Developing a Strategy for Improving Seismic Safety of Schools in Nepal

THE WORLD BANK

GFDRR
Global Facility for Disaster Reduction and Recovery

Introduction

Nepal is vulnerable to frequent and intense natural hazards. According to the World Bank report, "Natural Disaster Hotspots: A Global Risk Analysis," greater than 90 percent of Nepal's population lives in areas of high relative risk of death from two or more hazards. Of these hazards, Nepal is particularly prone to earthquakes. The region has seen four major earthquakes of magnitudes greater than 8.0 on the Richter scale within the last 100 years. Rapid and random growth of urban areas in Nepal creates a high level of vulnerability, as poor construction quality and nonenforcement of building codes increase people's exposure to earthquake risk.

There is growing consensus among stakeholders that public infrastructure in Nepal is particularly susceptible to seismic risk. In 1998 a study conducted by the National Society for Earthquake Technology (NSET) revealed that a third of all schools in the Kathmandu valley were structurally dilapidated and needed to be demolished and rebuilt. Furthermore, as high as 60 percent of public school buildings were vulnerable under normal operating conditions. The study highlighted a compelling need for developing and implementing an effective, integrated, and "ground-real" strategy for radically improving the seismic safety of schools all across the country. The strategy should both address the challenge of improving the structural safety of existing schools and develop a replicable model for future construction in Nepal.

Seismic Safety of Schools Program

In light of these risks, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank initiated a program, "Developing a Strategy for Improving Seismic Safety of Schools in Nepal," for implementation by NSET. The program aims to develop a national strategy to improve seismic safety of schools in Nepal based on the experiences of demonstration seismic improvement works at six schools in two districts of Nepal. The two-year program received funding of US$ 200,000.

The program has two objectives:

- Develop and implement a comprehensive pilot program for school earthquake safety in two districts of Nepal;
- Institutionalize the School Earthquake Safety Program (SESP).

On September 26, 2008, the project started formally with a Program Launch Workshop in Kathmandu attended by various education-related stakeholders. A Program Steering Committee was formed during the workshop. Based on the criteria finalized during the workshop, Lamjung and Nawalparasi districts were selected as the pilot demonstration districts for implementation of seismic improvement works. Overall the program aims to improve community safety through promotion and dissemination of safer construction technology.

Program Implementation

The pilot program implements various SESP components:

Survey and assess school buildings

The program surveys school buildings using standard forms and collects data required for vulnerability assessment. The collected data is analyzed, and measures to improve seismic safety (vulnerability reduction) are identified. In total, the pilot program surveyed 745 school buildings in Lamjung district and 636 schools in Nawalparasi district and developed detailed vulnerability analyses for existing school buildings with potential damage and casualty scenarios.

Implement measures to reduce earthquake risk

The program presents the identified risk reduction measures and develops consensus on the type of intervention. Based on the assessment results, the vulnerable buildings are either retrofitted or reconstructed to ensure structural safety. Retrofitting is recommended if the cost is within 30% of reconstructing a particular building (structural works). The retrofitting option has been very attractive and has gained people's acceptance. With community involvement in the program's entire implementation process from survey to construction, the risk reduction programs help people to replicate earthquake-resistant construction technology throughout the community.

The program identified six schools for intervention, three each in Lamjung and Nawalparasi. Of these, three existing structures have undergone retrofitting, and three have undergone earthquake-resistant reconstruction of a few schoolrooms. The youngest (preprimary) classes in each school will use the newly constructed earthquake-resistant schoolrooms. Each of the schools has drawn up plans for construction of additional classrooms when resources become available.

Train students and teachers

During project implementation, orientation programs for students and teachers are conducted on earthquake preparedness. Teachers are encouraged to instruct all students on minimum safety measures to be employed before, during, and after an earthquake. With project assistance, schools are also encouraged to organize for emergency preparedness. This preparation includes making response plans for individual schools and conducting earthquake simulation drills on a regular basis. In total, 81 teachers and over 4600 students participated in earthquake preparedness training.

Train local masons

An important part of project execution is the design of tools for developing skilled human resources in earthquake-resistant construction at the local level. The program encourages the community to employ local masons in retrofitting and reconstruction of school buildings. NSET engineers work with local masons involved in the program to show them construction techniques. The engineers explain in detail the processes of proper reinforcement: weakness in prevailing construction practices, minimum requirements for seismic resistance in different types of buildings, quality control of materials,

and importance of workmanship for strength. The training explains how retrofit elements, such as splints, bands, corner pins, etc., function to withstand an earthquake force. These masons are expected to be masters in earthquake-resistant construction and to serve as trained masons in their community. Through the program, 60 masons underwent a rigorous five-day training course. Additionally in the project, almost 120 masons got on-the-job training while constructing new classrooms. Expectations are that all of these masons will adopt the proper construction techniques, even when constructing residential buildings in the community.

Community orientation on earthquake safety

During implementation, the program conducts a series of orientations for the local community and for parents. Topics covered include various aspects of earthquake preparedness: earthquake risk in Nepal, loss and damage during past earthquakes, need for earthquake risk reduction, and simple techniques for risk reduction. More than 150 community members participated in earthquake orientation and community preparedness programs.

The Way Forward

To be completed in July 2010, the pilot program has truly raised earthquake safety awareness among teachers, students, and community members in the six communities of implementation. The program collaborated closely with government district development committees and district education offices, thereby strengthening capacity at the local government level in earthquake resistant design and retrofit of school structures. The mason-training program teaches skills reinforced through practice that are sustainable beyond the project pe-

riod. This training also raised community awareness of what to expect in earthquake-safe structures. Through demonstration, the pilot program has developed clear strategies for school safety and has built a strong case for further, enhanced, and stronger intervention in Nepal. The program demonstrates successful and sustainable activities and has the potential to be scaled up across other districts of the country.

A possible platform for scaling up activities could be the Nepal Disaster Risk Management Flagship Program. Six organizations, including the Asian Development Bank, the International Federation of the Red Cross, UN ISDR, UNDP, UN OCHA, and the World Bank have come together to form a disaster risk management member consortium for Nepal. The consortium identified five priority areas for disaster risk management in Nepal:

- School and hospital safety
- Emergency preparedness and response capacity
- Flood management (with river basin as a unit of planning)
- Integrated community-based disaster risk reduction management (DRR/M)
- Policy and institutional support

Detailed investment proposals were developed for each of the flagship priority areas, and in October 2009, the Government of Nepal endorsed the complete flagship program proposal. The support from the donor community will enhance Nepal's ability to scale up the Seismic Safety for Schools Program across the country.

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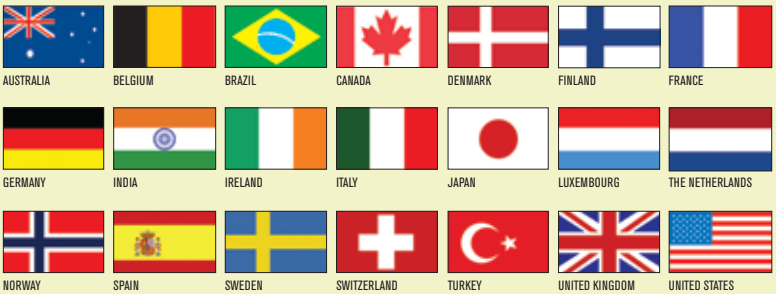

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