

Global Agenda

Building Resilience in Nepal through Public-Private Partnerships

October 2015



Contents

Foreword	4
Key Findings	5
1. The Need for Public-Private Collaboration in Building Resilience after the Nepal Earthquake	6
2. Context – Nepal and the 2015 Earthquake	7
About Nepal	7
The 2015 earthquake	8
3. Building Resilience into Housing	10
Overview	10
What can be improved: outdated building code and limited enforcement	10
What worked: retrofitting and incremental improvements	10
Innovations from the private sector to increase resilience	12
Proposals for public-private partnership	13
4. Ensuring Safe Schools	16
Overview	16
What worked?	17
What can be improved?	17
What innovations can the private sector bring to improve resilience?	18
Proposals for public-private partnerships	18
5. Enabling Tourism	19
Overview	19
What worked?	20
What can be improved?	20
How can the private sector contribute to improve resilience?	20
Proposals for public-private partnerships	21
6. The Way Forward	23
Endnotes	24
References	26
Acknowledgements	27

Global Agenda Council on Risk & Resilience

Chair

Kirstjen Nielsen, Senior Fellow, Center for Cyber and Homeland Security, George Washington University; President, Sunesis Consulting

Vice-Chair

Sara Pantuliano, Director, Humanitarian Programmes, Overseas Development Institute

Council Manager

Caroline Galvan, Practice Lead, Competitiveness and Risks, World Economic Forum

Forum Lead

Margareta Drzeniek Hanouz, Head of Global Competitiveness and Risks, World Economic Forum

Editor

Barnaby Willitts-King, Research Fellow, Humanitarian Policy Group, Overseas Development Institute

Members

Lauren Alexander Augustine, Director, Office of Special Projects on Risk, Resilience and Extreme Events, The National Academy of Sciences

Stanley M. Bergman, Chairman of the Board and Chief Executive Officer, Henry Schein Inc.

Michael Berkowitz, President, 100 Resilient Cities, The Rockefeller Foundation

Edwin Macharia, Partner, Dalberg Global Development Advisors

Victor Meyer, Global Head, Corporate Security and Business Continuity, Deutsche Bank

Paul Nicholas, Senior Director, Microsoft Corporation

Satoru Nishikawa, Vice-President, Japan Water Agency (JWA)

Yuichi Ono, Assistant Director and Professor, International Research Institute of Disaster Science (IRIDeS), Tohoku University

Joe Ruiz, Director, UPS Humanitarian Relief Program, The UPS Foundation

Dan Smith, Director, Stockholm International Peace Research Institute

Elizabeth Hausler Strand, Founder and Chief Executive Officer, Build Change

Jaan Tallinn, Founder, Centre for the Study of Existential Risk

Michael Useem, Professor of Management; Director, Center for Leadership and Change, The Wharton School, University of Pennsylvania

Margareta Wahlström, UN Special Representative of the Secretary-General for Disaster Risk Reduction, United Nations Office for Disaster Risk Reduction

Nick Wildgoose, Global Corporate Leader, Supply Chain Product, Zurich Insurance Group

Alexander Wolfson, Managing Director, Global Country Risk Management, Citi

Foreword

As described in the World Economic Forum's *Global Risks 2014* report, as people and things located throughout the world are increasingly hyperconnected, the impacts of catastrophic events know no geographical, jurisdictional or industrial boundaries. Further, the interdependencies inherent in shared and global infrastructure can compound existing systemic risks, making consequences non-linear and hard to predict. As a result, no single private-sector entity possesses all of the necessary authority, capability and capacity required to address complex risks, and as a global community, we cannot rely on government action alone to prevent, protect against, respond to, recover from and mitigate the effects of adverse events.

Therefore, to limit the effects of catastrophic events and ensure economic, cultural, societal and infrastructural continuity, we must work together in multistakeholder partnerships – with stakeholders from government, the private sector and civil society – to increase our collective ability to be resilient to hazards and risks. For this purpose, resilience is defined as “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”.¹

The World Economic Forum's Global Agenda Council on Risk & Resilience is developing resilience use cases to demonstrate how resilience can be built and strengthened through public-private partnerships, and to learn from specific events and/or risks that affect the global community.





Key Findings

This resilience use case offers the following key observations based on the analysis of the aftermath of the earthquakes that struck Nepal in April and May 2015 (the two periods are collectively referred to as “the earthquake” in this report):

- Resilience is a social and political issue as much as an economic and developmental one. Efforts to “build back better” must also incorporate support for Nepal’s political transition as a foundation for resilience.
- Strengthening pre-established partnerships between the public and private sectors can improve responses to and reduce the impacts of future emergencies.
- Crucial economic sectors, such as tourism and construction, can benefit from public-private cooperation for recovery and reconstruction.
- Implementing and enforcing building codes and focusing on making schools safe should be a high priority in reconstruction efforts.
- Retrofitting to make existing houses more “earthquake-resilient” can save lives and reduce economic losses, and can be done in an affordable way that uses locally available skills and technologies.
- The private sector can offer unique expertise, capability and capacity for the Nepali government’s reconstruction efforts.
- Public-private partnerships and innovative financing arrangements can be crucial parts of reconstruction and building resilience in Nepal.

1. The Need for Public-Private Collaboration in Building Resilience after the Nepal Earthquake

This resilience use case reviews the 2015 earthquake in Nepal, which killed over 8,000 people and destroyed or damaged hundreds of thousands of buildings. It assesses how buildings and key parts of the economy, such as tourism, can be made more resilient, and describes potential resilience-building public-private partnership activities. As with the World Economic Forum's report, *Managing the Risk and Impact of Future Epidemics: Options for Public-Private Cooperation* (June 2015), this use case aims to expand dialogue between the private sector, civil society, the international community and leaders, both in Nepal and in other countries that are at risk from such disasters.

The significant impact of the 2015 earthquake on the Nepali economy and tourism industry, as well as houses, schools and hospitals, highlights gaps in resilience – particularly in business continuity planning and crisis response, and in implementing and enforcing building policies and standards. Thus, renewed efforts are needed to prepare, together, for future events. Analysts suggest that a future earthquake could have a heightened catastrophic impact on buildings and people, given the poor quality of much of the construction in the Kathmandu Valley and rural areas.

The extent and complexity of the natural risks Nepal faces mean that a multistakeholder approach to resilience is vital. It is therefore beneficial to learn more about public-private cooperation in Nepal, and which risk management activities, construction materials and methods left buildings standing and occupants alive during and after the 2015 earthquake. What are the financial, technical and political barriers to furthering such resilience measures? What recommendations could be proposed to enhance Nepal's resilience to future adverse natural events? How can the capabilities and capacities for resilience in the public and private sectors, as well as civil society, be built on and leveraged? How can public-private partnerships in Nepal be strengthened before disaster strikes? How can access to grant and loan financing for building resilience be facilitated, and the financing used as an incentive for rebuilding safely?

Based on this assessment of the Nepal earthquake, its context and effects, and the response and recovery efforts, this resilience use case specifically assesses innovations that the private sector can bring in working towards the following resilience goals:

- **Building resilience into houses:** how to ensure the high quality and availability of local building materials, and technical expertise for multihazard construction methods; how to guide local authorities and owners in implementing the building code, gaining a better understanding of local risks and developing more local technical capacity; and how to use subsidies or financing as an incentive to rebuild safely
- **Ensuring safe schools:** assessing the cost and benefits of retrofitting schools, and how to provide technical support to improve school safety
- **Enabling tourism:** how to utilize public-private partnerships to encourage tourism, which was seriously affected by the earthquake and is a crucial component of Nepal's economy.

2. Context – Nepal and the 2015 Earthquake

About Nepal

Nepal is a landlocked, mountainous country in South Asia situated between India and China. With a population of 28 million and an estimated gross domestic product (GDP) of \$700 per person, Nepal is classified as a low-income country.² It ranks 100th of 140 economies in the World Economic Forum’s annual Global Competitiveness Index, largely due to weaknesses in the basic requirements for competitiveness, such as weak institutions (103rd), insufficient infrastructure (131st), and poor levels of health (101st) and higher education (113th). However, the overall competitiveness trend for Nepal is towards improvement.³

Nepal is vulnerable to multiple natural hazards. Its varied and extreme topography and weather result in annual floods and landslides, causing loss of life, assets and livelihoods. In addition to these risks, Nepal faces considerable conflict and governance challenges. The country is undergoing a complex political transition following a 10-year armed conflict in 1996–2006, in which about 16,000 people lost their lives and thousands more were injured or displaced.⁴ This has had important impacts on

the economy, as factors relating to the quality of institutions, such as government instability, corruption and political uncertainty, remain major impediments to doing business in Nepal.⁵

Since the 2006 peace agreement, security has increased and the majority of the country has experienced the beginnings of a “peace dividend”, with the scaling-up of development and economic activity. However, regional and socio-economic pockets have yet to feel any benefit from what is often perceived as a transition largely centred in Kathmandu. With the government in flux, Nepal lacks legal preparedness or resilience-related directives, and existing regulations are plagued with implementation challenges, with evidence of corruption and cronyism. Although a disaster management act has been in preparation for eight years, little progress has been made in passing a final version. Its National Disaster Management Authority is only now being set up. The promulgation of a new Constitution in September 2015 marks an important milestone after years of disagreement.





The 2015 earthquake

The earthquake that hit Nepal on 25 April 2015 at 11:56 am local time was a major one, with a magnitude of 7.8 on the Richter scale. It was the strongest quake to hit Nepal since the historic 1934 event, which had a magnitude of 8.0. Major aftershocks continued for several weeks, including a second major earthquake of magnitude 7.4 on 12 May. The damage was widespread in Kathmandu, the capital city, and across a wide swathe of rural areas. The confirmed death toll stands at over 8,800, with more than 22,000 people injured. The earthquake affected over 8 million people, or one-third of the country's population, and close to half a million houses were destroyed.⁶

Local communities, businesses and the Nepali authorities led the response to the earthquake, and were rapidly joined by international support from over 60 countries. The Nepali National Disaster Response Framework (NDRF) was the key tool for coordinating the response and facilitating decisions among civilian, police and military structures, and in requesting international assistance. The NDRF, issued in 2013 by the Ministry of Home Affairs, was "prepared for the effective coordination and implementation of disaster preparedness and response activities by developing a National Disaster Response Plan that clarifies the roles and responsibilities of Government and Non-Government agencies involved in disaster risk management in Nepal".⁷

While the international system and government responses were ramping up, the response of Nepal's civil society to the earthquake was swift. National and local businesses as well as volunteer groups quickly mobilized, forging innovative partnerships to deliver practical support, especially to hard-to-reach communities. This type of people-to-people support provided a lifeline for many, complementing official aid. The first international assistance of search and rescue teams, relief supplies and medical teams arrived within hours, and has since transitioned to rehabilitation and reconstruction assistance. International businesses also provided considerable support.

Catastrophic Risk Financing Facilities – an Opportunity for Nepal?

For the management of earthquake, hurricane and other natural hazard risks, the predominant and most established approach is through traditional insurance policies taken out by individuals or companies. As the scale of disasters increases in both frequency and severity, resulting in greater uninsured losses in many instances, traditional insurance approaches are not sufficient. Organisations such as Willis have played a role in developing new mechanisms, for example, catastrophic risk financing facilities operating at a multisovereign level, often within developing markets.

One notable facility is the African Risk Capacity (ARC), a leading example of how the private sector supports sovereign-level risk management via pooled multistate facilities against defined levels of natural hazard events.⁴⁷

Innovative insurance mechanisms, such as ARC, allow countries to buy an amount of insurance based on their level of risk, using data modelling mechanisms provided by the insurance sector. Rather than making a claim based on actual loss, countries enter into a catastrophe pool and are eligible for payouts, which are agreed in advance.

ARC is a multigovernment risk pool currently covering drought risk, but with the intention to expand coverage for flood, tropical cyclone and pandemic risks. Each participating country, prior to joining the scheme, must create a contingency plan identifying how payouts would be optimized to provide well-timed assistance to those affected. In addition to the payment of claims, countries are able to better understand their exposure to risk in advance of the disaster, and receive timely in-season advanced notice as drought events develop. The recent earthquake in Nepal highlighted the need for a similar risk transfer mechanism to enhance risk management through better understanding of the country's seismic exposure. Insurance penetration in Nepal is one-half of the level in China and a quarter of India's (Pokhara University),⁴⁸ and lacks the financial capacity to absorb the impact of a 1-in-100-year loss.⁴⁹ In cases where underinsurance is prevalent and risk management culture is poor, and when an area experiences high vulnerability and exposure, public-private insurance mechanisms may be best positioned to address reconstruction and redevelopment needs and manage future national risk.

Public-private insurance mechanisms at the national level have been developed and are well established; examples include those in New Zealand, Turkey and the US. Establishing further multicountry catastrophe risk insurance mechanisms in other regions will increase insurance penetration and global resilience.



3. Building Resilience into Housing

Overview

Housing was the most affected sector in the 2015 earthquake, according to the Post Disaster Needs Assessment (PDNA) report.⁹ The total damage and losses have been valued at \$3.5 billion; 498,852 houses were categorized as fully collapsed or damaged beyond repair, and 256,697 were partly damaged.

The PDNA recommends an owner-driven reconstruction approach, through which families receive technical and financial support in rebuilding or retrofitting their home. Families are not expected to rebuild with their own hands; rather, they hire a skilled builder, purchase quality building materials and make decisions about the layout of their home, with the guidance of an engineer or architect. Financial assistance is provided in instalments, contingent upon complying with building standards. This model has been successful in post-disaster housing reconstruction elsewhere when sufficient skills, funding and incentives (or enforcement) are available to ensure disaster-resilient building. However, the approach is less effective when the grant or subsidy available is less than required to rebuild a complete home, and when receipt of that funding has not been linked to compliance with building standards.

The Nepali private sector has a significant and multifaceted role to play in reconstruction. A variety of activities require expertise, ranging from the skills and know-how provided by small-scale local artisans and local producers of building materials to engineers, larger contractors and engineering firms, and to related sectors, such as information technology and finance. In addition, the Nepali business sector has been active in contributing monetary support, including over \$3 million to date to the Prime Minister's Disaster Relief Fund.¹⁰

What can be improved: outdated building code and limited enforcement

The earthquake's devastating effects demonstrated the need to update and enforce Nepal's building code. The government approved the Nepal National Building Code (NNBC, or Building Code) in 2003, and it was made mandatory in all municipalities in 2006. It allows for the construction of low-strength masonry (unreinforced masonry with mud mortar), according to "Mandatory Rules of Thumb".¹¹ In 2009, the Ministry of Physical Planning and

Works issued a comprehensive report recommending updates to the NNBC.¹² The report recommended, among other things, that the Code's sections allowing for low-strength and simple concrete buildings be replaced with more appropriate, standardized design requirements. Unfortunately, according to the PDNA, 95% of the buildings categorized as fully collapsed were built of low-strength masonry.

The Building Code should not only be updated but also implemented, translated into Nepali and enforced more comprehensively. The Earthquake Engineering Research Institute (EERI) reports that, as of 2015, only 26 of 191 municipalities had begun to implement the Code, and enforcement varies.¹³ In 2013 and 2014, eight municipalities from two districts in Nepal, which are members of the UNISDR's "Making Cities Resilient" campaign, reported their status of implementing the Building Code as falling between two levels: that of, "achievements have been made but are incomplete, and while improvements are planned, the commitment and capacities are limited," and "achievements are minor and there are few signs of planning or forward action to improve the situation".^{14,15}

A lack of building inspectors, as well as corruption, the absence of local government mechanisms and an overburdened judicial system, are among the factors undermining enforcement. The lack of human and technical capacity and materials is also hampering implementation. As close to 80% of all buildings are owner-constructed, compliance with the Building Code strongly depends on owners' understanding of the risks, costs and benefits of following the NNBC. Public buildings and schools are more compliant than private buildings (see, for example, the section "Ensuring Safe Schools"); in fact, private buildings constructed to a greater number of storeys than permitted are very common. In addition, rural areas lag significantly behind in implementing the Building Code; and, enforcement exists as a provision in the Building Act, which allows village development committees to avoid local mandatory adoption. Finally, many older houses were built before the Code was finalized.

In August 2015, the government drafted and began consulting on new guidelines for building construction, including the development of 55 standards, such as designating a minimum proportion of open space around residential and public buildings, and the use of higher strength materials and designs.



“

Natural hazards damage fundamental business components ... As [service providers], private-sector actors can act as providers of advanced technologies for disaster risk reduction, for example by provision of safer construction materials and processes ... The private sector and public-private partnerships play a critical role in protecting the livelihoods of vulnerable households, as providers of employment to community members. At this time ... the businesses need to demonstrate collective ability to prepare, respond and recover from disasters.⁸

”

Surendra Bir Malakar, in the op-ed “Nepali private sector: After the disaster”, *The Himalayan Times*, 3 July 2015

Collapsed adobe (mud brick) houses located a few blocks from Bhaktapur tourist square.

Credit: Satoru Nishikawa

What worked: retrofitting and incremental improvements

The 2015 Nepal earthquake provides a compelling case for the benefits of investing in retrofitting buildings to increase resilience, and making incremental improvements to the quality of new building construction. Retrofitting goes beyond repairing damage; retrofitting strengthens a building to withstand the next earthquake. Some common retrofitting measures for load bearing masonry include: adding more walls, strengthening existing walls by adding cement-based plaster or reinforced plaster overlay, repairing or adding reinforced concrete confining elements (such as columns and beams which tie the walls together and provide resistance to shaking in earthquakes), replacing a heavy roof with a lightweight one. Although the NNBC does not cover retrofitting, Nepal's National Society

for Earthquake Technology (NSET) has issued several documents addressing existing structures.¹⁶ During the earthquake, retrofitted schools performed better than those without strengthening or incremental improvement. The retrofitting for such schools resulted largely from work by NSET, the Asian Development Bank and the Ministry of Education as part of the Nepal Risk Reduction Consortium (NRRC) and others, as discussed in Section 4.¹⁷

Incremental improvements, such as using cement mortar instead of mud mortar (see the photograph of two buildings using these types of mortar), also resulted in incrementally better performance in the 2015 earthquake, based on technical assessments by Build Change in Nepal.¹⁸ Although these measures alone do not result in a building compliant with seismic safety requirements from a building-code standpoint, they may have made the difference between life and death for some people.



Successfully retrofitted school buildings that were undamaged in the earthquake.

Credit: R. Friedman/
Risk RED



Credit: R. Paci-
Green/Risk RED



This picture demonstrates the importance of incremental improvements on new buildings, and the strength gained by using cement instead of mud mortar. The building on the left uses mud mortar, while the building on the right, similar in number of storeys and features, has cement mortar and is undamaged. This does not demonstrate a retrofit.

Credit: Build Change

Innovations from the private sector to increase resilience

Building skills and providing construction workers

Nepal was facing a skilled-labour shortage before the 2015 earthquake. Housing reconstruction and retrofitting are predicted to require the labour of 20,000 skilled workers.¹⁹ Engaging local people in reconstruction efforts is critical for economic recovery. The challenge will be to create income-earning opportunities within local communities and permanently build skills to enable self-sufficient resilience efforts.

In 2011, 32% of Nepali households had at least one member working abroad, as earning opportunities were much greater overseas.²⁰ Most migrants are men – 92% in the 14 priority-affected districts.²¹ By the end of March 2015, Nepal had sent abroad 44,712 skilled workers and an additional 282,541 semi- or unskilled workers. The private sector hired many for construction labour, where they can earn higher wages than in Nepal, although working conditions can be hazardous.

At the same time, construction labour is needed in Nepal, and Nepali construction companies want to hire Nepali workers to meet the need, with some eager to promote skills training. Although large private-sector companies are unlikely to be directly involved in housing reconstruction in rural areas, the following initiatives demonstrate the types of activity that could benefit Nepal:

- Nepal Engineering Association mobilized hundreds of volunteers, many from the private sector, to assess the condition of houses and provide advice on retrofitting.

- Pumori, an engineering consultancy, suggested that housing recovery organizations partner with businesses like theirs to connect labourers trained throughout reconstruction with job opportunities after rebuilding has been completed.
- CE Construction focused its emergency relief efforts on providing help to 800 employees and 2,000 subcontractors, and assisting with debris clearance. The company uses migration as a skills development opportunity; it hires and trains labourers on the job in Kathmandu before sending them abroad, where they gain additional new skills. Upon their return, workers continue to work for the company and share knowledge gained abroad.

Increasing women's role in engineering and construction

In 2014, Nepal ranked 112th of 142 countries on the World Economic Forum's Gender Gap Index, indicating inequality in labour participation, skill levels and wages.²² Nepali engineers are required to register with the Nepal Engineering Council, and as of September 2014, 24,998 engineers were registered, of whom 3,145 were women. While housing reconstruction can provide an opportunity for women to increase their participation in the construction sector, build skills and increase wages, barriers exist to construction being seen as a profession for women, as it is instead viewed as a short-term response to income gaps. Promoting female role models from the construction sector could help change perceptions. Experience from Build Change and others has shown that, when women take a greater role in reconstruction – as engineers, architects, builders or homeowners – a greater degree of resilience building results, as women tend to prioritize a safer house over a larger one, compared to their male counterparts.

Proposals for public-private partnership

Regulating and investing in the construction materials industry

The Nepal construction materials industry suffered losses from the earthquake, and production was further interrupted as workers returned to their homes during the emergency relief phase. In the long term, however, local industries for construction materials are expected to benefit because of high demand. Industrial analysts anticipate the market will grow by about 35–40% over the next few years.²³ Issues relating to construction materials such as cement, bricks and sand illustrate opportunities and challenges. Earthquake recovery and reconstruction provide chances for both investment and regulation, which could create a large shift in these industries away from utilizing child labour and environmentally damaging processes. Public-private partnerships could be central to making this shift through a combination of government regulatory frameworks and incentives, and private-sector pressure to purchase higher-quality products.

Cement

“
We learnt during this earthquake that cement houses are stronger.
”

A 41-year-old mother of two children²⁴

If used properly, cement can result in a marked increase in the seismic safety of buildings, particularly in the low-strength masonry of mud mortar homes, which collapsed in large numbers during the earthquake. Demand for cement will be high, and efforts to distribute it throughout and beyond the 14 priority districts will be required.

According to Nepal's Cement Manufacturers Association, the country has more than 40 (mainly mini) cement plants. Nepal's cement industry is moving towards self-sufficiency, with cement imports falling and domestic production increasing. Currently, domestic products account for 85% of Nepal's consumption.²⁵ The industry has recently attracted foreign direct investment (FDI), with two cases reported in 2015 on globalcement.com:

- At the end of July 2015, the government endorsed a \$360-million FDI proposal by China's Hongshi Holdings to establish a cement plant in Nepal, in partnership with Nepal's Shiva Cement
- Dangote Cement Nepal announced long-term plans in June 2015, looking to construct a new plant that is expected to produce 6,000 tonnes of cement per day within three years.

Bricks

“

It's exciting to see the business community taking the initiative even before formulation of policies by the government. It's a great example of partnership between the business and non-profit sectors to achieve common goals. We believe that Nepal's consumers, if given the choice, would rather have clean bricks free of any trace of child labour or forced labour.

”

Homraj Acharya, Nepal Country Director, Global Fairness Initiative

Fired bricks are produced throughout the Kathmandu Valley using highly labour-intensive manual mixing, moulding and moving processes. According to the Federation of Nepali Brick Industries, the 2015 earthquake damaged 350 of 800 kilns.

Concerns about the environment, animal rights, and child and bonded labour are well documented in Nepal's brick manufacturing industry.²⁶ Non-profit and public-sector organizations, such as the Climate and Clean Air Coalition, Brick Clean Network and Better Brick Nepal, are working with the private sector to improve the country's brick-making industry.

Sand and gravel

Sand and gravel are also produced locally. The government announced reforms and new standards for the sand and gravel crusher industry in 2013. Regulations are driven largely by concerns over environmental protection, requiring specified setbacks from, for example, highways, rivers, voltage lines, educational institutions, forests, national parks, and places of cultural, religious and archaeological importance. Given the regulations, only 25 of 700 registered sand and gravel operations chose to follow the standards and remain in operation. Enforcing these laws on the excavation of sand and aggregates has significantly increased the cost of these raw materials.



Bhaktapur, Nepal: On-site local brick factory, circa December 2013.

Filling the financing gap for building resilient housing and supporting small to medium-sized enterprises (SMEs)

For housing, the PDNA estimates the per-unit reconstruction cost based on the cost of rebuilding a house to its pre-disaster condition; this estimate does not consider the additional investment needed to build resilience. Furthermore, the total sum required to rebuild or retrofit nearly 750,000 housing units has not been pledged or committed. Technical assistance is an essential component of owner-driven reconstruction, and the source of funding to cover these costs has not yet been defined. Non-governmental organizations (NGOs), multilateral donors and the private sector should be encouraged to fill gaps and create markets, given the hefty price tag for housing reconstruction. Nepal Rastra Bank (NRB), the country's central bank, announced a concessional loan scheme for homeowners to rebuild their homes. Though this product may be attractive to middle- and upper-income homeowners, it is unlikely to fill the gap for rural, low-income homeowners. Private loans are also being made available, including for the reconstruction of schools. A gap exists in the financial products available for SMEs in Nepal, whose needs are not met by the commercial banks or the microfinance institutions. The Nepal-based International Centre for Integrated Mountain Development (ICIMOD) calls for "revitalize[ing] micro, small, and medium-sized enterprises by providing loans at low interest rates, simplifying processes and mechanisms, and providing support to start-up businesses, as well as by facilitating

insurance mechanisms with public-private partnerships to mitigate risk".²⁷ The following initiatives could help meet such needs:

- The government plans to provide low interest rates/ incentives for producing housing materials.
- Cooperatives, common in Nepal's rural agricultural sector, have a potential role to play in disseminating information and providing financial services at a rural, local level, beyond the reach of financial institutions.

Although guidance for improved building construction standards is not yet in place, loans are actively being encouraged. To ensure these initiatives support resilient housing, banks would need to make loans conditional on some level of guarantee that safer construction standards will be adopted. This could range from simple attendance at a seminar on building resilient housing to linking the release of funds to the certification of building standards.

4. Ensuring Safe Schools



The main goal of the project is to gradually ensure that school children in seismic regions go to earthquake-safe schools and that local communities build their capacities to cope with earthquake disasters.²⁸



Objective of the School Earthquake Safety Program, adopted by the Government of Nepal in 2010

Overview

The Building Code covers schools under the “important building” category. This includes buildings which either house essential facilities before and after a disaster (e.g. hospitals, fire and police stations, communication centres); or by their very purpose have to house large numbers of people at one time (e.g. cinema halls, schools, convention centres); or have special national and international importance (e.g. palaces); or house hazardous facilities (e.g. toxic or explosive facilities).²⁹

According to the Nepal Department of Education (DOE), the country has more than 82,000 school buildings on over 35,000 campuses, of which 75% are public and the remainder private. More than 8.5 million students attend these schools. Around 89% of school buildings are made of load-bearing masonry (bricks or blocks), and in rural areas, more than half are made of masonry – a very common type of construction, which is more vulnerable to earthquakes than wood-framed construction.³⁰ A 2011 school vulnerability assessment estimated that more than 49,000 schools required retrofitting, and another 12,000 needed demolition and reconstruction.

The 2015 earthquake fully or partially destroyed more than 50,000 classrooms, according to the DOE. The PDNA reports that total damage and losses in the educational sector amounted to \$300 million, with more than 80% of the damage in the 14 most-affected districts. Public schools accounted for 92% of the total damage and losses.

The cost of recovery has been estimated at close to \$400 million. The Education cluster, the coordinating body for the government, UN and non-governmental organizations (NGOs) in emergencies, conducted a technical survey from May to July 2015 and found that at least 34,500 classrooms, or 63% of the 54,600 classrooms assessed in the 14 most-affected districts, were in blocks classified as unsafe. In addition, 41% of all school buildings assessed were reported as requiring demolition and rebuilding, and only 10% required no reconstruction or repair.³¹

In general, Nepal’s school buildings fall into three categories of vulnerability:³²

- 1) *Existing, and neither code-compliant nor earthquake-resistant:* Existing structures with poor construction quality that cannot be retrofitted (around 25% of structures) – to be demolished and rebuilt
- 2) *New, and neither fully code-compliant nor earthquake-resistant:* New structures in good physical condition but not fully code-compliant (around 25% of structures) – can be retrofitted
- 3) *Existing, and code-compliant but not earthquake-resistant:* Existing structures of sufficient quality but not seismic-resistant (around 50% of structures) – can be retrofitted

In sum, half of Nepal’s schools are not compliant with building code standards, and approximately 75% of all school structures require retrofitting, with the rest needing to be demolished and rebuilt.





Schools undergoing retrofitting in Dhangadi before the earthquake.

Credit: Liva Shrestha, Lead Engineer, Build Change

What worked?

Nepal is a member of the Worldwide Initiative for Safe Schools (WISS), a government-led programme aimed at facilitating comprehensive school safety according to the following pillars:³³

- Policy planning and advocacy
- Disaster resilient school infrastructure
- Risk reduction and resilience education
- School preparedness
- Monitoring and evaluation

In support of government efforts, such as WISS, the private sector contributes to school safety through numerous initiatives and activities. For instance, Kathmandu Living Labs³⁴ mapped and collected exposure data for 2,256 schools, colleges and universities in the Kathmandu Valley. These data are available publicly on OpenStreetMap, an open-source website, for free viewing and download, and provide a foundation for assessing the risk associated with school and health facility buildings, and enabling effective preparedness and response planning and resourcing.³⁵

In addition to vulnerability and risk assessments, substantial progress has been made in retrofitting school buildings since this was introduced by NSET in 1997.³⁶ For example, the DOE and NRRC developed a comprehensive plan to assess 1,800 school buildings and retrofit 900 in the Kathmandu Valley.³⁷ In addition, under a comprehensive school safety programme adopted in 2010, plans are to assess 60,000 school buildings and implement retrofitting to them in the next 15 years. The DOE also has developed the “Visionary Strategy for Increasing Disaster Resilience for Schools in Nepal”, which addresses structural aspects, such as retrofitting and seismic resilient construction.³⁸

What can be improved?

Approximately 3.3 million students attend private schools in Nepal.³⁹ In many instances, these schools rent space in old houses, which may be inappropriate for this function, and may not consider disaster-related safety issues. Although efforts have been made to look into retrofitting for private schools, and despite the “visionary strategy” also covering private schools, no programmes currently exist for improving their disaster safety.

With no specific law regulating the safety of private schools, making schools safe is still a choice and not an obligation in Nepal. Combined with the lack of compliance on standards for school retrofitting, and a lack of hazard, vulnerability and capacity assessment (HVCA), there is room for improvement in making private schools resilient. In addition, although the school curriculum promotes disaster-risk knowledge, further efforts are required that focus on providing local knowledge and adaptation, and the development of life-saving skills.

Good data and evidence are required to convince decision-makers to make safe schools a priority in their national education plan, and to allocate budgets and leverage private-sector knowledge and expertise in implementation. Several countries provide lessons, such as Mexico, which used special funds to support school safety work at the national level, and Uzbekistan, which retrofitted all of its schools in three years. In addition, Turkey’s “39 Schools/39 Districts” project facilitated the retrofitting of 39 public schools in only 10 months, and Iran allocated \$4 billion between 2006 and 2014 for renovating and retrofitting schools, leading to more resilient school infrastructure.

What innovations can the private sector bring to improve resilience?

The new Reconstruction Authority has the mandate to coordinate with the private sector, but as its work has yet to start, no overall national guiding policy exists on how to engage with the private sector in reconstruction and in building disaster resilience. However, a number of efforts are under way to involve the private sector in improving building construction in Nepal. These could form a basis for developing a public-private partnership in promoting infrastructure resilience, especially for schools.

Proposals have also been made on how to improve school safety in the country, including those offered by the NRRC.⁴⁰ Possible areas where the private sector can assist in building school resilience include: support by consulting firms at the field level to advise on resilient school construction; linking bank lending to improved school construction standards, especially for private schools; and providing expertise from technical and engineering schools to local authorities to improve the implementation of school building codes. Most of these actions will also benefit other infrastructure types in addition to schools. For example, a number of private companies currently provide technical support and materials, and assist in raising awareness on safer building construction. Moreover, wide scope exists to involve private consulting firms in improving building code compliance at the field level.

As mentioned, another area that could be promoted is linking the provision of loans and private financing by banks to compliance with building code standards. This could apply, in particular, to the construction of private schools. Private insurance offerings could also be improved to ensure that structures are properly covered, and to improve enforcement of building and usage code compliance.

As referenced in the previous section, monitoring and enforcing the Building Code, particularly for private schools, is often limited because of low government capacity. Field monitoring visits by municipalities and the DOE can vary in frequency and are often not standardized. It may be possible to leverage the expertise of private engineering schools, which produce thousands of engineers annually, to provide technical support in school safety to the DOE and municipalities. This support could be in monitoring code implementation for new schools and, perhaps, in retrofitting existing schools.

With more than 75% of existing school buildings in Nepal vulnerable to earthquakes, promoting the retrofitting of schools is urgently needed, especially in high-risk areas. The private sector can assist with know-how and technical support, based on experience from Turkey and Iran (as already mentioned).

Proposals for public-private partnership

Public-private partnerships could be developed to implement WISS in Nepal, as well as to support efforts under the Reconstruction Authority. Specific activities and areas of work that could be incorporated include:

- Encouraging banks to provide loans and private financing for promoting compliance with building code standards
- Promoting the expansion of private insurance to ensure that school structures are properly covered, and to improve enforcement of building and usage code compliance
- Using the expertise of private engineering schools, which produce thousands of engineers annually, to provide technical support in school safety to the DOE and municipalities
- Encouraging private consulting firms to support innovative prototype design for the construction of private schools; and, exploring innovative and cost-effective retrofitting options for existing ones and offering them to the Reconstruction Authority for possible adoption and implementation
- Supporting the setting and implementation of standards and quality assurance criteria for safer private schools
- Encouraging the exchange of relevant experience in other countries to support disaster-resilient private schools in Nepal
- Encouraging a national public awareness campaign and educational programme that support comprehensive school safety, as well as preparedness activities (e.g. drills, simulation exercises).

5. Enabling Tourism

“

Tourism is valued as the major contributor to a sustainable Nepal economy, having developed as an attractive, safe, exciting and unique destination through conservation and promotion, leading to equitable distribution of tourism benefits and greater harmony in society.

”

Nepal Vision for Tourism 2020

Overview

Rich in natural, cultural and religious assets, Nepal has everything to be an attractive tourist destination. In 2014, the World Travel & Tourism Council reported that the travel and tourism sector in Nepal accounted for 8.6% of the nation's GDP, and forecast it to grow to 9.9% by 2024.⁴¹ In 2014, the travel and tourism sector employed more than 726,000 people, representing 6.4% of total employment in Nepal. The World Economic Forum's *Travel & Tourism Competitiveness Report 2015* ranks Nepal 23rd out of 141 economies on price competitiveness, 25th on natural resources and 59th on prioritization of the travel and tourism industry.⁴² Nepal's potential for growth is significant; however, constraints such as the lack of infrastructure, security concerns and the repercussions of the 2015 earthquake will continue to limit future growth of the sector if not addressed appropriately.

The PDNA estimated the total economic repercussions of the 2015 earthquake on the Nepali tourism industry at \$780 million, with \$180 million in damages and \$600 million in losses. Of the total economic impact, close to 90% was borne by private individuals and businesses. According to the PDNA, seven out of 10 World Heritage sites in the Kathmandu Valley were damaged and popular trekking routes were affected. This is noteworthy, as Nepal relies heavily on its rich cultural heritage and natural resources to attract tourists. The most significant damage related to hospitality infrastructure was to hotels, as the quake destroyed more than \$150 million worth of private property. In terms of revenues, more than \$450 million in income, all private, was lost. For tourism businesses, losses from visitor cancellations are typically the first consequence of disasters, geopolitical tensions, terrorism or pandemics. As such, the earthquake's negative repercussions will likely translate into fewer tourist arrivals over the next several years, significantly affecting future revenues.



Nepal's religious and tourist sites such as Boudha, pictured, are an important source of tourism revenue. Boudha itself was not seriously damaged in the earthquake, but tourism has declined.

Credit: Barnaby Willitts-King



The previously bustling tourist square in Bhaktapur, the historic capital city 12 kilometres east of Kathmandu, is a World Heritage site and major tourist attraction. Only locals now frequent Bhaktapur.
Credit: Satoru Nishikawa

What worked?

Over the past few years, innovative solutions implemented by the private sector have improved the resilience of Nepal's tourism industry. For instance, USAID funded a project entitled Promoting Public-Private Partnership for Earthquake Risk Management (3PERM), which provided businesses with the tools to develop earthquake preparedness plans.

What can be improved?

Nepal's tourism sector faces many underlying challenges, which have been highlighted and exacerbated by the 2015 earthquake. Without a clear decision-making structure and process, the three tourism recovery committees formed by the government have lacked focused leadership, coordination and strategy because of poor preparedness and crisis management planning. As a result, the private sector stepped in to take a leadership role in recovery, but without the government's stamp of approval, initiatives in some cases lacked authority and sustainability.

How can the private sector contribute to improve resilience?

Full recovery from the effects of the 2015 earthquake will take many years: However, significant action can be taken in the short, medium and longer term, and learning from other countries' response and recovery experiences can be integrated into Nepal's strategy.⁴³

In the initial recovery phase, minimizing the disaster's future negative economic effects is important, by improving openness through visa and travel facilitation. In addition,

improving destination and brand management can be done by highlighting, for instance, numerous destinations in Nepal that have not been affected by the earthquake.

The Pacific Asia Travel Association has suggested improving accessibility with various activities, such as doing a makeover of Tribhuvan International Airport, introducing "Welcome Ambassadors" for passengers and waiving visas for select tourist-generating countries. Promoting tourism through both traditional and social media could be extremely beneficial for the country, with a special focus on Asian audiences. Campaigns should be featured, such as "The Best Way to Help Nepal is to Visit Nepal", and social media could unite them through hashtags, such as #imwithnepal. It is also critical to develop a positive narrative around the country, through positive stories and articles that should be shared with lifestyle editors of newspapers and magazines.

In the follow-up phase, under rehabilitation, more focus can be given to messaging – what to communicate and to whom. For example, it would be useful to review the travel advisories issued by the Nepalese government, and consider ways to improve interpretation within target countries so that potential travellers can easily access information. In June 2015, the Nepal Tourism Board issued a press release encouraging international travellers to visit Nepal, noting that monuments at the heritage sites would reopen for tourists on 15 June 2015.⁴⁴ It would be useful to create a stronger link between guidance from the Nepal Tourism Board and Nepali travel advisories (in collaboration with key representatives from the tourist industry), and assist target countries with correctly interpreting these advisories.



Popular trekking routes in the Himalayas are renowned worldwide for their beauty but have suffered from declining numbers of visitors.

Credit: Barnaby Willitts-King

In the longer term, rebuilding and redeveloping damaged areas and enterprises, following a “build back better” approach, could be considered, with specific focus on methods such as the “Safe Trekking System”.⁴⁵ The government could support the private sector in obtaining financing for such approaches in the form of loan facilitation and subsidies.

Another possibility would be to promote the adoption of a simplified business continuity planning and management system for the tourism industry, including hotels, tour operators, restaurants and other SMEs supporting tourism. A programme run by the Asia Disaster Preparedness Center (ADPC), for example, targets small to medium-sized industries in South-East Asia and promotes improved understanding of business impact analyses and risk analyses, as well as the adoption and updating of business continuity plans.⁴⁶

Given the prevalence of natural disasters in Nepal, having an adviser in the government for tourism risk mitigation, crisis operation and communication recovery management may be useful. That adviser could be linked initially to the Reconstruction Authority and work closely with the private sector.

Finally, foresight in risk management, leadership in proactive planning and crisis management, and effective crisis response capabilities can result in augmented protection of Nepal’s reputation as a desired destination, and thus enhance profitability with a very modest investment. Such plans should be developed with public and private tourism stakeholders, periodically reviewed and updated, and communicated widely. (see box on Phuket tourism risk management)

Case Study – Phuket Tourism Risk Management Strategy

The 2004 Indian Ocean tsunami devastated coastal areas of Phuket Province in Thailand. All businesses were adversely affected to some degree. Tourism, the main economic activity in Phuket, suffered a severe downturn as pictures and reports of the disaster spread around the world. Thailand’s Ministry of Tourism and Sports, through the Office of Tourism Development, determined that Phuket and other Thai tourist regions should be better equipped to deal with future crises and disasters that may affect tourism and the country’s economy.

The Phuket Tourism Risk Management Strategy, developed by the government working closely with the local tourism industry, contains a summary of potential risks, the relevant government agencies responsible for dealing with them, and additional action the tourism industry can take to ensure the safety and security of visitors and tourism business employees. This is the first case identified in the region in which a destination has taken a classic risk management approach to develop a risk management strategy, using a group from the public and private sectors and civil society.

Source: Kean, I., Phuket Tourism Risk Management Strategy, APEC International Centre for Sustainable Tourism, 2006.

Proposals for public-private partnerships

Stronger public-private partnerships (PPPs) in a number of areas could assist in developing and improving the resilience of Nepal’s travel and tourism sector. For example, a PPP could review and help update the 2009 tourism plan in the context of the 2015 earthquake reconstruction process. Such partnerships will further strengthen the growing political and public support for businesses to act as drivers of economic recovery, especially in the tourism sector.

The Reconstruction Authority, now mandated to work with the private sector, could develop a national forum for businesses to engage with each other and the government on reconstruction, which would have the additional benefit of promoting economic reform and the peace process. Such a forum should ensure a broad range of business participation, especially from entities located outside the Kathmandu Valley. PPPs need to be strengthened particularly in national business federation development, including the promotion of cooperation across various districts and regions.

The government, working closely with the private sector and the Reconstruction Authority, could undertake the following activities:

- Review and update the current tourism policy and relevant disaster risk management policies that affect the tourism sector
- Consult with tourism-sector stakeholders to review existing institutional and legal arrangements related to travel and tourism, particularly the Tourism Act and Nepal Tourism Board Act, as well as required improvements to ensure they include disaster risk reduction and provisions for business resilience
- Develop a comprehensive Nepal Tourism Risk Management Strategy, identifying areas for public- and private-sector investment and business resilience
- Promote hotel resilience certification in Nepal, involving government agencies for tourism and disaster risk management; businesses such as hotel associations, hotels, resorts and tour operators; and civil society
- Conduct a national survey to identify the private sector's needs and requirements to build resilience in Nepal's travel and tourism industry, and what means it already has to do so (noting that similar surveys in Thailand, Philippines, Indonesia and Vietnam have provided important inputs in developing national roadmaps for safer businesses)

Two approaches will help strengthen both the tourism industry and the country's ability to withstand natural disasters: one is to make appropriate amendments to institutional and legal arrangements that improve the enabling environment for strengthening the industry's resilience; and the second is to encourage Nepal's private sector to adopt risk management strategies into business plans.

Expediting Recovery – The Benefits of Simplified and Transparent Customs Clearance Procedures

Concerns are that initial customs waivers, granted after the earthquake for humanitarian goods, have since been removed, thus leading to delays and high costs for agencies providing support. More open and flexible customs policies help minimize the impact of humanitarian disasters and improve disaster response and recovery. Post-crisis recovery can be expedited by simple and transparent customs clearance procedures free from onerous duties and taxes.

Customs modernization holds great promise for Nepal. The Organisation for Economic Co-operation and Development estimates that global incomes rise by \$40 billion for every 1% reduction in global trade costs; and, that the World Trade Organization's (WTO) new Trade Facilitation Agreement can cut trade costs by almost 15% for low-income and 10% for high-income countries. Trade facilitation is important because it can have a major impact on bringing down trade transaction costs (it essentially concerns the cost of clearing goods for import and export). Despite the huge attention given to the cost of border controls over the last 10-15 years, goods continue to be delayed at the border for days (or even weeks), slowing trade flows and adding business costs that are often passed on to consumers. Trade transaction costs are highest in developing countries, which are the least able to carry this additional burden.

Several elements of poor connectivity affect least developed countries (LDCs), many of which are remotely located or landlocked, or are small island states where transport infrastructure is often poor. As a result, the average cost of trading is higher in LDCs (for instance, the cost is 43% higher to move a container across the border) than in other developing countries. These costs affect SMEs disproportionately; they often lack the means and capacity to comply with complex rules, and the high costs of compliance with customs and border procedures, as well as other non-tariff measures, represent significant charges compared to their smaller trade volumes. They are thus uncompetitive as suppliers, hampering their integration into regional and global value chains. The Trade Facilitation Agreement, which will be binding for all 161 WTO member states at the level of all border agencies (and not just customs authorities), has been described as a classic "win-win" outcome.

6. The Way Forward

Nepal remains at risk from earthquakes and many other natural hazards. The experience of the 2015 earthquake underlines the importance of strengthening partnerships between the public and private sectors to prepare for future emergencies. This involves putting in place stronger business continuity, worker safety, environmental and risk management measures; exploring insurance solutions to manage risk; and streamlining customs arrangements in emergencies. Crucial economic sectors, such as tourism and construction, can also benefit from public-private cooperation for recovery and reconstruction.

Specific to the review of building resilience, the earthquake experience in Nepal provided a compelling financial, technical and social case for investing in retrofitting (strengthening existing buildings) and making small but significant changes to how new buildings are constructed, in order to build resilience prior to the next earthquake. Doing so will save lives and reduce economic losses, and can be done in a way that is affordable and uses locally available skills and technologies in support of the local economy. PPPs should be a crucial component of this approach to building resilience, and can help address the need for financing by providing grants or loans to encourage adherence to building codes.

A country's overall resilience is measured socially and politically, as well as economically and developmentally. Overall, Nepal will need to address the long-standing political and social fault lines that undermine its resilience,

as much as its seismic ones. In the longer term, building resilience in the country will involve developing a shared vision between the public and private sectors regarding how Nepal's economy should evolve, and how education and skills training can support that vision. Countries with a legacy of conflict face particular challenges in putting in place effective legislative frameworks for building resilience – such as strong building codes and resilient school requirements – and in ensuring that such frameworks can be implemented and can make a difference at both a national and community level. The post-earthquake push to “build back better” should be harnessed towards progressing Nepal's political transition as a foundation for future resilience.

The vast reconstruction effort needs to factor in sensitivity to conflict, with analysis of the local sociopolitical context informing project design to avoid exacerbating conflict or vulnerability. If they are inclusive, infrastructure projects can provide excluded Nepalis with new opportunities for participation. Women and other marginalized people could be given platforms to shape the building of public or residential structures and assume roles in their construction that provide them with new skills and status. NGOs and national champions of conflict sensitivity can offer guidance to the government agencies and companies leading the reconstruction effort to support the integration of a peacebuilding approach to both reconstruction and resilience.



Endnotes

1. UN Office for Disaster Risk Reduction (UNISDR) terminology for disaster risk reduction, 2009; see <http://www.unisdr.org/we/inform/terminology>.
2. Based on the World Bank Income Group Classification (July 2015) and the International Monetary Fund's World Economic Outlook (April 2015 edition; www.imf.org/weo).
3. The World Economic Forum's annual Global Competitiveness Index measures the "set of institutions, policies, and factors that determine the level of productivity of an economy", which in turn will set the levels of prosperity that can be reached by an economy. The index looks at a range of issues, from institutions, infrastructure, health and education to market efficiency (including the financial, labour and goods markets), technological readiness, business sophistication and innovation. For more information, see the Forum's *The Global Competitiveness Report 2015-2016*.
4. According to Dhurba Gaida, secretary of Nepal's taskforce investigating conflict-related casualties, in "Nepal government raises war death toll", ReliefWeb, 22 September 2009, reliefweb.int/report/nepal/nepal-government-raises-war-death-toll.
5. See *The Global Competitiveness Report 2015-2016* for the Most Problematic for Doing Business and the underlying methodology.
6. *Post Disaster Needs Assessment (PDNA)*, National Planning Commission of Nepal, National Emergency Operations Centre/Ministry of Home Affairs, 2015. See http://icnr2015.mof.gov.np/page/post_disaster_needs_assessment.
7. *National Disaster Response Framework*, Ministry of Home Affairs, July 2013. See: un.org.np/reports/national-disaster-response-framework.
8. See <http://thehimalayantimes.com/opinion/nepali-private-sector-after-the-disaster/>.
9. *Post Disaster Needs Assessment, Vol. B: Sector Reports*. (2015) National Planning Commission of Nepal, National Emergency Operations Centre/Ministry of Home Affairs, 2015.
10. See <http://pmrelief.opmcm.gov.np/>.
11. Mandatory Rules of Thumb are government guidelines designed to help owner builders make construction comply with the Building Code but without the support of qualified civil engineers.
12. *Recommendation for Update of Nepal National Building Code*, Ministry of Physical Planning and Works, Government of Nepal, 2009.
13. *Briefing for the April 25, 2015 Nepal Earthquake*, Learning from Earthquakes, Earthquake Engineering Research Institute (EERI). EERI is a "nonprofit, technical society of engineers, geoscientists, architects, planners, public officials, and social scientists. EERI members include researchers, practicing professionals, educators, government officials, and building code regulators." See <https://www.eeri.org>.
14. See <http://www.unisdr.org/we/campaign/cities>.
15. Local Hyogo Framework for Action progress reports assess priorities and progress in implementation of disaster risk-reduction actions: http://www.preventionweb.net/english/hyogo/progress/reports/local.php?o=pol_year&o2=DESC&ps=50&timeline=0&cid=121&x=12&y=7.
16. NSET Nepal, 2009, *Seismic Vulnerability Evaluation Guideline for Private and Public Buildings, Part I: Pre Disaster Vulnerability Assessment; Seismic Vulnerability Evaluation Guideline for Private and Public Buildings, Part II: Post Disaster Damage Assessment; and Retrofitting of Common Frame Structural (Pillar System) Houses*. NSET "was conceptualized with the main objective 'to foster the advancement of science and practice of earthquake engineering and technology for mitigating the earthquake risk and increasing the seismic safety, to enhance professionalism, professional engineering and scientific ethics and to further the objectives of the International Association for Earthquake Engineering as applicable to Nepal'". See <http://www.nset.org.np/nset2012/index.php/menus/menuid-57/submenuid-131>.
17. See <http://un.org.np/coordinationmechanism/nrrc>.
18. Build Change is a non-profit organization whose mission is "to greatly reduce deaths, injuries and economic losses caused by housing and school collapses due to earthquakes and typhoons in emerging nations". See <http://www.buildchange.org/about/>.
19. Post-Disaster Needs Assessment, National Planning Commission (2015).
20. World Bank Group, *Large-scale Migration and Remittance in Nepal: Issues, Challenges, and Opportunities*, Poverty Reduction and Economic Management Sector Unit, South Asia Region, 23 June 2011.
21. Ministry of Labor and Employment, Department of Foreign Employment, Government of Nepal, *Labor Migration for Employment: A Status Report for Nepal 2013/2014*.
22. World Economic Forum, *The Global Gender Gap Report 2014*, Gender Gap Index: Nepal.
23. Tripathi, A., "Construction Industry Now", *New Business Age*, July 2015.
24. In: Awale, S. "A concrete future", *Nepali Times*, Nr. 758, 15-21 May 2015.
25. Globalcement.com
26. Pattison, P. and Kelly, A. "How Nepal is trying to solve its blood brick problem," *The Guardian*, 12 February 2015.
27. ICIMOD, *Strategic Framework for Resilient Livelihoods in Earthquake-Affected Areas of Nepal*, ICIMOD Working Paper 2015/6, June 2015.
28. NSET, "School Earthquake Safety Program (SESP)"; see <http://www.nset.org.np/nset2012/index.php/successstory/successstoryview/successstoryid-4>.

29. See http://mundamak.gov.np/wp-content/uploads/2014/09/NBC-205_2013-12-07.pdf.
30. Not all masonry buildings are vulnerable, and in many cases they can perform acceptably in earthquakes, especially if reinforced and built to good standards. However, low-strength stone masonry with mud mortar and a heavy roof, as is common in Nepal, makes buildings particularly vulnerable to collapsing in an earthquake.
31. *Post Disaster Needs Assessment (PDNA)*, National Planning Commission of Nepal, National Emergency Operations Centre/Ministry of Home Affairs, 2015.
32. See http://www.iitk.ac.in/nicee/wcee/article/WCEE2012_4080.pdf.
33. See <http://www.wcdrr.org/safeschools>.
34. See <http://kathmandulivinglabs.org/project/details/mapping-schools-and-hospitals>. Kathmandu Living Labs is “dedicated to the co-creation and implementation of mobile and internet-based technology solutions to enhance urban resilience and civic engagement in Nepal”; see http://kathmandulivinglabs.org/pages/details/about_us.
35. OpenStreetMap offers a map of the world “built by a community of mappers that contribute and maintain data about roads, trails, cafés, railway stations, and much more, all over the world”. See <http://www.openstreetmap.org>.
36. See http://www.iitk.ac.in/nicee/wcee/article/WCEE2012_4080.pdf.
37. The NRRC “is a unique arrangement that unites humanitarian and development partners with financial institutions in partnership with the Government of Nepal in order to reduce Nepal’s vulnerability to natural disasters”. See <http://un.org.np/coordinationmechanism/nrrc>.
38. Referenced in *Safer Building Construction Mapping Exercise: Analysis Report*, NRRC Flagship5/DUDBC, 2014. See flagship5.org.np/wp-content/uploads/2014/12/1.-mapping-analysis-report.pdf.
39. See <http://www.spotlightnepal.com/News/Article/EARTHQUAKE-Unsafe-Schools>.
40. *Safer Building Construction Mapping Exercise*, op. cit.
41. World Travel & Tourism Council. *Travel & Tourism Economic Impact 2014: Nepal*; see <http://bit.ly/1DOPH8Y>.
42. See http://www3.weforum.org/docs/TT15/WEF_Global_Travel&Tourism_Report_2015.pdf. Published biennially, the Travel & Tourism Competitiveness Index benchmarks the travel and tourism competitiveness of 141 economies and comprises four subindexes, 14 pillars and 90 individual indicators.
43. A possible example is the case of Thailand’s developing a tourism risk management strategy following the 2004 tsunami and the flooding of 2011. See the case study on Phuket in this report.
44. See <http://asiapacific.unwto.org/news/2015-06-08/press-release-nepal-tourism-board-nepal-ready-welcome-tourists>.
45. A Safe Trekking System should allow for good communication along the trail, a monitoring system that tracks the location of visitors and staff during the trek, a responsive rescue system, appropriate shelter along the way and enterprises that offer good basic services and quality infrastructure (e.g. bridges, providing drinking water).
46. ADPC, an independent NGO, “has been contributing in making Asia-Pacific safer by strengthening disaster resilience at all levels”. See <http://adpc.net/igo/contents/adpcpage.asp?pid=2>.
47. ARC, “Criteria for Granting Certificates of Good Standing”, Second ARC Conference of the Parties, Kenya, 26-28 November 2013, <http://www.africanriskcapacity.org/documents/350251/639448/Criteria+for+Certificates+of+Good+Standing+EN.pdf>; and ARC, *Drought Triggers ARC Insurance Payout in Sahel ahead of Humanitarian Aid* [Press release], 22 January 2015, http://www.africanriskcapacity.org/documents/350251/844579/PI_Press+Release+Sahel+Payouts+EN_22012015_vFinal_CR.pdf.
48. Ghimire, R., *Growth of Insurance in Nepal in Post Liberalization Period*. See http://www.academia.edu/5587708/Growth_of_Insurance_in_Nepal_in_Post_Liberalization_Period.
49. UNISDR, *Making Development Sustainable: The Future of Disaster Risk Management*, Global Assessment Report on Disaster Risk Reduction 2015.

References

- Awale, S., 2015. "A concrete future", *Nepali Times*, Nr. 758, 15-21 May, <http://nepalitimes.com/article/nation/A-concrete-future.2251>.
- BBC, 2009. "Nepal raises conflict death toll", 22 Sept, http://news.bbc.co.uk/1/hi/world/south_asia/8268651.stm.
- Flagship 5 and Department of Urban Development and Building Construction (DUDB), 2014. *Safer Building Construction Mapping Exercise: Analysis Report*, <http://flagship5.org.np/wp-content/uploads/2014/12/1.-mapping-analysis-report.pdf>.
- The Himalayan Times, 2015. "Nepali private sector: After the disaster", 3 July, <http://thehimalayantimes.com/opinion/nepali-private-sector-after-the-disaster/>.
- Kathmandu Living Labs, 2015. "Mapping Schools and Hospitals", <http://kathmandulivinglabs.org/project/details/mapping-schools-and-hospitals>.
- Lizundia, B., 2015. "April 25, 2015 Nepal Earthquake and Aftershocks: Introduction to the EERI Learning from Earthquakes Briefing Videos", *Earthquake Engineering Research Institute (EERI)*, <http://www.eqclearinghouse.org/2015-04-25-nepal/files/2015/07/01-Introduction-Lizundia-EERI-2015-Nepal-EQ-Briefing-2015-07-21.pdf>.
- Ministry of Labor and Employment, 2014. *Labor Migration for Employment: A Status Report for Nepal 2013/2014*, Kathmandu: Government of Nepal.
- Ministry of Physical Planning and Works, 2009. *Recommendation for Update of Nepal National Building Code: Final Report*, Kathmandu: Government of Nepal, http://errrp.org.np/document/study_report/NBC%20Update-%20Final%20Report-Building%20Code%20July%2015%2009.pdf.
- Ministry of Urban Development, 2013. *Nepal National Building Code: Ready to Use Guideline for Detailings of Low Rise Reinforced Concrete Buildings Without Masonry Infill*, Kathmandu: Government of Nepal, http://mundamak.gov.np/wp-content/uploads/2014/09/NBC-205_2013-12-07.pdf.
- National Planning Commission, 2015. *Post Disaster Needs Assessment, Vol. A: Key Findings*, Kathmandu: Government of Nepal, <http://www.worldbank.org/content/dam/Worldbank/document/SAR/nepal/PDNA%20Volume%20A%20Final.pdf>.
- National Planning Commission, 2015. *Post Disaster Needs Assessment, Vol. B: Sector Reports*, Kathmandu: Government of Nepal, http://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_397970.pdf.
- National Society for Earthquake Technology (NSET) Nepal, 2009. *Seismic Vulnerability Evaluation Guideline for Private and Public Buildings, Part I: Pre Disaster Vulnerability Assessment*, Kathmandu: Government of Nepal.
- National Society for Earthquake Technology (NSET) Nepal, 2009. *Seismic Vulnerability Evaluation Guideline for Private and Public Buildings, Part II: Post Disaster Damage Assessment; and Retrofitting of Common Frame Structural (Pillar System) Houses*, Kathmandu: Government of Nepal.
- Nepal Tourism Board, 2015. *Nepal is ready to welcome tourists* [Press release], 5 June, <http://asiapacific.unwto.org/news/2015-06-08/press-release-nepal-tourism-board-nepal-ready-welcome-tourists>.
- Pattison, P. and Kelly, A., 2015. "How Nepal is trying to solve its blood brick problem", *The Guardian*, 12 February, <http://www.theguardian.com/global-development/2015/feb/12/how-nepal-is-trying-to-solve-its-blood-brick-problem>.
- Rajouria, A., 2013. "Unsafe Schools: Nepal's school buildings are at risk from earthquakes despite efforts at minimizing it", *New Spotlight Nepal*, vol. 6, 31 May, <http://www.spotlightnepal.com/News/Article/EARTHQUAKE-Unsafe-Schools>.
- Rasul, G. et al., 2015. "Strategic Framework for Resilient Livelihoods in Earthquake-Affected Areas of Nepal", *ICIMOD Working Paper 2015/6*, Kathmandu: International Centre for Integrated Mountain Development.
- Tripathi, A., 2015. "Construction Industry Now", *New Business Age*, July, <http://www.newbusinessage.com/MagazineArticles/view/1250>.
- Vishokarma, J. S. et al., 2012. "Implementing School Retrofitting Program in Nepal: Experiences and Lessons Learnt", Paper presented at the 15th World Conference on Earthquake Engineering, Lisbon, 24-28 September, http://www.iitk.ac.in/nicee/wcee/article/WCEE2012_4080.pdf.
- World Bank Group, 2011. *Large-scale Migration and Remittance in Nepal: Issues, Challenges, and Opportunities*, Report No. 55390-NP, Policy Reduction and Economic Management Sector Unit, South Asia Region, Washington DC: World Bank.
- World Conference on Disaster Risk Reduction, 2015. "Safe Schools", <http://www.wcdrr.org/safeschools>.
- World Economic Forum, 2014. *The Global Gender Gap Report 2014*, Gender Gap Index: Nepal, <http://reports.weforum.org/global-gender-gap-report-2014/economies/#economy=NPL>.
- World Economic Forum, 2015. *The Global Competitiveness Report 2015-2016*.
- World Economic Forum, 2015. *The Travel & Tourism Competitiveness Report 2015*.
- World Travel & Tourism Council, 2014. *Travel & Tourism Economic Impact 2014: Nepal*, <http://www.wttc.org/-/media/files/reports/economic%20impact%20research/country%20reports/nepal2014.pdf>.

Acknowledgements

Contributors to the report

Kapil Adhikari, Chief Financial Officer, Chaudhury Group
Ganesh Bista, Officer, Emergency Cash Transfer Program, Mercy Corps
Suraj Choudhary, CE Construction
Elizabeth Drew, Head of International Institutions, International Alert
Sophie Evans, Senior Analyst, Capital, Science & Policy Practice, Willis Group
Naresh Giri, Project Officer, Building Code and Risk Sensitive Land Use Planning, UNDP
Dipesh Gurugh, Project Officer, Environmental Camps for Conservation Awareness (ECCA)
Mario Hardy, CEO, Pacific Asia Travel Association (PATA)
Andrew Jones, PATA Vice Chairman and PATA Nepal Tourism Rapid Recovery Task Force leader, Pacific Asia Travel Association (PATA)
Akanksha Kathri, Community Lead, Regional Strategies – India and South Asia, World Economic Forum
Rebecca Laberene, Associate Director, Service Implementation, 100 Resilient Cities
Katerina Labrousse, Project Specialist, INFrastructure Initiatives
Ganga Laina, Female Mason, CE Construction
Rohita Maharjan, Social Specialist, MinErgy
Pramila Malkar, Chief Marketing Administrator, Training Institute for Technical Instructors (TITI, a subset of CTEVT)
Maneshwor community members, roughly 20 in total
Tiffany Misrahi, Community Lead, Aviation & Travel Industries, World Economic Forum
Shreya Mitra, Environment, Climate Change and Security team, International Alert
Sharada Nepali, Field Officer, MinErgy
Prerana Pakhrin, Co-Owner, Fuji Hotel, Kathmandu
Rolita Patel, Disaster Resource Partnership Secretariat, Hindustan Construction Company
Aslam Perwaiz, Head of Department of Disaster Risk Management Systems, Asian Disaster Preparedness Center (ADPC)

Eliza Pradham, Human Resources, CE Construction
Ashta Prajapati, Project Officer, International Development Enterprises (IDE)
Golam Rasul, Theme Leader, Livelihoods, International Centre for Integrated Mountain Development
Pujan Raj Regmi, Director, Pumori
Christel Rose, Programme Officer, UN Office for Disaster Risk Reduction
Sankhu community members, roughly 20 in total
Raju Man Sewal, Director, Human Resources, CE Construction
Mahendra Shahi, Program Manager, Financial Services, Mercy Corps
Shivahari Sharma, Deputy Director-General Department of Urban Development and Building Construction
Liva Shrestha, Lead Engineer, Build Change
Tim Stewart, Samarth
Syangja (Chapakot and Waling) community members, roughly 25 in total
Fatik Thapa, Executive Director, Education, Nepal Participatory Action Network
Jerry Velasquez, Chief of Section, UN Office for Disaster Risk Reduction
Bert van Walbeek, VP Business Development Asia Pacific at Safehotels Alliance; Member of Pacific Asia Travel Association (PATA)
Elizabeth Yee, Vice President, Strategic Partnerships and Solutions, 100 Resilient Cities



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum is a comprehensive and integrated platform to strategically shape global, regional, national and industry agendas.

The Forum helps the foremost political, business and other leaders of society to improve the state of the world, serving as an independent and impartial partner and acting as the officially recognized International Institution for Public-Private Cooperation.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744

contact@weforum.org
www.weforum.org