTI) — a government institute that researches structural earthquake mitigation and develops building codes — replaced the Soviet building code. The current building code incorporates seismic resistance measures into new building construction. However, many weak buildings constructed before the new building code remained. The country saw a need to address pre-existing schools that were seismically unsafe.

Policy Development Process

In 2004, the first Uzbek president, Islam Karimov, established the National Program on School Education Development for 2004-2009 by a presidential decree. The programme aimed to improve all aspects of education in Uzbekistan. One of the programme's objectives was to improve structural school safety through capital rehabilitation and reconstruction of school buildings. The Cabinet of Ministers adopted a resolution developing a government working group to structurally assess all primary and secondary schools nationwide.

The State Committee for Architecture and Construction established a design working group to assist the assessment process. The group included 11 state engineering and design institutes under the leadership of Uzbek Research and Design Institute of Standard and Experimental Design of Residential and Public Buildings (UzLITTI). The design working group assessed the structural integrity of school buildings, determined a required structural intervention, and developed designs for retrofitting projects and reconstruction projects.

The Fund for the Development of School Education provided most of the funding for the programme. The fund was established in 2004, shortly after the adoption of the National Program for Education Development 2004-2009. Additional funding came from foreign donors, including the Islamic Development Bank, the Asian Development Bank, the governments of Japan and China, and the World Bank. In total, 1.4 trillion Uzbek soums went toward school construction work between 2004 and 2009.

The assessment process began in early 2004 and was primarily based on questionnaire responses from school officials. The Ministry of Public Education (MPE) sent questionnaires to all of the nearly 10,000 primary and secondary schools in Uzbekistan. The questionnaire asked school administrators for information, including:

- School name and address
- Construction date
- Capacity
- Number of floors
- Building area and volume
- Building materials
- Construction methods

Schools Impacted:
- 8,501

Problems:
- High earthquake risk
- Seismically susceptible school building stock

Goals:
- Reduce risk of earthquake-related injury and death in schools

Intervention:
- Nationwide assessment of all schools
- Seismic retrofit or reconstruction of all schools requiring structural intervention

"...many schools had been built without engineering or geological studies, and had been built with earthquake-vulnerable materials..."

Schools were required to fill out the questionnaire and submit 10 photos of the school building from different angles. The questionnaires were due a week later.

The design working group assessed the questionnaire results and grouped each school building into a structural solution category. In cases of ambiguous questionnaire responses, the design working group sent a team of engineers to the school for a field assessment. Field teams reassessed questionnaire criteria on site and examined other characteristics, like existing anti-seismic measures, soil conditions, and existing damages to the school building.

The design working group used the questionnaire or field survey results to group each school building to one of the following categories:

1. **Demolition and new construction.** The school building was susceptible to collapse, it was more cost and time-effective to demolish and reconstruct than restore or retrofit the building.

2. **Operating repair.** The school met the current building code requirements and did not require strengthening, but some required light repairs.

3. **Rehabilitation.** The school required anti-seismic strengthening, also called retrofitting.

4. **Capital reconstruction.** The school building required strengthening and new construction, such as additional classrooms or sports halls.

The intervention category assigned to a school building was often related to the building's age, because older buildings were associated with fewer or no anti-seismic structural standards. The oldest buildings in the inventory, many of which were rural schools, were often built with adobe or stone, and had sinking foundations and visible cracks in the bearing walls from previous earthquakes. These buildings were highly susceptible to heavy damage and even collapse in earthquakes. Older buildings of adobe and stone were typically slated to be demolished, while newer buildings tended to only need light repairs. Notably, 64 percent of the Uzbek population lived in rural areas in 2015 (World Bank, 2016).

The assessment process took just over three months. All school assessment data was collected and organised by UzLITTI. The design working group assigned schools to one of the intervention category and developed a group of design solutions for each of these categories. The group also made guidelines for conducting routine repairs within the defined budget. All of the designs were consistent with the most recent 1996 building codes that included anti-seismic measures.

Table 1. Recommendations following structural safety assessments of nearly 10,000 primary and secondary schools

Category	Percent
Demolition and new construction	7
Operating repair	24
Rehabilitation	42
Capital reconstruction	27

Table 2. Number of new designs created by UzLITTI for school retrofit, repair, and reconstruction

Category	Number of New Designs
Demolition and new construction	6
Operating repair	10
Rehabilitation	220

"The design working group assessed the questionnaire results and grouped each school building into a structural solution category..."

Construction Process

The MPE began implementing the plans in summer of 2004. The MPE delegated most of the implementation work to municipal and provincial governments. The MPE required that local governments prioritise school interventions based on each school's level of need compared to other schools in the area. Construction proceeded, first prioritising demolition of unsafe schools, then reconstruction of those schools. Rehabilitation of weak schools followed, with schools that needed only operating repairs being prioritised last.

Local governments organised public tenders for construction work according to technical and budget requirements defined by UzLITTI. Local construction firms bid for contracts and those firms that won the tender consulted with the design working group for guidance on how to implement their designs. The local branch of the State Architectural Construction Supervision (GASN) monitored contractors to ensure they were meeting the structural requirements. During a school building's construction work, students attended the closest open school. Construction costs for enhanced seismic resistance increased new construction costs by between 3 percent and 14 percent per school, depending on school capacity, seismic intensity zone, number of floors, and ground conditions.

The implementation coincided with a United Nations Centre for Regional Development (UNCRD) Global Earthquake Safety Initiative (GESI) project titled Reducing Vulnerability of School Children to Earthquakes in 2006. The UNCRD project targeted four international cities, including Tashkent. One of the project goals was to ensure that children living in seismic regions had safe learning spaces. In Tashkent, the UNCRD partnered with the MPE and UzLITTI to retrofit two model schools. During the retrofitting process of these two model schools, parents attended seminars on anti-seismic retrofitting strategies. Experts leading the seminars discussed the role of structural mitigation measures in reducing earthquake risk and the leaders encouraged parents to consider earthquake risk and risk reduction measures in their homes. The UNCRD — along with UzLITTI, the NGO HAYOT, the Tashkent Khokhmiyat Office, and the Red Crescent Society of Uzbekistan — also held a two-day technical training workshop for local engineers, technicians, and masons on seismically resistant construction methods. (UNDEA & UNCRD, 2008).

Between 2004 and 2009, 8,501 Uzbek primary and secondary schools — a total capacity of 3 million students — were retrofitted, repaired, or rebuilt under the National Program for Education Development 2004-2009. A total of 351 schools were reconstructed, 2,470 schools underwent capital reconstruction, 3,608 schools were rehabilitated, and 2,072 underwent operating repairs (Akhmedov, 2013).

Major Impacts:

- All structurally substandard primary and secondary school buildings retrofitted or rebuilt

Greatest Insights:

- Cooperation among multiple government ministries and departments
- Establishment of mechanisms for monitoring school construction work

What's Next:

- Continued maintenance of school buildings
- Non-structural mitigation

Figure 1. Following structural assessment of schools, the MPE rehabilitated 3,608 schools using a variety of retrofit techniques; another 2,470 schools underwent captial reconstruction, a form of intervention that included a combination of new construction and retrofit. Photo credit: Bakhtiar Nurtaev

Policy-Enabling Factors and Remaining Challenges

Since the beginning of the National Programme for Education Development in 2004, all structurally substandard primary and secondary school buildings in Uzbekistan have been retrofitted or rebuilt to be seismically safe. In 2011, the national government established a new fund to maintain and improve primary, secondary, and higher education facilities to ensure that schools remain structurally safe into the future. The government will need to develop effective planning and implementation mechanisms for necessary retrofits and repairs to ensure that available funds translate into an effective school maintenance policy.

The assessment and structural intervention work in primary and secondary schools in Uzbekistan demonstrates the national government's commitment to child safety and disaster risk reduction. Its mechanism for implementing large-scale retrofitting and reconstruction projects serves as a model for other countries to follow. Much of the programme's success came from cooperation among government ministries and departments. Including schools and local governments in planning and implementation processes also helped the project succeed. The government's establishment of construction monitoring mechanisms ensured that construction was consistent with seismically safe designs. Finally, the national government was able to quickly complete the mandate of the National Programme for Education Development because it was a policy priority. The government saw school seismic safety as one of the most important and urgent projects on the national policy agenda. By ensuring a steady source of funding for ongoing school maintenance, Uzbekistan further protected the gains made during their school rehabilitation and reconstruction programme. The programme and ongoing maintenance ensures not only current, but future generations of Uzbekistan children will learn in safe school facilities.

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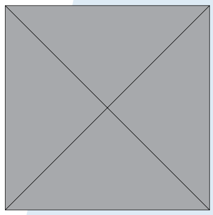

Comprehensive School Safety (CSS) is a framework for advocacy and action aligning policies and plans across education and disaster management sectors at all level. It uses child-centred all-hazards risk assessment and context analysis as the evidence base for action in three overlapping areas: Safe Learning Facilities, School Disaster Management, and Risk Reduction and Resilience Education. For more information, see http://www.gadrrres.net/

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Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

Nationwide School Earthquake Drills in Iran

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Iran

Pillar 2: School Disaster Management

Organisations:
- *International Institute of Earthquake Engineering and Seismology (IIEES)*
- *Ministry of Science, Research and Technology (MSRT)*

Schools Impacted:
- 82,000 public schools
- 14,000 private schools

Produced by Save the Children, Risk RED, and the International Institute of Earthquake Engineering and Seismology, with support from the global partnership with C&A Foundation and C&A

Overview

Since Iran initiated its nationwide school earthquake drill program in 1996, it has managed to reach students across the country at all levels of education as well as expand the program to engage community members outside of schools. By 2016, nearly 13 million children participated in earthquake drills across the country for the nation's 18th national drill. In 2015, Iran implemented the Safe Schools – Resilient Communities program. The program uses schools to offer hazard risk education and preparedness tools to community members, connecting student's knowledge to their parents and other stakeholders in the community. Over a two-year period, Safe Schools – Resilient Communities has already been introduced in 37 communities.

The success of Iran's implementation of earthquake drills and hazard mitigation education in schools across the country comes from strong cooperation between the Iranian Ministry of Education (MoE) and the International Institute of Earthquake Engineering and Seismology (IIEES). By centring disaster preparedness education in schools, children have the opportunity to transfer hazard and preparedness knowledge to their families and then to community members (Izadkhah, 2004; Izadkhah and Heshmati, 2007).

Keywords: Iran, earthquake, school disaster management, drills, community engagement

Hazards and Education Context

Iran sits atop the seismically active Alpine-Himalayan orogenic belt and has been struck by many destructive earthquakes (Hessami et al., 2003). The last major earthquake in Iran was the 2003 Bam Earthquake, an event that claimed more than 26,000 lives, destroyed a large percentage of Bam's building stock, and resulted in economic losses of more than $1 billion USD. Most earthquake-related deaths in Iran result from the collapse of seismically weak buildings. However, during the last decade, most seismically susceptible schools made of adobe or masonry have been reconstructed and are now structurally safe.

In Iran, about 13 million children – around 60% of which are in primary schools and the remainder in secondary and high schools – are enrolled in around 96,000 schools. The MoE has authority over the 82,000 public schools and can mandate earthquake drills, and an additional 14,000 private schools comply with the MoE's principles and also engage in drills when asked (Khabaronline, 2017; Otaghkhabar, 2016).

Iran is a signatory to the Yokohama Strategy for Disaster Risk Reduction (DRR) of 1999, the Hyogo Framework for Action (HFA) of 2004 and the Sendai Framework for DRR of 2015. Accordingly, it has committed to developing disaster-resilient communities through various DRR initiatives, including child-focused ones, since the 1990s. As a prime vehicle for communication, schools can be used to disseminate knowledge to students and families, and can act as spaces for public forums in which the greater community can participate. Furthermore, schools are important institutions in forming the culture of a society (Shaw and Kobayashi, 2001).

Development of a School Drill Program

During the International Decade for Natural Disaster Reduction in the 1990s, the International Institute of Earthquake Engineering and Seismology (IIEES) discussed earthquake risks to schools and communities with the senior management at the MoE, providing evidence of seismically-weak school buildings across the country. The IIEES is an Iran-based international research body committed to developing structural- and management-based solutions to seismic hazards. Both organisations agreed that schools needed more robust hazard preparedness and response policies.

The two organisations decided to work together to encourage formal and informal risk-reduction education, with an emphasis on community inclusion. The IIEES and the MoE concluded that schools were ideal places for conducting hazard awareness activities and began discussing how school sites could be appropriate venues for educating citizens about earthquake safety and preparedness. In 1996, the MoE and the IIEES piloted Iran’s first school earthquake drill in one preschool and one elementary school in Tehran, with success. The young students learned how to “drop, cover, and hold on” to their desks during earthquakes. Teachers and staff practiced how to safely evacuate the students from the building and account for everyone’s safety.

A year later in 1997, the IIEES and the MoE ran the country’s first Earthquake and Safety Drill as a pilot project in three schools: two boys’ high schools and one girls’ high school. An evaluation of the drill results revealed that the students were capable of responding appropriately to an earthquake event.

The main objectives of the Earthquake and Safety Drills were to:

1. increase the knowledge of children and teachers about earthquakes
2. develop preparedness for appropriate responses during an earthquake
3. reduce the disastrous consequences of earthquakes
4. build a culture of safety in earthquake-prone communities

Problems:

- High earthquake-related deaths from seismically weak buildings.
- Lacklustre school participation in school earthquake drills.

Goals:

- Reduce injury and death in earthquakes.
- Increase school participation, and quality of participation, in drills.

Intervention:

- Mandatory annual school earthquake drills, directed by a national council and supported by education materials.
- Public awareness campaign within and beyond schools.

1996 — 1st pilot drill in one preschool and one elementary in Tehran

1998 — 1st Tehran Drill for all high schools in Tehran

1999 — 1st National Drill, high schools only

2000 — 2nd National Drill, secondary and high schools only

2003 — 5th National Drill for all schools

2015 — 17th National Drill for all schools and pilot community drills in one Tehran neighborhood and five neighborhoods in other provinces

2016 — 18th National Drill for all schools and community drills in one neighborhood in each province

Expanding Nationwide

Following the successful pilot, the IIEES and MoE sought to scale up the drills to all schools in the capital city of Tehran. In 1998, the IIEES developed several programs to prepare schools to conduct the drills and 1,059 high schools across the city performed the drill. In preparation, the IIEES met with some of the participating high school principals to emphasise the necessity of performing drills in preparation for a hazard event and to familiarise them with drill procedures. Principals that did not attend the IIEES meeting were sent detailed drill guidelines. The IIEES Public Education Department also developed educational programs, which changed each year, that targeted children using workshops, drawing competitions, and exhibitions as educational tools, and through filming educational shows that were aired on local television.

In 1999, the MoE further expanded the program and made the drills mandatory in both public and private schools nationwide; however, problems arose. In some schools, the principals did not take the drills seriously. In some cases, the Students and Parents Associations did not lend their support to the drill program. Additionally, the insufficient number of trainers for the drill programs resulted in inconsistencies in drill implementation across schools and, in some cases, negatively affected performance of drills. As a result, the MoE began requiring that schools submit annual drill performance reports.

In 2002, the MoE and the IIEES established the Planning Council for National Earthquake and Safety Drills for the specific purpose of managing and enhancing the program of earthquake drills in Iran. This drill council is comprised of representatives from the IIEES, the MoE, the Iranian National Committee for Disaster Risk Reduction (later replaced by the National Disaster Management Organisation as a representative of the Ministry of Interior), the Red Crescent Society of Iran, and the Islamic Republic of Iran Broadcasting. Today, the drill council plans and helps execute annual earthquake drills across the country (Parsizadeh et al., 2004).

Drill council organisations are active in helping schools prepare for the annual Earthquake and Safety Drill by raising awareness and offering educational materials. The MoE and the IIEES design and distribute posters advertising the drill to all schools (Figure 1). The Islamic Republic of Iran Broadcasting airs various scientific and educational programs about earthquake safety on the radio and television one week prior to the drill. The IIEES prepares a 12-page booklet of drill guidelines in Persian each year and distributes it two weeks before the national drill. The booklet outlines the objectives of the drill, the logistics, how to identify potential hazards in the classroom, and sheltering and evacuation protocols during an earthquake event. The booklet also stresses the importance of the roles of teachers and instructors in guiding their students through the drill as a learning process.

On the day of the annual drill, the MoE coordinates the Earthquake and Safety alarm within schools, while the Islamic Republic of Iran Broadcasting sounds the alarm on the national radio. On cue, students, teachers, and all school staff perform “drop, cover, and hold” for 30 to 60 seconds, followed by emergency evacuation (IIEES Brochure, 2004). Each year one or two schools are selected as models of good implementation, and their drill, conducted with representatives from IIEES and the MoE, is also broadcast on the radio to encourage student enthusiasm.

The MoE provides partial funding for drill implementation in schools, covering the costs of printing the pamphlets and posters and basic emergency supplies. Some drill-related services, such as the dispatch of ambulances and fire trucks to the schools are provided free of cost through coordination with the Iranian Red Crescent Society and the National Disaster Management Organisation of Iran. Several other organisations contribute their services to the drill each year.

Figure 1: The MoE and the IIEES design and distribute posters advertising the drill to all schools. Source: IIEES.

> ***"The use of schools as DRR centres enhanced social capital, community involvement, public awareness and social cohesion..."***

Extending to Communities

Inspired by the successful expansion of Iran's national school drill program, in 2015, the IIEES expanded their work to engage the broader community in earthquake risk reduction measures. They initiated a new program called Safe Schools – Resilient Communities, which aimed to raise hazard awareness and build resilience in the communities surrounding schools. The program provided communities with broad DRR training and facilitated community participation in the annual Earthquake and Safety Drill. Community engagement and training is particularly important where local governments lack the capacity to prepare for and respond quickly to strong earthquakes or other natural hazards (Amini Hosseini et al., 2014). Furthermore, they knew community members could make a substantial contribution to emergency planning and response because they are most familiar with their environments and have a personal incentive to reduce local risks (Izadkhah and Hosseini, 2010).

The IIEES decided to base the Safe Schools – Resilient Communities program in school buildings to emphasise the importance of a partnership between schools and the broader community in reducing overall community disaster risk (Amini Hosseini, 2016). As the site of the Safe Schools – Resilient Communities program, school buildings had to be structurally sound and building contents had to be secured so that students and community members were physically safe inside. Therefore, each school selected as a community DRR centre was assessed for its structural characteristics by the Organisation for Development, Renovation, and Equipping Schools of Iran as a representative of the MoE. The organisation also equipped each participant school with emergency response equipment.

Major Impacts:

- All school children practice how to respond safely during earthquakes.

Greatest Insights:

- Mandatory reporting of drill performance and an adequate number of trainers helped ensure schools did the drills, and did them correctly.

What's Next:

- Expand partnerships between schools and communities to build community response preparedness.

The IIEES first implemented Safe Schools – Resilient Communities in 2015 in one neighbourhood of Tehran and five neighbourhoods in other major Iranian cities, in conjunction with the annual national Earthquake and Safety School Drill (Figure 2). As of December 2016, one selected neighbourhood in Tehran and 30 others in large cities had piloted the Safe Schools – Resilient Community program.

For the three months prior to the Earthquake and Safety School Drill, the Safe Schools – Resilient Communities program educated community members about earthquake mitigation and response strategies. IIEES representatives trained local facilitators to hold workshops to teach community members appropriate responses to an earthquake event, sheltering and evacuation protocols, and methods for addressing structural and non-structural risks in houses. Workshop facilitators also guided community members in preparing risk maps of their neighbourhoods.

Figure 2. Registration of local people for safety drills at the entrance of schools and joining the students to perform the safety neighbourhood drills. Source: IIEES.

Policy-Enabling Factors and Remaining Challenges

Through the Safe Schools – Resilient Communities pilot program, schools began playing a major role in community risk reduction. Not only did the schools participating in the Safe Schools – Resilient Communities pilot program serve as physical spaces for disaster training and education before a disaster; they became a symbolic site for disaster preparedness.

Iran's expansion of school earthquake drills nationwide and its development of a cooperative and inclusive community risk reduction program are the products of the long-term partnership between the MoE and the IIEES, demonstrating the necessity of strong relationships between government institutions and expert advocate organisations. However, Iran's education sector still faces challenges with strengthening weak schools and measuring the effectiveness of its emergency management systems. Over 30% of Iran's school building stock is seismically unsafe. Furthermore, the effectiveness of the earthquake drill and community risk reduction program will not be known until the next major earthquake occurs.

Existing research (Paci-Green et al., 2015; Ronan et al., 2015) indicates a need for teaching flexible drill procedures that allow students to consider their circumstances before reacting to a hazard. Incorporating more flexible drill protocols may be a next step for Iran's national Earthquake and Safety Drill.

Program organisers hope to build upon the lessons learned so far and expand Safe Schools – Resilient Communities to all urban and rural areas of Iran by 2025, based on the number of structurally safe school facilities available. With the support of United Nations Educational, Scientific and Cultural Organisation (UNESCO), the Safe Schools – Resilient Communities program is currently being developed for piloting in Afghanistan and Pakistan in 2017. The organisers of the program hope the introduction of schools as local centres for disaster management will serve as an operational bridge between residents, students, parents, and school staff, ensuring that even beyond participating in earthquake drills, the greater community remains engaged in risk reduction with the support of program specialists.

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Los Angeles, United States

Pillar 2: School Disaster Management

Organisations:

- *Los Angeles Unified School District (LAUSD) Office of Emergency Management*
- *Federal Emergency Management Agency (FEMA)*

Schools Impacted:

- 1,000 public schools

Save the Children

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C&A Foundation

Produced by Save the Children and Risk RED, with support from the global partnership with C&A Foundation and C&A

Developing School Plans and Performing Drills in Los Angeles

Jill Barnes[1] and Ana Miscolta[2]

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2. Risk RED

Overview

In California, the Los Angeles Unified School District (LAUSD) Office of Emergency Services has some of the most comprehensive disaster management strategies in the United States. Every one of the nearly 1,000 schools in LAUSD develops a Safe School Plan. The LAUSD Office of Emergency Services distributes apps to educate users on hazard risks and has each school participate in a global earthquake drill.

The heart of their success lies in the creation of a comprehensive template that local schools use to create and annually update their Safe School Plans. The template addresses multiple natural and social hazards and has detailed emergency planning information and guidelines for plan completion. The LAUSD Office of Emergency Services directs each of its over 1,000 schools to create a committee of teachers, non-teacher staff members, students, parents, and a local law enforcement officer – a process that integrates participation and responsibility across multiple groups.

Keywords: Los Angeles, emergency response, earthquake, drills, emergency planning, safe schools, Great Shakeout

Hazard and Education Context

It is no surprise that the Los Angeles Unified School District (LAUSD) leads the United States in school disaster management. California is a hotbed of natural hazard risk. While the state deals with various hazards, earthquakes have spurred much of the action. In the past 100 years, several earthquakes have caused structural damage and disrupted educational activities in the Los Angeles region. Fortunately, only one – the Whittier Narrows earthquake of 1987 – occurred while students were in school.

The near misses spurred Californians to adopt safe school construction policies early on. Following the 1933 Long Beach Earthquake, in which 70 schools were destroyed and 120 damaged, the state enacted the 1933 Field Act. The act required that schools be built with stricter construction standards and monitored more closely during construction. Five years later, the Garrison Act of 1938 applied these new standards to existing schools (Petal & Green, 2009). Three decades later, the 1971 San Fernando Valley earthquake left many schools built before 1933 damaged, prompting Los Angeles to replace 90 pre-1933 schools and retrofit 100 others (Jennings & Housner, 1973).

Alongside these safer school facilities policies, California began developing disaster management legislation. In 1945, the state adopted the California Disaster Act, which created a single state agency for preparing and responding to disasters. This agency and its predecessors wrote the California State Emergency Plan, an overarching emergency response document that recognised school districts as local government authorities and mandated that they be prepared to respond to all emergencies that occur within their jurisdictions.

State Policies for School Disaster Management

With policies in place to ensure safer school construction and designate school districts responsible for responding to emergencies, California turned to developing robust school disaster management plans. The Katz Act of 1984 required that all public and private elementary and high schools with 50 students or more develop an earthquake disaster plan that defined emergency roles and protocols for staff and students. The Act also required schools to hold regular "drop, cover, and hold on" and evacuation drills. These regulations were later supplemented by California Education Code Sections 32280–32289, which mandated that all schools develop Safe School Plans by March 1, 2000. The plans were to include natural hazard risk, school and home violence, and traffic safety with annual updates submitted to the governing board of their school district.

Over the next decade, California state emergency management requirements evolved until, ultimately, the state created the Standardized Emergency Management System (SEMS), the set of requirements LAUSD schools must comply with today.

SEMS was incorporated into state and local emergency planning, including school plans, in 1996. After the 1991 East Bay fires in Oakland, which claimed 25 lives, the California legislature passed the Petris Act in 1993. The act directed the Governor's office to develop a system for managing emergencies when multiple jurisdictions and agencies with designated roles in the State Emergency Plan were involved. SEMS instructed higher levels to support emergency response coordination among lower levels (California Emergency Management Agency, 2009). SEMS also established inter-agency coordination to ensure rapid communication and decision-making, and a state mutual aid programme amongst fire departments, police departments, and health facilities.

SEMS derived its main functions from the Incident Command System (ICS), a concept originally developed in the 1960s with the purpose of more effectively combatting wildfires in California. ICS is characterised by its division of emergency response into five functions:

- **Management:** Policy planning and coordination of relevant government agencies and private organisations.
- **Operations:** Coordination of emergency plan execution consistent with policy.
- **Planning and intelligence:** Collection, analysis, documentation, and dissemination of information.
- **Logistics:** Coordination of facilities, services, equipment, and human resources.
- **Finance and administration:** Documentation and coordination of funding.

When ICS is implemented in a school context, school staff and local and state agencies involved in emergency response divide up the five ICS functions,

Problems:
- High regional risk of earthquakes, fires, and school violence.

Goals:
- Ensure safety of students in emergency situations.
- Coordinate emergency response among LAUSD, first responders, and local government.
- Train and educate students and staff on proper behavior in emergency situations.
- Ensure all schools have a complete school safety plan.

Intervention:
- Development and incorporation of SEMS into emergency planning.
- Mandating of regular earthquake and other emergency drills.
- Development of a Safe School Plan template for school use.

"The Katz Act of 1984 required that all public and private elementary and high schools with 50 students or more develop an earthquake disaster plan ..."

improving coordination and communication between school site personnel, first responders, and emergency management offices at the local and state levels (California Emergency Management Agency, 2009).

The Petris Bill required all school districts to incorporate SEMS into their school safety plans by 1996. Each plan also had to include documentation of the use of SEMS in plans, training, and exercising. Non-compliant districts risked losing financial compensation from the state for emergency-related personnel costs (California Emergency Management Agency, 2009).

In 2003, the National Department of Homeland Security developed the National Incident Management System (NIMS), an ICS-based incident-management system that coordinates multi-jurisdictional response to domestic emergencies, requiring that all local and state agencies in the United States adopt it to be eligible for certain federal grants. Because California jurisdictions had already adopted SEMS, another ICS-based system, they were generally already compliant with NIMS. However, California school districts legally must comply with NIMS by national law and with SEMS by state law.

Supporting School Emergency Plan Development

Few school administrators had the time or expertise to develop school disaster management plans that fully complied with the complex state and national policies for emergency response. They needed support from the LAUSD Office of Emergency Services, yet with so many schools in its district, the office could not help each school individually.

The LAUSD Office of Emergency Services developed a 600-page template for School Safety Plans that guides LAUSD schools to develop Safe School Plans in compliance with SEMS, NIMS, and the California Education Code. Without the template, it would have been difficult and time-consuming for individual schools to ensure their plan followed all the applicable regulations. Details concerning evacuation routes, meeting points, and role designation for specific staff members, were left to school administrators and faculty.

Safe School Plans for LAUSD schools are divided into three volumes:

1. **Coordinated Safe and Healthy School Plan**, which evaluates the effectiveness of existing school policies in creating a safe and positive environment for students.

2. **Emergency Procedures**, which develops the school's emergency response protocols and establishes a plan for training personnel.

3. **Intervention and Recovery**, which identifies the resources a school will need to achieve post-disaster recovery.

Each school must establish a Safe School Committee in charge of reviewing and updating its Safe School Plan. In LAUSD, Safe School Committees must include the principal, the United Teachers Los Angeles Chapter Chair, one non-teaching staff member, one student representative if the plan is for a high school, one parent representative of a current student, and one local law enforcement officer. In addition to mandatory members, LAUSD Office of Emergency Services encourages schools to recruit staff members with diverse training backgrounds for the committee (Office of Environmental Health & Safety, 2009).

LAUSD schools must also establish a School Site Crisis team, composed of staff members assigned specific emergency roles and a backup member for each role. An incomplete list of emergency roles includes:

- **Incident Commander**, usually the principal, who oversees overall crisis response and communication with the school district during an emergency.

- **Crisis Team Leader**, who coordinates all crisis team responders.

- **Communications/Media Manager**, who provides parents and media with situation updates.

- **Crisis Counselor**, who provides counseling to students and staff who require emotional support.

The Safe School Committee must also establish two or more Search and Rescue teams, each comprised of at least four trained faculty members (LAUSD Office of Emergency Services, 2016).

The LAUSD Office of Emergency Services requires that schools have a copy of their Safe School Plan in the main office of the school for public reference, in the head administrator's office, in the school's emergency supply bin, and in the main faculty lounge. Safe School Plans are not available online for security reasons; however, parents and others can visit the main office of the school and sign in to review its plan.

To further engage LAUSD students and staff in emergency planning, the LAUSD Office of Emergency Services released two smart phone apps that are based on the district's Safe School Plan template. The LAUSD Staff/Responder Emergency Plan app is available to all district employees and first responders and describes response protocols for 21 different categories of emergencies. The LAUSD Community Emergency Plan app, which students, parents, and community members can download in English and Spanish, describes LAUSD emergency plans and protocols, including parent notification and reunification procedures.

In response to a 2012 school shooting, in which 20 children were killed, the national Federal Emergency Management Agency (FEMA) released a document titled *Developing High-Quality School Emergency Operations Plan*. This planning document guides school districts in developing and formatting emergency plans, as well as plans for the prevention and mitigation of emergencies (FEMA, 2013). The LAUSD has changed its Safe School Plans guidance document to align with these federal guidelines.

"Without the template, it would be difficult and time-consuming for individual schools to ensure their plan followed all the applicable regulations..."

Practicing Emergency Plans and Drills

Safe School Plans address various emergency scenarios that ideally will not come to pass. However, emergency drills, described in each school's Safe School Plan and mandated under the Katz Act, offer staff and students the opportunity to practice what to do in emergency scenarios.

The LAUSD Office of Emergency Services provides an emergency drill reference guide to all district schools. The guide describes both drill procedure and frequency. Earthquake "drop, cover, and hold on" drills must be conducted on a monthly basis; fire drills must be conducted monthly in elementary and middle schools and twice a year in high schools; lock-downs, shelter-in-place, and take cover procedures must also be practiced twice a year in all schools (LAUSD Office of Emergency Services, 2012).

Major Impacts:

- All LAUSD schools a standardised Safe School Plan.
- All LAUSD schools practice regular earthquake and other emergency drills.

Greatest Insights:

- Safe School Plans are reviewed annually.
- Students practice in regular emergency drills from elementary school through high school.

What's Next:

- Safe School Plans for the 2017–2018 school year will align with FEMA guidelines for the planning and formatting of school emergency plans.

In March 2017, a LAUSD high school fully activated their ICS and emergency plan after receiving a bomb threat by telephone. School staff safely evacuated their students at both the threatened school and another school in the vicinity while police conducted a full search of the school grounds. Though no threat was found, successful implementation of the school's emergency procedures demonstrated the effectiveness of having emergency plans in place and practicing them during drills.

In addition to periodic drills, all LAUSD schools participate in California's annual Great Shakeout drill in October – a massive community earthquake drill organised by the Earthquake Country Alliance. In 2016, the Great Shakeout included 55 million participants from around the world. The LAUSD coordinates with the fire department and MySafe:LA, a fire and life safety organisation, to help facilitate and participate in the drill. The community drill involves schools, businesses, government institutions, and the broader community in a "drop, cover, and hold" drill slightly after 10am on the third Thursday of October, a date and time that ensures schools can participate. Participants also practice their respective emergency plans on the same day.

During the "drop, cover, and hold" drill, students and staff find shelter and if none is available find an area without windows. They remain in a position that protects their heads and vital organs. After the "shaking" ends, the staff member in each classroom asks if anyone is injured and offers treatment or arranges transportation accordingly. Staff also make note of damage or exposure of hazardous materials resulting from the "shaking". The staff member then checks if neighbouring classrooms require assistance. Finally, the staff member leads students out of the building and to a safe area outdoors in an orderly manner, leaving a mark on the classroom indicating that students have evacuated, and that no hazardous materials or bodies are inside the classroom (Petal & Green, 2009).

Previous expert observation of the first Great Shakeout drill at one LAUSD high school revealed that a rote memorisation approach to emergency procedures could leave students in danger. For example, students already located outside during the drill did not think to move away from outdoor hazards, such as adjacent buildings or light posts. Similarly, students in an open dance studio were unsure of how to behave during the drill (Petal & Green, 2009). Students needed to think through individual scenarios that may arise for them and how to react to an earthquake safely in a variety of locations.

Policy-Enabling Factors and Remaining Challenges

Overall, the LAUSD Office of Emergency Services provides an excellent model of how a large school district or local government can guide schools in planning for emergencies. It is important to note that the LAUSD Office of Emergency Services emergency planning policy is strongly supported by California state law, and what is arguably a proactive hazard planning culture in California, evidenced through extensive participation in the statewide annual Great Shakeout earthquake drill. Students benefit not only from the existence of emergency plans in school, but from hazard and emergency response education, as is provided through periodic school drills and the availability of emergency planning apps.

Emergency plans, emergency response protocols, and school drills should be based upon guiding principles developed from research on major causes of injury and death from past earthquakes (for example, see Johnston, Standring, Ronan, et al., 2014; Petal, 2011). Students and staff need to understand the principles behind protective actions practiced in drills so they can apply these principles in potentially novel situations during actual earthquakes.

Despite the LAUSD Office of Emergency Services impressive work in emergency planning and hazard mitigation, significant challenges remain. One of the greatest obstacles to managing the development and maintenance of Safe School Plans in the LAUSD is the size of the district relative to the number of managers monitoring school plans. Though the use of a template ensures that Safe School Plans will follow an approved format and contain all local, state, and national requirements, the LAUSD Office of Emergency Services must review over 1,000 plans to ensure that school inputs are both safe and realistic.

One of the ways the LAUSD Office of Emergency Services addresses this disparate ratio is by relying upon district Operations Coordinators. These coordinators act as liaisons between the LAUSD and schools for non-instructional issues and can support schools when they need help developing Safe School Plans. The coordinators can also report plan discrepancies to district authorities. Another remaining challenge is promoting flexible drilling and evacuation procedures; Paci-Green et al. (2015) identified unintended consequences of drills done in a rote-like fashion. The LAUSD Office of Emergency Services supports disaster management policy in which school staff, students, and other community members actively engage in emergency planning, fostering resilient school communities.

Comprehensive School Safety (CSS) is a framework for advocacy and action aligning policies and plans across education and disaster management sectors at all level. It uses child-centred all-hazards risk assessment and context analysis as the evidence base for action in three overlapping areas: Safe Learning Facilities, School Disaster Management, and Risk Reduction and Resilience Education. For more information, see http://www.gadrrres.net/

Suggested Citations: GADRRRES. (2017). Pillar 2: Developing School Plans and Performing Drills in Los Angeles, GADRRRES Comprehensive School Safety Policy Case Studies Series. http://www.gadrrres.net/resources

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Global Alliance for
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GADRRRES Comprehensive School Safety Policy Case Studies Series

Philippines

Pillar 2: School Disaster Management

Key Organisations:

- *National legislative and executive branches*
- *Department of Education (DepEd)*
- *Department of Social Welfare and Development (DSWD)*
- *Save the Children Philippines*
- *World Vision*
- *UNICEF*
- *Plan International*

Children Impacted:

- 35 million +

Save the Children

risk RED

C&A Foundation

Produced by Save the Children and Risk RED, with support from the global partnership with C&A Foundation and C&A

Protecting Children in Emergencies by Law in the Philippines

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2. Risk RED

Overview

When Typhoon Haiyan struck Southeast Asia in 2013, it affected nearly 6 million children in the Philippines, leaving thousands dead and many more psychologically traumatised. In the aftermath of the disaster, Save the Children, World Vision, UNICEF and Plan International conducted a study to identify children's needs through direct consultation with children. The findings of this study became the basis of policy advocacy led by Save the Children. The campaign developed relationships with members of the Philippine Senate and House of Representatives and presented an evidence-based policy solution based on the post-Haiyan research studies. In 2016, after several amendments in the Senate and House of Representatives, President Aquino signed the Children's Emergency Relief and Protection Act. The act outlined specific measures to ensure the safety of children in disasters.

Keywords: The Philippines, typhoon, children in emergencies, policy advocacy, policy enactment, child participation

Hazard and Education Context

The Philippines is highly susceptible to natural hazards, including typhoons, storm surges, flash floods, droughts, earthquakes, and volcanic eruptions. It experienced 191 natural hazard events between 2003 and 2013, making it the country with the highest frequency of natural hazards out of all Southeast Asian countries during that decade (EM-DAT, 2017).

Typhoons are one of the country's most significant natural hazard threats because they are both frequent and destructive. Around 20 typhoons hit the Philippines every year, and about eight to nine make landfall. Typhoon Haiyan in 2013 was the strongest storm on record to make landfall in the Philippines. Wind speeds reached 10-minute sustained speeds of 230 kilometres per hour and one-minute sustained speeds of 315 kilometres per hour. The typhoon caused 6,300 deaths in the Philippines alone – many of which were children. Property damage was also extensive, displacing 4.4 million people. In the aftermath of the typhoon, many suffered from homelessness, lack of clean water, food scarcity, and severe psychological trauma.

The education sector was not unscathed by this disaster. The typhoon damaged or destroyed 3,200 school buildings, approximately 90% of the school buildings in the typhoon-affected regions of the Philippines, affecting the education of over 1 million children (Valcarcel, 2013). Approximately one-third of the population in the Philippines – about 34.6 million people – is under the age of 15 years old (Philippines Statistical Authority, 2012). Nearly all children attend primary school, though secondary school enrolment is lower at 88.3% (UNESCO Institute for Statistics, 2016).

Typhoon Haiyan caused disorienting impacts to children and youth. The property damage and social disorganisation left by Typhoon Haiyan made educational continuity impossible in certain parts of the Philippines. This disruption left children without social structure or a physical place of belonging, especially in cases where they had lost their home or families. Orphaned or separated children were also highly vulnerable to risks of abuse or trafficking after the typhoon.

National disaster management policy in the Philippines dates back to the establishment of the Civilian Emergency Administration in 1941, which developed policies and plans for emergency response. Presidential Decree 1566 in 1978 established the framework for what is currently known as the National Disaster Risk Reduction Management Council, a council that includes the Department of Education (DepEd). The council is responsible for developing the National Disaster Risk Reduction and Management Framework as well as actions the national and local governments must take to reduce disaster risk and build community resilience (NDRRMC, 2011).

Prior to Typhoon Haiyan, and in agreement with its adoption of the Hyogo Framework for Action 2005–2015, the Philippine government had developed two significant policies in 2010 that addressed disaster risk in the education sector:

- **The Strategic National Action Plan 2009–2019 for Disaster Risk Reduction** institutionalised disaster risk reduction (DRR) into policies and plans of government agencies at all levels. Among its many provisions, it calls for the mainstreaming of DRR in the education sector, both in terms of developing safe school structures and incorporating DRR education into curricula.

- **The Philippine Disaster Risk Reduction and Management Act** (Republic Act 10121) mandated government agencies – including the DepEd – integrate DRR and climate change adaptation strategies into their policies and programs. It also mandated the creation of local disaster risk reduction management offices. As part of the Act, the DepEd required its local offices to designate a DRR coordinator to manage the local education sector DRR programmes and cooperate with local NGOs working on DRR-related initiatives. Through these local offices, the DepEd carried out activities for preparedness and response, including the coordination of preparedness trainings, assistance in post-disaster reconstruction, and development of DRR management plans at the school level.

During the same period, the DepEd also developed a Resource Manual for schools that provided information on disaster planning in schools, and included guidelines for developing evacuation plans and establishing emergency response teams.

Despite the policy advances in 2010 and the involvement of the DepEd in DRR initiatives, the devastation from Typhoon Haiyan showed the gaps in the existing disaster management framework. A year after the typhoon, a 2014 Save the Children policy report found that the national DRR policy framework was unable to properly operate as a whole, despite seemingly robust DRR policies at the level of individual agencies, including the DepEd.

A particular gap was that the national or regional policy had not been implemented at the local level. Many schools had not implemented DepEd DRR policies due to lack of awareness, resources, or will. Many schools had not

Problems:
- High natural hazard risk.
- Lack of comprehensive policy addressing the wellbeing of children in emergencies.

Goals:
- Support the physical and psychological health of children in emergency situations.

Intervention:
- Development of comprehensive policy supporting the security and wellbeing of children in emergencies.
- Enactment of the Children’s Emergency Relief and Protection Act.

“Classrooms were also often used as evacuation and supply centres, causing further school disruption...”

accessed the DepEd DRR Resource Manual, which would have provided crucial information for emergency planning and response in schools. The report found that had more policy attention and resources been directed toward child-focused DRR initiatives prior to Typhoon Haiyan, the burden placed on children and the education sector could have been significantly lessened after the disaster (Cooke, 2014).

Using Evidence to Develop a Child-Centred Emergency Policy

A month after the typhoon struck, Save the Children, World Vision, UNICEF, and Plan International began a study in December 2013 investigating the self-identified needs of children affected by Typhoon Haiyan. The study assessed 286 children and completed 42 focus group sessions. The purpose of the study was to identify existing weaknesses in the system, with emphasis on those systemic weaknesses that affected children.

The study found that, as of June 2014, over 10,000 children affected by Typhoon Haiyan remained in precarious situations with unstable access to education and health resources. The study identified primary policy gaps and problems during the disaster, including a lack of psychological and social support for children, lack of protections against child abuse and trafficking, loss of birth certificates, and lack of child-specific data collection in post-disaster assessments. Classrooms were also often used as evacuation and supply centres, causing further school disruption.

Based on the results of the study, Save the Children knew it needed to engage in bottom-up policy advocacy to develop a child-centred policy framework that could protect and harness resources for children in disasters. Save the Children wanted to pass a new policy quickly to avoid another major hazard event within the current policy framework, which had failed children in Typhoon Haiyan. The urgency was also to avoid a shift in political leadership that could potentially be unwelcoming to policy change. Save the Children understood that advocacy for policy reform would be most effective after a disaster, when it was still fresh in the minds of citizens and lawmakers.

Save the Children first developed a policy advocacy team, recruiting local staff who were familiar with the language and political nuances. The Advocacy Team further strengthened relationships with Congress by closely collaborating with them in the development of the bill. The team offered DRR workshops to members of Congress on relevant House or Senate committees. Save the Children also provided Congress with copies of research reports detailing the impacts of Typhoon Haiyan on children and current policy assessments in order to build support for policy change. Save the Children developed a draft bill in September 2014 based on the data from the post-Haiyan study and analysis of the existing policy framework, presenting the draft bill to members of the House Children’s Welfare Committee. To avoid the problems of many top-down policy interventions, the draft bill was worded carefully, using local phrases and words so that it was easily understood by local policy-makers. Representative Susan Yap authored House Bill 5062, The Children’s Emergency Relief and Protection Act, based on the draft bill provided by Save the Children.

House Bill 5062 proposed a comprehensive emergency program to be implemented by the Department of Social Welfare and Development (DSWD), which would provide shelter and basic necessities and services for displaced children and heighten surveillance to prevent post-disaster child abuse and trafficking. The bill would also increase child participation in DRR planning and post-disaster needs assessment, limit use of schools as evacuation centres, and collect child-specific data in order to better understand the impacts disasters have on children.

Based on suggestions from the House of Representatives, House Bill 5062 was substituted for House Bill 5285, which had 70 co-authors. The Philippines has a two-branched legislature, and bills must be approved in both the House of Representatives and the Senate to become law. House Bill 5285 encountered no opposition and passed on its third reading in the House. The Senate, on the other hand, developed its own Technical Working Group to revise the bill into a more comprehensive version. The revision process lasted over a year. Save the Children's advocacy team attended the working group meetings and provided input and the team was in constant communication with relevant Senators.

To build broad community support, Save the Children engaged in a media campaign and local advocacy initiatives to raise awareness about the bill and increase the push for the passage the bill. Save the Children staff convinced over 30 local government offices in different parts of the country to send position papers supporting the bill to lawmakers. The team gathered 6,000 community signatures in support of the bill, which were presented in Congress, a process that created both top-down and bottom-up support for an intervention to better protect children during disaster.

"...provide shelter and basic necessities and services for displaced children and heighten surveillance to prevent post-disaster child abuse and trafficking..."

Figure 1. Save the Children built a strong coalition of advocates, including children and local governments, that encouraged national congressional leaders to enact laws to protect children in emergencies. Source: Save the Children Philippines.

Major Impacts:
- Development of legal safeguards for child welfare in emergencies.

Greatest Insights:
- Consultation of children in the development of the Children's Emergency Relief and Protection Act.
- Building broad coalition of advocates.

What's Next:
- Ensure the law is fully and properly implemented.

Senate Bill 3034 was eventually passed by the bicameral committee in May 2016, and was signed into law the same month by former President Benigno Aquino as Republic Act 10821: The Children's Emergency Relief and Protection Act. The law took effect on June 7, 2016. As required by the law, the DSWD began drafting its implementing rules and regulations in consultation with Save the Children, the Technical Working Group, other key stakeholders, and most importantly, children. On February 28, 2017, the finalised implementing rules and regulations of the Children's Emergency Relief and Protection Act were signed by Secretaries of a host of departments – the Departments of Social Welfare and Development, Education, Health, Interior and Local Government, and National Defence – as well as by the Philippine Statistics Authority, the Philippine National Police, the Armed Forces of the Philippines, and the Office of Civil Defence. Each signed as a signal of support and compliance. The Save the Children Philippines Country Director signed as a representative of civil society.

Components of the Children's Emergency Relief and Protection Act

The Children's Emergency Relief and Protection Act directs the DSWD to develop a Comprehensive Emergency Programme for Children. The program will activate upon declaration of a state of calamity or any other emergency situation. DSWD, in coordination with other government agencies, is currently developing this program, with the support of the Save the Children, and expects to have it completed and approved in 2017. As per the law and implementing rules and regulations, eight components will be included in the program:

- establishment of evacuation centres
- establishment of child and women-friendly transitional shelters, and a referral mechanism for orphaned, unaccompanied and separated children
- assurance for immediate delivery of basic necessities and services
- stronger measures to ensure the safety and security of affected children
- delivery of health, medical and nutrition services
- plan of action for prompt resumption of educational services for children
- establishment of child-friendly spaces; and promotion of children's rights.

In order to support a full and accurate implementation of the new law and its accompanying Comprehensive Emergency Program for Children, Save the Children Philippines continues to support the DSWD through a project titled Strengthening Child-Centred DRR and Emergency Response. This project aims to build the institutional capacities of the national and local governments to protect children in emergencies through better inclusion of children in the planning process.

Policy-Enabling Factors and Remaining Challenges

The passage of the Children's Emergency Relief and Protection Act was largely made possible by the research and advocacy of Save the Children Philippines, which drafted a version of the original bill and continuously lobbied over the next two years to pass a piece of legislation based upon this bill. Save the Children's involvement in policy advocacy, development, and implementation highlights how important researchers and partner organisations can be in advocating for, and ensuring lawmakers pass, evidence-based policies. However, existing support and advocacy for children's welfare within the House of Representatives and Senate were integral in passing the law. The timing of policy advocacy was also important in passing the Children's Emergency Relief and Protection Act.

Typhoon Haiyan had occurred less than a year prior when HB 5062 was first introduced. The devastation from the storm was still fresh in the minds of both citizens and lawmakers, making the political climate ripe for policy change. Complementing the national advocacy work, were initiatives at the local level, such as the resolutions of support from the public and local government offices. Both the top-down visioning and bottom-up advocacy contributed to a broad-based push for the passage of the bill. The country's success indicates "punctuated" policy change can happen after disasters. Policy development and advocacy should begin soon after the emergency phase winds down.

Passing a comprehensive bill addressing the wellbeing of children in disasters is a substantial accomplishment for the Philippines. However, it remains to be seen how effective the law will be in practice. Ensuring the full support and participation of all government agencies involved in the Comprehensive Emergency Program for Children is something that can be continued in the present. Civil society organisations should maintain their support of government agencies, and should offer their resources where needed.

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Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

Students Leading Communities in Disaster Risk Reduction through Informal Education in Cuba

Orestes Valdés Valdés[1] and Ana Miscolta[2]

1. Cuban Ministry of Education 2. Risk RED

Cuba

Pillar 3: Risk Reduction and Resilience Education

Organisations:

- *Cuban Ministry of Education (MINED)*

Schools Impacted:

- 128+ schools (from project, not including 2017 participants)
- 8,881 schools primary and secondary basic schools (that use national DRR curriculum)

Save the Children

risk RED C&A Foundation

Produced by Cuban Ministry of Education, Save the Children and Risk RED, with support from the global partnership with C&A Foundation and C&A

Overview

In Cuba, environmental education and disaster prevention are directly related. From preschool through secondary school, the national curriculum addresses environmental protection. Classes focus on ecological problems, natural hazard risks, and disaster mitigation and prevention. However, officials within the Ministry of Education (MINED) consider formal school-based disaster risk reduction (DRR) and environmental education insufficient, because it excludes adults and cannot be rapidly updated with new knowledge. In response, the MINED-developed informal DRR education programs that include the whole community. The project, Education, Leadership, and Gender for the Strengthening of Resilience in Children and Adolescents against Risk, Danger, and Vulnerability in Cuba (the Education, Leadership, and Gender project), aims to strengthen the resilience and response capacity of children and communities against natural hazards. Despite frequent hurricanes and flooding in Cuba, the number of related fatalities is minimal, largely due to the political will of preserving lives through formal and informal hazard education.

Keywords: Cuba, DRR education, informal education, community education, hurricane, flooding

Policy Context

The island of Cuba is exposed to risks of hurricanes, floods from heavy rains, and coastal flooding, due to its tropical climate in the Caribbean Sea. It also faces risks from earthquakes and other natural hazards. Hurricanes affect Cuba nearly every year. Hurricane Matthew, which struck Cuba in October 2016, was the most intense hurricane in the Caribbean within the past seven years. Hurricanes cause coastal and inland flooding from heavy rains. While flooding is most common during the rainy hurricane seasons, climate change is increasing the frequency of flooding during traditionally dry seasons as well.

The Cuban national government, through the Cuban Ministry of Education (MINED), provides funds to develop environmental and DRR education programs in the 8,881 primary and basic secondary education schools in the country. In 2016, the government allocated 23% of the national budget to the education sector – a far higher percentage than many other countries. In Cuba, the education sector is completely nationalised, and there are no private schools. Education is provided by the state for free and is accessible to all.

Since the Cuban revolution in 1959 – and especially since the 1970s – the Cuban state has used environmental education as a tool to prevent and reduce the effects of disasters on the population. The Cuba Constitution (Cap. 10, Art. 98) established the responsibility of the state to reduce disaster risk and preserve human lives. The constitution acknowledged the importance of education in this goal. The Cuban education system operates on the theory that proper education about environmental protection and DRR will give students proactive attitudes about the subjects that will remain with them into adulthood. They will put knowledge acquired in school into practice in their personal and professional lives.

The MINED determines the National Education System, which defines the national curriculum and provides textbooks. National study plans, programs, and textbooks started explicitly including DRR education in 1975. Since then, MINED has used the Perfection of the National Education System – an ongoing curricular revision process – to update the national curriculum material and general education approach. During each revision, MINED has added more education material about the environment and DRR and developed new methods of incorporating this material into diverse class subjects.

In primary school, students from grades one to six study their natural surroundings and learn about the environment through daily observation. They write about subjects such as their neighborhoods, plants, animals, national monuments, museums, seas, rivers, mountains, and other components of their environment. The students put emphasis on caring and protecting those environments.

In primary and basic secondary grades, environmental and DRR education are incorporated into the curriculum through natural sciences classes. In primary grades one through four, DRR education is also included in the "World We Live In" class, which is focused on discovering and protecting nature through outdoor excursions. Later, in fifth and sixth grades, students expand their understanding of the natural environment and DRR. Students learn about the national emergency response body, the Cuban Civil Defense, and the role it plays in disaster response and risk reduction. Students also learn about environmental exploitation of natural resources and ways they can actively protect the environment.

The Perfection of the National Education System for the years 2016–2022, which is currently underway, is focused on incorporating further material into the curriculum on topics including risk, vulnerability, resilience, climate change, mitigation, sustainable development, risk management, early warning systems, and evacuation plans.

Figure 1. Students at a primary school in Cienfuegos province demonstrating what they have learned about first aid in Civil Defense class. Photo credit: Orestes Valdés Valdés

Problems:

- High hurricane and flooding risk; incomplete knowledge about disaster risk reduction in communities.

Goals:

- Elevate the roles of children in community disaster risk reduction; educate communities in disaster risk reduction.

Intervention:

- Comprehensive incorporation of DRR into national curriculum; development of community DRR education programs that place children in leadership roles.

> *“The MINED considers school-based, formal education on disaster risk reduction (DRR) and the environmental insufficient because it excludes adults and out-of-school populations ...”*

Environmental education — and DRR education in particular — has been thoroughly incorporated into the Cuban national curriculum through means of formal policy. Despite this achievement, the MINED considers school-based, formal education on disaster risk reduction (DRR) and the environment insufficient because it excludes adults and out-of-school populations and cannot be rapidly updated with new information. For this reason, the MINED has developed other types of formal and informal education initiatives that include the general population while still centring children and adolescents as project protagonists and agents of change. While the incorporation of DRR material into the national curriculum is a type of formal policy, the ongoing development and implementation of DRR education initiatives, usually through partnerships with civil society organisations, reveals an informal policy of promoting DRR education in schools through alternative means.

The MINED maintains the practice of working with international non-governmental organisations, such as the United Nations Children's Fund (UNICEF), Save the Children, and the United Nations Educational, Scientific and Cultural Organisation (UNESCO), to develop its formal and informal environmental education system through projects and programmes. Based on its current priorities and evaluation of need, the MINED develops and distributes terms of references for environmental education projects that are consistent with their education policy and model of development. Organisations, usually those that already have a work-related presence in Cuba, answer to these terms of references, thereby developing partner projects with the MINED. While each partner organisation has its own approach to project development and implementation, it must work within the educational policy paradigm of the MINED, in accordance with its pedagogical approach to environmental education. In essence, this means that organisational partners must share Cuba's post-revolutionary values, which revolve around equality in education and environmentally sustainable development. While the duration of a single project may be finite, its lessons are often used for changes to permanent policy through incorporation into curricular content or teacher training content.

Promoting DRR Education through Partnerships

Among current or recent projects being carried out by the MINED and partner organisations in primary and secondary schools are:

- “Disaster risk reduction in schools and communities in areas of high hazard recurrence in the province of Camagüey” in partnership with Save the Children.
- “Education about climate change for sustainable development in schools associated with UNESCO and other education institutions” in partnership with UNESCO.
- “Education, Leadership, and Gender for the Strengthening of Resilience in Children and Adolescents against Risk, Danger, and Vulnerability in Cuba” in partnership with UNICEF.

The UNICEF project, now in its fifth year, is described in detail below to illustrate how these MINED partnerships with non-governmental organisations work to improve environmental education. Project outcomes will be reported after 2017.

Education, Leadership, and Gender project implementation

The MINED developed the five-year Education, Leadership and Gender project in 2013, with help from UNICEF Cuba and more than 15 Cuban interdisciplinary ministries and institutes in the sectors of education, civil defence, and DRR. The project aimed to strengthen the leadership roles of children and adolescents, their families, and their communities in learning and pursuing new knowledge and skills in disaster mitigation and prevention. It worked with students, mothers, teachers, and community leaders and focused on girls and women as active decision-makers and project leaders in an effort to challenge the prevailing stereotype that women and girls cannot coordinate or hold directing roles in community projects. Between 2013 and 2016, more than 14,000 children and 1,800 teachers have participated in the project, in 128 schools and 107 communities.

The MINED selects between 25 and 30 participant communities within a single province to participate each year. Within each half of the schools (usually between 35–60) participate each year. Teachers within non-selected schools receive DRR and resilience trainings so they can individually incorporate project material into their class activities.

The MINED evaluates:

- The extent of territory with identified risks, dangers, and vulnerability (considering existing studies in each consejo popular, a small-scale administrative unit, and municipality, carried out by the Ministry of Science, Technology, and Environment; the Civil Defence; the Institute for Planning; and other institutions).
- The population of children and adolescents affected by disaster risk.
- The development and progress of local governments in preventing or preparing for disasters.

The Education, Leadership, and Gender project's annual budget is USD $42,000 for each project year between 2014 and 2018. The funds are divided amongst all participant communities. The MINED contributes 70% of the funding while UNICEF contributes the other 30%.

Project activities are divided into two categories: some activities for students only happen in schools, while other activities happen in workshops geared towards entire communities, including students. Ministries with disaster-based expertise, such as the Ministry of Science, Technology, and Environment, provide data on local hazard risk; organisations with education-based expertise such as the Centre of Pedagogical Documentation and Information help design the pedagogical approach of the project; and civil society organisations such as the Federation of Cuban Women and the Committees of the Defence of the Revolution help garner community support for the project and encourage their own members to get involved.

The project provides teachers with a three-day training workshop. It relies on a cascade training approach. Officials from the MINED and UNICEF play a supervisory and coordination role after the initial teacher training workshops, relying on teachers and school administrators to direct project activities to meet the goal of enhancing local DRR capacity.

Teachers learn to incorporate various learning methods, such as thinking exercises, competitions, research projects, presentations, games, skits, discussions, stories, songs, poems, and exhibits. These activities are permanently incorporated into annual classroom activities.

"Between 2013 and 2016, more than 14,000 children and 1,800 teachers have participated in the project, in 128 schools and 107 communities ..."

The range of interactive learning experiences for students represents best practices delivered globally. These include:

- Creation of risk maps of the school and its surroundings to encourage thinking about risks and vulnerabilities in their own neighbourhoods and households. These are updated every three months. The exercises direct them to talk with their families about measures they should take in the house to protect themselves from hazards. Students also discuss past disasters that have affected the community.

- Competitions, research projects, exhibits, and discussions, using creative and artistic mediums, writing and listening to songs, stories, and poems with themes of environmental protection and hazard prevention, and development of short skits on the same theme.

- Exploratory excursions around the school to identify potential risks through their own observations.

- Presentations to families and the rest of the community in two-day public workshops, which are led by teachers, administrators, and community leaders. Students use skits, demonstrations, games, and presentations. The workshops end with food, dancing, and local music with lyrics that focus on disaster prevention and environmental protection.

Children are encouraged to continue teaching their families and neighbours about the environment and DRR, and serve as liaisons between schools and the community. The project is designed to involve families and communities in the education and training process so they can support children to continue activities related to DRR and environmental stewardship within the household and in school.

Figure 2. Student risk maps or models of their school and community for display in the community. Photo credit: Orestes Valdés Valdés

Major Impacts:

- DRR education from primary school through pre-university for all Cuban students; inclusion of over 14,000 students and their families and communities in community DRR education project.

Greatest Insights:

- Using children as project protagonists and community risk communicators; development of a national curriculum that instills environmental and natural hazard awareness from an early age.

What's Next:

- Implementation of Education, Leadership, and Gender for year 2018; the MINED has plans to develop a community education project that focuses on multi-risk early warning system.

Challenges and Successes

The partnership and coordination between the MINED, supporting ministries, institutes, and organisations, and schools and partners have been a major factor in the successful advancement of knowledge of hazard risk mitigation and disaster prevention in over 100 Cuban communities. Non-governmental partner organisations help facilitate ongoing DRR education initiatives in Cuba, which support the Cuban government's proactive policy approach to disaster prevention. These DRR education initiatives fit within an existing national legal framework that holds the government responsible for ensuring the safety of human lives in situations of disasters.

Lack of financial resources remains an ongoing challenge in the implementation of formal and informal DRR education projects across Cuba. Financial resource scarcity has been exacerbated by the ongoing economic blockade imposed by the United States, despite the reestablishment of diplomatic relations in 2015. The economic blockade, among its other effects, impedes access to finances and credits for the development of educational projects and programs in Cuba. Nevertheless, the MINED and other Cuban institutions and organisations continue managing existing funds and resources for developing and monitoring educational projects and programmes that reduce disaster risk and protect the environment.

The Cuban government promotes the principle that children, women, and men are a major component of the environment, and the most precious resource to be protected in disasters. The development and implementation of environmental and DRR education demonstrates the commitment of the state to this principle, as well as its commitment to environmental protection. The success of Cuba's formal and informal education, and its commitment to these principles, is reflected in the country's low number of disaster-related fatalities. Despite its strength, Hurricane Matthew in 2016 left no fatalities, highlighting a culture and society centred around disaster prevention.

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Global Alliance for
Disaster Risk Reduction & Resilience
in the Education Sector

GADRRRES Comprehensive School Safety Policy Case Studies Series

South Korea

Pillar 3: Risk Reduction and Resilience Education

Organisations:

- *Ministry of Land, Infrastructure and Transport (MOLIT)*
- *Ministry of Education, Science, and Technology (MoEST)*

Schools Impacted:

- 11,563 public and private schools

Save the Children

risk RED

C&A Foundation

Produced by Save the Children and Risk RED, with support from the global partnership with C&A Foundation and C&A

Mainstreaming Road Safety Education for Children in South Korea

Author: Ana Miscolta, Risk RED

Overview

In South Korea, the journey to school is an everyday hazard for many children. Between the years of 1988 and 2014, South Korea made a series of policy changes that lowered national child traffic fatalities by nearly 97%. These policy changes began in 1995, and included both formal and informal educational approaches to roadside safety for children and adults. The policies created school zones, increased penalties for traffic violations, and integrated road safety education into kindergarten and elementary schools. Both helped decrease child traffic fatalities over the next two decades. The number of child roadside deaths dropped from 1,766 in 1988 to 53 in 2014 (Sul et al., 2014). The rate of traffic fatalities per 100,000 children in South Korea is currently 1.3, the same rate as the Organisation for Economic Cooperation and Development (OECD) country average. South Korea's successful road safety policies provide a model for other governments to emulate.

Keywords: South Korea, traffic accidents, traffic park, roadside safety training, school zones

Hazard and Education Context

South Korea's economy grew rapidly from 1980 to 2010, with its Gross Domestic Product increasing thirty-fourfold. With the growth, a larger proportion of the population bought cars, increasing registered vehicles on the road from under 530,000 in the early 1980s to 19.4 million in 2015. Traffic accidents and related fatalities increased proportionally throughout the 1980s. Traffic fatalities peaked in 1991, killing 13,429 people, including 1,566 children. Most fatal road accidents involving children in South Korea were vehicle-to-pedestrian collisions in urban areas. The death of these children highlighted a need to improve safety protocols for children who walk to and from school, especially in cities (Sul et al., 2014).

In South Korea, the Ministry of Land, Infrastructure and Transport (MOLIT) is responsible for developing traffic safety policies. MOLIT oversees the National Transportation Safety Master Plan, a comprehensive document that defines traffic safety policy goals and outlines the roles various government ministries play to meet the goals. In addition to MOLIT, the Ministry of Education, Science, and Technology (MoEST), which designs and oversees the national curriculum in public and private schools, and the Road Traffic Authority, which coordinates traffic safety education for licensed drivers and the public, played enormous roles in reducing child traffic fatalities. Together, MoEST and the Road Traffic Authority collaborated to design and incorporate road safety education into the formal national curriculum (Sul et al., 2014).

Building Evidence and Public Support for Road Safety Policies

Civic and research organisations focusing on road safety and child welfare played a substantial role in developing road safety education initiatives in the early 1990s. These organisations researched and published road accident data to convince the national government to take action. The Korea Green Mother's Society, a non-profit focused on improving road safety conditions for children, helped pressure the government to develop road safety policies. The group was founded in 1971, and has consistently lobbied presidential, mayoral, and gubernatorial candidates to pledge to support child road safety policies. With 530,000 members nationwide – most of whom are mothers of young children – such pressure is often effective. Government-affiliated institutions, such as the Road Traffic Authority and the Korea Transport Institute, published policy research and recommendations, which also prompted the national government to develop traffic risk reduction policies in the early 1990s.

Politicians were highly receptive to the call from these organisations to take actions reducing traffic-related child deaths. Policies aimed at saving children's lives are less often subject to the partisan disputes of everyday politics. Lending support to pro-child causes may politically benefit elected officials. With the launch of a road safety campaign in 1992, the political climate was ripe for a series of policy changes aimed at making roads safer for children.

Institutionalising Comprehensive Road Safety Education in Schools

In 1992, the national government launched the Reduce Traffic Accidents campaign in response to the high number of traffic accidents and child roadside deaths. As part of the campaign, the government recommended that kindergartens teach 40 annual hours of traffic education to each student and elementary, middle, and high schools teach 20 annual hours. Following this recommendation, many schools began voluntarily teaching road safety education. To support compliance with the national government's recommendation, the MoEST and the Road Traffic Authority, developed road safety educational materials for elementary schools in 1993.

In 1996, the MoEST attempted to strengthen road safety education programs in schools by mandating kindergartens teach 30 hours of road safety education, and that elementary, middle, and high schools teach 21 to 23 annual hours. However, the directive lacked a strong legal basis for enforcement. To address this legal gap, the national government amended the School Health Act in 1998 and the Child Welfare Act in 2000. Both amendments outlined the responsibility of school administrators to provide traffic education. The amendment to the Child Welfare Act also outlined road safety education guidelines for each age group:

- Kindergarten education focused on using sidewalks, crossing roads, and riding school buses.
- Elementary education focused on finding safe routes to school, understanding traffic rules, and using different forms of transportation.
- Middle and high school education focused on using and maintaining bicycles, understanding traffic rules, and preventing accidents.

The Child Welfare Act required school administrators to report their relevant educational plans along with a report detailing the "result of the education" to the school's superintendent each year. The law does not define guidelines for the report or penalties for not submitting, marking a weakness in the monitoring scheme (Sul et al., 2014).

Problems:
- High rate of traffic fatalities.

Goals:
- Reduce child traffic fatalities.
- Engage students in traffic and transportation education.

Intervention:
- Mandatory traffic education in schools.
- Development of extracurricular traffic education facilities.

Major Impacts:

- 95% reduction in child traffic fatalities between 1988 and 2014.

Greatest Insights:

- Use of both formal and informal educational approaches to convey traffic safety knowledge to children.

What's Next:

- Reduce traffic fatality rate among general population.
- Reduce child traffic fatality rate even further.

In 1997, the President made a pledge to further strengthen road safety education. In response, the Ministry of Education and the Road Traffic Authority developed content for the 7th National Educational Curriculum between 1998 and 2000, and curricular changes were incorporated into textbooks. MoEST prioritised updating textbooks for first and second graders, who were less likely to understand basic safety skills, then tackled older grades. In South Korea, private and public schools are subject to the national curriculum developed by MoEST and must use state textbooks.

A 2008 amendment to the Child Welfare Act required all schools to provide a minimum of 10 annual hours on road safety education every two months. Schools often teach more road safety education than is required. In 2008, all schools in South Korea reported providing between 21 and 23 annual hours of safety education to students, with a minimum of 12 hours dedicated to road safety training. Road safety education is also incorporated in textbooks for other school subjects, such as social studies, ethics, and physical education. Eight elementary school textbook subjects include road safety material. Teachers in charge of teaching road safety must attend training courses from the Road Traffic Authority. In 2012, 7,735 teachers were trained through such courses (Sul et al., 2014).

Children also learn about road safety outside the classroom. In 2002, the national government developed facilities called "traffic parks" or "road safety experience centres" for kindergarten and elementary students to test hands-on learning approaches to safety education. Traffic parks are confined areas that mimic real roadways to help train children in a safe environment. Children learn how to use crosswalks, interpret traffic signs, and safely ride in vehicles. They also learn where accidents involving pedestrians are most likely to occur in the street. In 2012, 306,273 kindergarteners and 22,133 elementary-level students attended traffic parks. Some schools take field trips to traffic parks. Many parks are designed as recreation spaces, so parents can bring their children outside of school hours (Sul et al., 2014).

The Ministry of Security and Public Administration also introduced the Walking School Bus system in 2010 as another out-of-classroom education approach. In this system, groups of 10 children walk to school along predetermined routes. Each group is accompanied by two helpers, who are usually retired teachers, police officers, or community volunteers. The Walking School Bus picks up and drops off children at fixed "stations" along the main route. Children learn about safe routes, and helpers teach children basic self-protective skills, like crossing streets and interpreting traffic signals. As of 2014, around 600 elementary schools participated in the Walking School Bus system, out of 6,001 elementary schools nationwide.

Policy-Enabling Factors and Remaining Challenges

South Korea has drastically reduced child traffic fatalities since the early 1990s, after the national government developed education-based policies for traffic safety. Classroom-based approaches contributed to the reduction in child traffic fatalities by teaching children skills to protect themselves on the street. Non-educational policies passed during the same period also played a large role, such as school zones and increased traffic penalties. In 1995, the government introduced the school zone system nationwide, which imposed stricter traffic rules in areas around schools. Traffic fines in school zones are double the normal amount. The new school zones and higher traffic violation penalties were also influential in making roads safer for children (Sul et al., 2014).

Education-based approaches to roadside risk reduction may be most effective in tandem with changes to traffic laws. Developing policies aimed towards improving driving practices acknowledges the responsibility drivers have to reduce roadside risks for children. These policies do not put the entire risk reduction burden on children, as a policy only focusing on self-protection would.

In 2013, the government announced a new plan that aims to reduce overall traffic fatalities to less than 4,000 by the end of 2017 (OECD/ITF, 2015). The plan includes child-focused measures, such as updating traffic education portions in textbooks, expanding access to traffic safety classes, increasing enforcement of child safety belts in vehicles, and expanding the Walking School Bus system.

Despite South Korea's impressive strides in reducing the rate of child traffic fatalities, its overall pedestrian fatality rate remained the highest among OECD countries in 2014 (OECD/ITF, 2015). Such a high pedestrian fatality rate indicates the country must take further measures to ensure roadside safety for all. Experts suggest the problem comes from a high rate of alcohol consumption, a fast-paced culture, lack of sidewalks, and relatively high speed limits (Yang & Kim, 2003; OECD/ITF, 2016). Developing measures to address the root causes of traffic accidents will benefit children and reduce the rate of child traffic fatalities even further.

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