Preparing for a Major Earthquake in Nepal: Achievements and Lessons

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SUMMARY:
The earthquake risk of Nepal is very high and is increasing alarmingly due to rapid urbanization, poor construction practices, and lack of awareness and preparedness. Despite the high risk, public awareness on earthquake hazard and risk was minimal until a few decades back and organized approaches for earthquake risk management (ERM) was not practiced. Only after a massive destruction and a loss of 721 human lives due to an earthquake in 1988, the need for an organized approach was realized. Since then, several innovative initiatives on ERM were implemented. Nepal has made great strive in understanding the earthquake risk, developing appropriate methodologies for earthquake risk reduction and has demonstrated feasibility of risk reduction measures through numerous successful programs. The need now is to up-scale the successes by institutionalizing them and here international cooperation and support are required for such up-scaling.

Keywords: Earthquake Risk management, Public Awareness and Capacity Building, Institutionalization

1. INTRODUCTION

Efforts towards earthquake risk management started being implemented in Nepal rather late. Despite the fact that systematic geological studies started being conducted in Nepal as early as the 1930s, Nepal was rather late in realizing the earthquake threat that the country is exposed to. While the 1988 Udayapur Earthquake awakened the Nepalese professionals to the need to develop organized approaches to mitigate the risk, the National Building Code Development Project (1992-1994) was the first initiative on assessment and mapping of seismic hazard at the national scale.

In past, big earthquakes in Nepal have caused high extent of human casualty and damage to structures. The Great Nepal- Bihar Earthquake, with epicenter located at about 240 km east of Kathmandu and with magnitude of 8.4 Richter scale took place in 1934. It reportedly killed 8519 persons and damaged 80,000 buildings in Nepalese territory. Later, 1988 Udayapur Earthquake also resulted in heavy loss of lives in eastern region and the Kathmandu valley. Because of rapid urbanization, particularly in the last decades with uncontrolled development and poor construction practices in cities especially in Kathmandu valley it is axiomatic that during future earthquakes, the extent of loss of lives and property hitherto be unexpectedly high.

Despite the availability of knowledge of historical seismicity, and continued geological researches in the Nepal Himalayas, public awareness on the earthquake hazard and risk was minimal till some years ago, and implementation of earthquake risk management efforts were almost non-existent. The 1988 Udayapur Earthquake was a big turning point. Following the massive destruction and a toll of 721 human lives, the need for an organized approach was felt in all quarters. Several initiatives were conceptualized and implemented by the Government as well as non-government sectors since then. The following list provides a brief glimpse of the process:

Table 1.1: Trigger and History of Organized Earthquake Risk Management in Nepal

Historical events	What changed as a result?	Challenges/ obstacles to progress	Tangible examples(s) of Success stories
1. 1988 Earthquake	Earthquake became a national concern National Building Code developed NSET established in 1993	NBC implementation huge task	NBC incorporated 4 levels of building code provisions to cover entire building typologies of Nepal
2. International Decade for Natural Disaster Reduction (IDNDR) (1990-1999)	National Action Plan for DM Prepared, 1994 – to be presented during World Conference in Yokohama, Japan	Lack of policy, legal instrument felt acutely	IDNDR national committee decentralized to include members from outside government e.g NSET became member
3. Kathmandu Valley Earthquake Risk Management Project (KVERMP), Nepal Earthquake Risk Management Program (NERNP), Program for Enhancement of Emergency Response (PEER), 1997-2005, implemented by NSET	Organized approaches for ERM started e.g. Earthquake risk assessment of KV, action planning for risk mitigation, knowledge management, Preparedness. Earthquake Damage scenario helped to enhance awareness at different levels. Need for integrating disaster reduction into development of infrastructure started being felt.	Limited GON involvement and acceptance in ERR.	Earthquake scenario, action-plan for KV. School Earthquake Safety Program (SESP) Annual Earthquake Safety Day (ESD) Mason training programs Hospital assessment Water System Assessment Building code Implementation in Lalitpur Community Based Disaster Risk Management PEER in 6 counties by NSET Public Private Partnership in Earthquake Risk Management (3PERM)
4. Study on Earthquake Disaster Mitigation for Kathmandu Valley (JICA study 2000-2002)	Enhanced Government's involvement in ERR	No follow-up, No actions	GIS based risk maps Tools for community based ERM developed and tested
5. World Conference on Disaster Reduction (WCDR), 2005, Kobe, Japan	DRR included as policy in national plan National commitment to DRR reiterated Need felt for improving policy, legal environment Numerous programs/ actors, methodologies islands of success	No proper mechanism and plan for implementation No budget, no plan for DRR, no adequate international support for DRR.	More CBDRM More Schools More Municipalities
6. Formulation of National Strategy for Disaster Risk Management (NSDRM), 2007-2009	National vision for DRR portrayed Comprehensive DRR framework Priority actions identified Cluster approach accepted as key Replicable models identified Need for institutional framework for DRR felt Donors included DRR in their national strategy	Scaling up Lack of Institutional mechanism Action	SESP in outside KV National strategy for safer schools RSLUP in KMC Building Vulnerability parameter collected in census 2011
7. Nepal Risk Reduction	NSDRM Approved by Government	Risk assessment & RR not	SESP, 65 schools Retrofitted in 2 years

Consortium (NRRC), October 2009	Unified and consensus approach by most donors/ Financial institutions on DRM Collective efforts to assist Government	mandatory in Development works by Government/ Donors Huge need Vs. Limited institutional and HR Capacity Mainstreaming DRR	Training Curricula, manuals, Guidelines Prepared/ Tested Plan for Hospitals retrofitting CDRMP by UNDP

3. KEY PROGRAMS

The following sections explain main projects, programs implemented in the past in Nepal which have significant impact and contribution towards enhancing the organized earthquake risk management efforts in Nepal.

3.1. Kathmandu Valley Earthquake Risk Management Project (KVERMP)

The Kathmandu Valley Earthquake Risk Management Project (KVERMP) was implemented during September 1997 - December 1999 by the National Society for Earthquake Technology – Nepal (NSET) in association with GeoHazards International (GHI), as the Nepal national project of the Asian Urban Disaster Mitigation Program (AUDMP) implemented by the Asian Disaster Preparedness Centre (ADPC).

KVERMP included a wide variety of activities aimed at beginning a self-sustaining earthquake risk management program for Kathmandu Valley. Project components included: 1) development of an earthquake scenario and an action plan for earthquake risk management in the Kathmandu Valley, 2) a school earthquake safety program, and 3) awareness raising and institutional strengthening.
The project was implemented with strong participation by national government agencies, municipal governments, professional societies, academic institutions, schools, and international agencies present in Kathmandu Valley in advisory committees, various workshops, seminars, interviews and joint programs.

The major accomplishment of the project was development of an earthquake damage scenario and an action plan for reducing the seismic risk of the valley. The action plan is a consensus document depicting roles and responsibilities of all concern institutions in managing the seismic risk of Kathmandu. School Earthquake Safety Program (SESP) was another major accomplishment. It established technical and social feasibility and also the affordability of seismic improvement of school buildings. SESP is now an established program which not only helps build the school buildings stronger, but also serves as an awareness raising tool that ultimately makes the entire community safer against earthquake. Training of masons in earthquake safe construction and disseminating the earthquake safety information to children, teachers, parents and community at large are the strongest parts of SESP which is found as the start of a self replicating process. The KVERMP also helped institutionalise the seismic safety consideration with several policy shifts - at NSET's request, the government designated January 15 as the Earthquake Safety Day, in recognition of the occurrence of the last earthquake to strike the valley on January 15, 1934. An Earthquake Safety Day National Committee has been constituted with the Minister of Science and Technology as the Chair, and 22 representatives of various organizations, including NSET, as committee members. The Committee is responsible for organizing the Earthquake Safety Day events annually.

The KVERMP achievements provided enough motivation for the municipalities of Vyas, Dharan and Banepa to develop their worst case earthquake damage scenario which served as the basis for developing action plans for ERM and subsequent implementation.

3.2. The Study on Earthquake Disaster Mitigation of Kathmandu Valley (SEDM)

The Japan International Cooperation Agency (JICA) carried out a project "The Study on Earthquake Disaster Mitigation in the Kathmandu Valley, Kingdom of Nepal" (MOHA/HMGN-JICA, 2002) in cooperation with the Ministry of Home and several Nepalese institutions. The study undertook a more detailed loss estimation for 3 scenario earthquakes. Potential casualty and damage to infrastructures was done at the municipal ward level. Different surveys were undertaken for assessing the available resources and constraints. A building inventory was prepared for 1100 typical buildings representing the valley. Damage analysis of existing building stock, public facilities, and lifeline networks was based on the building inventory research. This study also undertook a social structure survey that explored existing social norms that contributed to disaster resiliency of the society. The existing policy and legal environment was also researched

It ended up proposing several schemes for making seismic risk coping mechanism operational and sustainable, (MOHA/HMGN-JICA, 2002):

- to build a coordination mechanism by establishing a permanent structure such as National Disaster council
- to put higher priority on the disaster mitigation and preparedness policies and confirm it in the 5 year national plan.
- to empower local autonomous bodies for risk management
- to promote public awareness to earthquake disaster and give support to target groups for resilient capacity on self-help basis.

The SEDM proposed generation and implementation of earthquake disaster reduction plans at different levels of the government. It was suggested that the individual disaster management plans should be prepared at each level of government and institutions by the method of full participatory planning by all stakeholders.

3.3. Other projects/programs

The following table provides and list of other significant efforts in the past:

Table 1. Other significant projects, programs for ERM in Nepal

Program / Project Information	Key Project Components
Community Based Disaster Risk Management in Nepal (CBDRM-N)	• Formation of Community Based Disaster Risk Management Groups. • Organize 5 day Community Based Disaster Risk Management Trainings Program • Facilitate the CDMGs to plan and conduct 3 days Participatory Hazard, Risk, Vulnerability and Capacity Assessment Training program in each of the program communities. • Facilitate the CDMGs to prepare Disaster Risk Management Master Plan of their community. • Facilitate the selected 3 schools to prepare School Based Community Disaster Preparedness Plan • Conduct half day orientation program on Primary Health Centre Based Disaster Response Plan for the selected PHC of the program communities. • Institutionalize the Disaster Risk Management (DRM) Initiative at 3 local government and social institutions by prepositioning of emergency rescue supplies at 12 places and development of 72 trained government officials/volunteers.
Disaster Preparedness for Safer Schools (DPSS) in Nepal	• Improve Disaster safety of public schools through increased hazard awareness; improved disaster management skills among school children, teachers and parents • Increase Disaster awareness of communities through disaster awareness and training programs and campaigns using schools as entry point • Assist to institutionalize disaster safety concepts into regular education system

Program / Project Information	Key Project Components
	by developing and assisting in implementation of national strategies for wide-spread application of concepts, approaches and methodologies to enhance disaster safety of schools.
Developing A Strategy for Improving the Seismic Safety of Schools in Nepal	• Developing and implementing a pilot program to identify physical structural-seismic retrofitting needs of schools, and replicable, specific retrofitting measures to scale up and improve school safety across the country; • Developing a replicable agenda and program for mainstreaming DRR at the school level through awareness raising and related capacity building; • Developing a pilot program for training of the local construction industry in seismic retrofitting techniques; • Developing an integrated strategic framework for improving the seismic safety of schools across the country, through a scaling up of the different pilot programs.
Program for Enhancement of Emergency Response (PEER) Stage 3	• Strengthen the capabilities of PEER countries to provide collapsed structure search and rescue and basic and advanced life support during emergencies by further strengthening and institutionalizing the Medical First Response (MFR) and Collapsed Structures Search and Rescue (CSSR) courses. • Implemented in 6 Asian countries: Nepal, India, Pakistan, Bangladesh, Indonesia, Philippines
Nepal Earthquake Risk Management Program (NERMP)	• Improving seismic safety of public school buildings in Nepal through school retrofitting/reconstruction, training and awareness programs • Advocacy for and seismic vulnerability assessment/ improvement of public facilities and critical structures such as water supply, hospital • Assisting municipalities in building code implementation • Training of engineers, technicians and masons • Public awareness raising
Municipal Disaster Risk Reduction Program in Nepal (MDRIP)	• Earthquake risk assessment of Ilam and Panauti municipalities • Action planning for earthquake risk reduction • Implementation of earthquake vulnerability reduction measures • Training and public awareness raising
Risk Mapping and Shelter Response Planning Program	• Earthquake risk assessment of Maputo municipality and Kathmandu Valley • Evaluation of potential shelter needs • Development of Shelter Response Strategies and Response Plans for Maputo and Kathmandu • Development of Guidelines and Training materials for risk assessment and shelter response planning • Conduct trainings
Disaster Inventory / Information Management System in Nepal (DIMS)	• Collection of disaster data for all hazards of past 33 years in Nepal (1971 – 2003) • Inventory of the collected data into DesInventar System • Analysis • Recommendation on possible institutionalization system of Disaster Information Management System for Nepal (Further, NSET has continued the DIMS and collected, inventoried and analyzed the disaster data of 2004 – 2007) on its own resources)
Development of National Strategy for Disaster Risk Management in Nepal (NSDRM)	• Formulation of National Strategy for Disaster Risk Management (NSDRM)
Disaster Preparedness and Response Plan	• Development of Disaster Preparedness and Response Plan Framework for Lalitpur Sub Metropolitan City • Identification of Evacuation sites and potential deep tube wells for continued

Program / Project Information	Key Project Components
Framework and Pre-positioning of Safe Drinking Water in the Kathmandu Valley	water supply • Seismic vulnerability assessment of deep tube well sites • Design and supervision of seismic improvement of deep tube well sites • Training to Deep tube well operators
Community Based Disaster Management Project (CBDMP)	• Formation of Community Based Disaster Management Committees in eighteen community of six districts in Nepal • Disaster management training for community leaders, volunteers and women groups • Demonstration implementation of disaster risk reduction measures • Training of school teachers and students on aspects of disaster preparedness and response
Disaster Preparedness and Response Plan Framework and Pre-positioning of Safe Drinking Water in the Kathmandu Valley	• Development of Disaster Preparedness and Response Plan Framework for Lalitpur Sub Metropolitan City • Identification of Evacuation sites and potential deep tube wells for continued water supply • Seismic vulnerability assessment of deep tube well sites • Design and supervision of seismic improvement of deep tube well sites • Training to Deep tube well operators
Kathmandu Valley Earthquake Preparedness Initiative (KVEPI)	• Development of curricula and materials for training of community disaster workers • Implementation of training programs for trainers and end-users • Establishment of community level Disaster Management Committees in 10 wards of Kathmandu Valley • Pre-positioning of light search and rescue tools and equipment in the communities
Seismic Vulnerability Assessment of major Hospitals in Nepal	• Study of Structural and non-structural vulnerability of 14 major hospitals of Nepal • Identification of mitigation options. • Planning for future intervention The study culminated in following two Guidelines besides the study report: • Guidelines for Seismic Vulnerability Assessment of Hospitals jointly with WHO and Ministry of Health, His Majesty Government of Nepal, 2004. Non-structural Vulnerability Assessment of Hospitals in Nepal, published jointly with NSET, WHO and Ministry of Health, 2003.
Study on Seismic Vulnerability of Drinking Water Supply System in Kathmandu Valley	• Design survey questionnaire and formats for interviewing key stakeholders of the drinking water supply; • Survey of critical locations of pipeline network, collection of information on the water supply system, interview stakeholders; assess the institutional capability; • Develop, adapt methodology for the seismic vulnerability assessment of water supply pipeline network since the regional lacks such methodology; • Analyze the system based on the developed, adapted methodology, identify weak locations in the network; and • Identify strategy for mitigation of the seismic vulnerability of the system in the long run, recommend medium-term and short-term measures for better preparedness.
Pre-Positioning of Emergency Rescue Stores (PPERS)	• Pre-positioning of emergency rescue tools and equipment in 8 locations of Kathmandu Valley • Establishment of Community level Disaster Management Committee (DMCs) in respective communities

Program / Project Information	Key Project Components
	• Training of community disaster volunteers

4. NEW THRUSTS

4.1. Urban Regeneration

This is a concept of redevelopment of city core area with improved infrastructure, enhanced economic activities, transformed old earthquake-vulnerable building stock into earthquake-resistant neighborhood, improved Quality of Life, preserved historic & architectural heritages and social relation from a situation of highly vulnerable buildings without possibility of seismic retrofitting; poor accessibility, especially for emergency services; poor Infrastructures; under-utilized high tourism and economic potentials and cultural heritage and vernacular architecture at high risk due to seismic and fire hazards, and also due to the current trend of building repair & replacement.

4.2. Nepal Risk Reduction Consortium (NRRC)

In May 2009, the Government of Nepal launched the comprehensive Nepal Disaster Risk Reduction Consortium (NRRC). The NRRC is a unique institutional arrangement, bringing together financial institutions, development partners, the Red Cross / Red Crescent Movement, and the UN in partnership with the Government of Nepal. It bridges the spectrum of development and humanitarian partners, uniting to support the Government of Nepal in developing a long term Disaster Risk Reduction Action Plan building on the National Strategy for Disaster Risk Management (NSDRM). The founding members of the Consortium are the Asian Development Bank (ADB), the International Federation of the Red Cross and Red Crescent Societies (IFRC), United Nations Development Programme (UNDP), UN Office for the Coordination of Humanitarian Affairs (OCHA), UN International Strategy for Disaster Reduction (ISDR) and the World Bank. Five priority areas are being implemented as the five flagship programs under the NRRC.

4.3. Promoting Public Private Partnership for Earthquake Risk Management (3PERM)

The program 3PERM focuses on tapping the vast potentials of private sector for contribution to earthquake risk reduction in Kathmandu Valley and Nepal. The program is geared towards: a) raise awareness of all stakeholders, especially the private sector and other stakeholders that closely relate with potential earthquake risk reduction activities to be led by the private sector, b) assess the potential of the commmitments and potential energy and leadership within the private sector and its potential capacity to exert pressure on the government to consider earthquake risk management as one of the priority areas for mainstreaming into the development processes, and c) implement a detailed study of the model PPP in urban regeneration to be piloted in a demonstration neighborhood of the core area of Kathmandu.

The program believes that participation of the private sector is essential, and should be a “matter of fact” perpetually in disasetr risk reduction processes. Therefore, it is necessary to raise awareness of the private sector, convince the businesses that earthquake risk management is much more than “charity”, and demonstrate the economic, social and corporate feasibility of PPP in disaster risk reduction, and pursuade that it is a sound investment to be done. 3PERM also emphasizes on the added benefits of this program to other sectors such as tourism, cultural heritage preservation, contribution to social assets generation etc.

4.4. Risk Sensitive Land Use Planning (RSLUP)

The RSLUP provides a view and a framework on how the Kathmandu Valley Development Concept

can be made risk sensitive or disaster risk reduction and management (DRRM) compliant. In view of the need identified by the Government of Nepal, to integrate disaster risk concerns in the development planning process and land use plans of the Kathmandu Valley, the study looks into the planning process and outputs at the Valley level, and looks into the various aspects of its planning system where disaster risk reduction (and climate change and variability risk aspects) may be introduced and thus making it risk sensitive and supportive of the sustainable development. A framework of RSLUP was developed for Kathmandu Metropolitan City (KMC) during 2008 by KMC with the technical support from Earthquake and Megacities Initiative (EMI) and NSET. Currently, RSLUP is being developed for the entire Kathmandu Valley under the Comprehensive Disaster Risk Management Programme (CDRMP) of UNDP, Nepal under the Flagship 5 component of NRRC.

4.5. Building Code Implementation Program in Municipalities of Nepal (BCIPN)

As in many developing countries, Nepal is also witnessing rapid urbanization. More and more residential and commercial buildings are constructed in urban and urbanizing centres in the country. Unfortunately, a majority of the buildings are constructed violating the stipulations of the national builindg code and hence are extremely vulnerable to earthquakes. While the legislation has made compliance to building code mandatory, the municipalities are not capable to exercise effective control over the building permit and building inspection processes due to lack of appropritae mechanisms and capacities for building code implementation. Lack of awareness among the population is another reason for the failure of building code enforcement. The program BCIPN focuses on assisting the municipal governments in Nepal in enhancing their capacities to develop and administer the building permits and control system properly for ensuring improved seismic performance of all new building construtction in those urban and urbanizing areas of Nepal where compliance to the National Building Code has been made mandatory by law. This entails, one one hand, helping the municipalities to develop an effective mechanism for building code implementation, and on the other, enhance earthquake awareness of the residents and technical knowledge of the municipal official on aspects of earthquake risk management including earthquake-resistant design and construction. This is proposed to be achieved by conducting a series of training courses for technical personnel including the contractors and maosn and by conducting earthquake orientation and other awareness activities. The project aims at supporting some municipalities with provision of technical human resources such as engineers and construction technicians as and when necessary.

5. REMARKABLE ACHIEVEMENTS

Following are some of the important achievements of the continued efforts of NSET and many other institutions in earthquake risk management in Nepal:

- There has been a remarkable change in terms of policies, especially in the area of building code development and implementation
- The level of earthquake awareness in the population is remarkably enhanced in areas where people and agencies were active in the past decade. It indicates towards a very high potential of bringing in change in other parts of the country also. Figure 1 below shows a remarkable change in public awareness in perception of earthquake risks.
- The demand for earthquake-resistant construction is growing – house-owners are influencing the municipal authorities to include seismic safety in the building permit process. The importance of such change in peoples' attitude towards earthquake safety becomes obvious when one considers that it is taking place at a time when there was no significant devastating earthquake in Kathmandu in the past several decades.
- More and more institutions are implementing earthquake risk management actions as their regular agenda

With these successes, the challenge now is to continue the momentum so that the lessons learned could be utilized on a larger scale so as to improve earthquake performance in many more number of

urban and urbanizing settlements in Nepal and the adjacent areas. The problem is enormous given the rapid growth of the urbanizing settlements in the country. In the existing settlements, such as the core areas of Kathmandu, the problem appears to be almost hopeless. However, successful cases of effective awareness raising, and achieved positive changes in the mindset of people, provides certain level of optimism on the possibility of vulnerability reduction even in old cities such as Kathmandu.

While these changes are very positive, they are just the start. There is still much to be done. There are several challenges to be met. A decade ago, the concerned professionals and agencies were at their wit's end especially after the 1988 Udayapur Earthquake. Now, the same people and agencies know how things can be improved and are implementing programs that include disaster mitigation. They know and are better convinced on the truth of what WSSI propagated – the time to act is NOW!

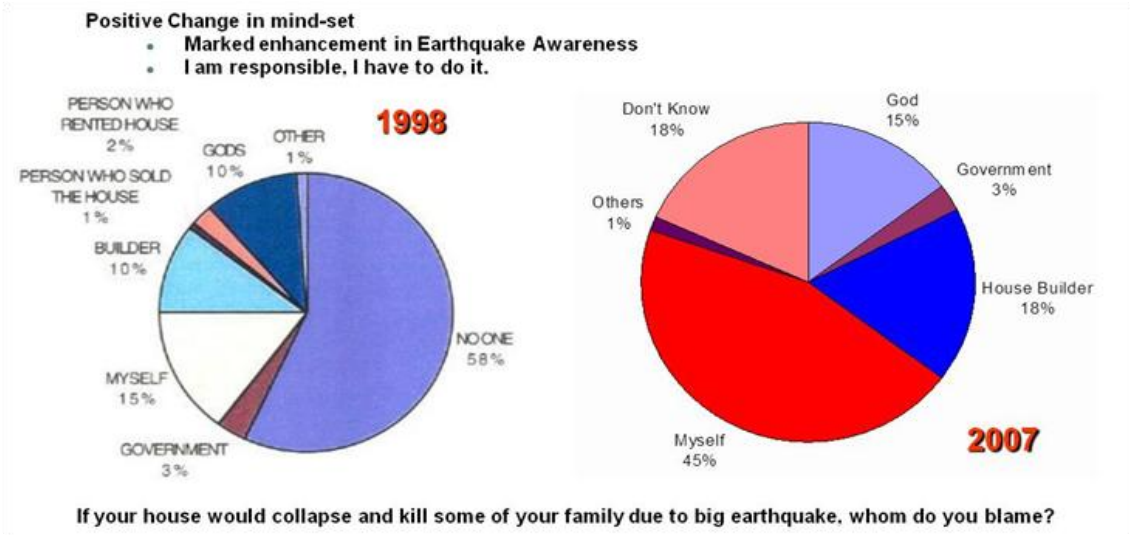

Figure 1. Change in Perception of Earthquake Risks

6. CHALLENGES AND POSSIBILITIES FOR FURTHER IMPROVEMENTS

The achievements made by Nepal in the past 10-12 years in terms of successful implementation of earthquake risk reduction actions could be considered as a matter of pride and satisfaction by those who are involved in the process directly or indirectly. The success made is surprising, especially if one considers the fact that Nepal is one of the weakest economies and the nation has not made / does not have capability to make/ any significant investment in disaster risk reduction, and that the seismic risk of the country is one of the highest in the world if one considers earthquake lethality as an indicator.
Such situation puts forward two main challenges to the concerned professionals and agencies a) continue the support provided so far to ensure that the efforts and investments made so far are insured, and b) assist the local institutions, central and local governments, and non-governmental organizations, to take up new and ever-widening responsibilities. One has to understand that raising earthquake awareness of the community reduces the risk significantly, but it also tremendously increases the demand for more and better knowledge, technologies, management tools, institutional capabilities, and improved policy and legal environment. Coping with such natural, expected and desired outcome may become a maddening trance for the activist especially if he/she or the institution fails to receive the support, mainly a moral support!

The following are seen as the major tasks that need to be addressed in coming times:

A) Scale up Activities: there could be a serious blow to all the efforts and successes achieved so far, and people would stop believing in mitigation if the earthquake occurs now. Therefore, it is necessary to accomplish and consolidate as much as possible before the next big one. The scale of implementing the methodologies that are proven to be replicable, e.g. hazard/risk assessment, action planning of

earthquake risk management, implementation of SESP, mason training, earthquake awareness etc.), need to be implemented in as wide geographical area as possible. There should be a significant increase in the number of masons trained in earthquake-resistant construction, or the number of engineers trained in earthquake vulnerability reduction for Cities (EVRC).

So far NSET worked in Kathmandu Valley and some cities. It is necessary to implement projects in all the 58 municipalities of Nepal. Perhaps it is necessary to implement similar initiative also in the adjoining districts/municipalities in India.

B) Make the Approach comprehensive: Success in earthquake risk management can not be achieved in piecemeal. The efforts should be comprehensive: it should tell the common man how to construct safer abode, how to maintain it, how to convince his neighbor on the benefits of EVR, what to do before, during, and after an earthquake, how to demand earthquake safety from the state etc.

C) Emphasize on Action oriented Implementation: It is clear at this stage that the School Earthquake Safety Program (SESP) works wonderfully in developing countries, then why to waste time by not implementing similar initiatives.

D) Emphasize on Grass-roots level works: The most vulnerable are at the grass-roots level, and the ones most willing to implement EVR are also at the grass-roots level.

E) Publicize Success Stories (anyway they are few and far in-between!) Given the low level of awareness and the complexity of earthquake risk reduction measures, it is recommended to emphasize on successful cases.

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