

Earthquake Awareness Programs as a Key for Earthquake Preparedness and Risk Reduction: Lessons from Nepal

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SUMMARY:

Nepal is a highly seismic country having a long history of destructive earthquakes. Huge loss of life and property had occurred in series of earthquakes in the past and it is believed that next big earthquake is around the corner. Studies have estimated a heavy loss of life and property due to the possible future earthquake in the country. The impact of destructive earthquakes can only be reduced through coordinated efforts among all stakeholders and individuals for effective awareness and preparedness. Realizing this fact, National Society for Earthquake Technology-Nepal (NSET) has been conducting earthquake preparedness awareness programs in massive scale focusing different level of stakeholders and individuals in the country. This paper presents the experiences on such activities carried out by NSET in Nepal, which will work as the guiding efforts for the similar countries in the world.

Keywords: Public Awareness, Earthquake Preparedness, Earthquake Risk Reduction

1. INTRODUCTION

Earthquakes are the most disastrous of all natural calamities which catches life and property in the shortest possible time. The recent earthquakes have shown their devastating natures destroying major cities of the world. The seismic hazard is a natural phenomenon and is related to identifiable geographic areas. However, seismic risk is related to human activities; and the risk exists only when something of human value is exposed to an earthquake. Earthquake as a hazard is beyond human control, therefore only way to reduce the risk is increasing the capacity of potential victims to cope with the impact of potential earthquake. Here the term 'capacity' is the capability of individuals or communities to reduce the impact during an earthquake, which comes through awareness and preparedness. Though medium and small earthquakes are frequent, Nepal has not experienced major earthquake since 1934. NSET along with many professional organizations has been working for earthquake awareness and preparedness realizing as this period is good slot of time to be prepared for the next big earthquake affecting the country. This has raised significant awareness and enhanced the capacity among the general people and the policy makers. A field study carried out immediately after the recent, 18 September 2011, Sikkim-Nepal Earthquake has shown that the large number of people have saved themselves from the earthquake by following the safety measures what they have learnt through the media, pamphlets or orientation and training programs. However, earthquake Safety cannot be achieved in developing countries unless we initiate a bottom-up approach in which house-owner and common people become aware, have basic ideas on earthquake preparedness and convinced on the need to make their residences safer against earthquake. Therefore, as one of the reliable means of disseminating awareness message in all communities, NSET has implemented a separate program focusing schools called School Earthquake Safety Program (SESP). Besides, it has been conducting such programs for embassies, diplomatic missions, aid agencies, INGOs, NGOs, security agencies, hospitals and even general masses to aware, enhance knowledge on earthquake safety.

2. AWARENESS FOR INDIVIDUALS AND INSTITUTIONS

2.1. Earthquake Preparedness Orientation Programs

Nobody can assure earthquake safety unless everybody in the community is aware of earthquake consequences and gets prepared. Being prepared alone will not work always for others. Therefore, a massive awareness program for making prepared individuals from all communities and different stakeholders is a must. Keeping this in mind, NSET has been conducting regular earthquake orientation programs since its establishment for different level of stakeholders in Nepal. Usually such program is conducted by NSET upon request of the agencies or organization. However, for marginalized people, if realized, NSET itself conducts such programs. Mainly the orientation programs are focused on: earthquake basics and existing risks in Nepal; earthquake preparedness and risk reduction measures; ways to respond during and after earthquake; pre-positioning emergency supplies; acquiring life saving skills; and safer construction etc. However, the presentations vary slightly depending upon target audience, and interest of audience. Figure 1 presents the data and trend of orientation programs conducted during last ten years. Each year the number of participants is increasing. During this period more than 21,000 people have taken part in this program. It means, virtually, the earthquake awareness message is conveyed to more than 21,000 families. Earlier we had to convince people to participate, but now people are demanding such programs for their communities, schools, organizations, and even for families.

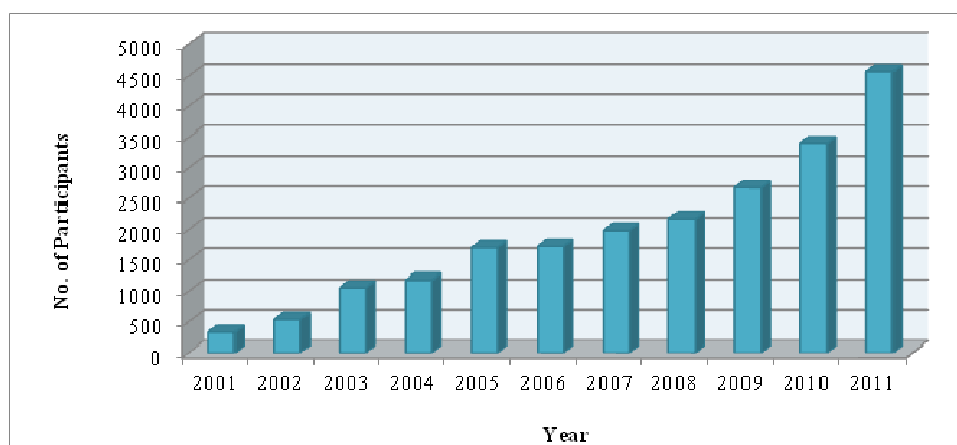


Figure 1: Trend of Earthquake Preparedness Orientation Programs

2.2. Developing Response Plans and Conducting Drills/Simulation Exercises

NSET has been assisting different national/international organizations, and the Government agencies for developing Earthquake Preparedness and Response Plans (EPRP). EPRPs are prepared based on the organizational structure, capacity, available facilities and local situation of the respective organizations. The plans guide the organizations to design and implement the activities for preparedness; to develop the skill and capacity for effective response during earthquake; and plan for quick repair, restoration of damaged physical entities for continued functioning of the organization after earthquake. However, NSET recommends the respective organizations to update the plans according to change in the organizational structure, capacity and local situation. Hence, the plans ensure the effective earthquake risk management, if well implemented. However, practices are prerequisite for the perfection of the plans; and frequent tested plans are reliable and implementable. Therefore, NSET assists different communities, schools, hospitals and other stakeholders for conducting drills and simulation exercises (Photo 1). These are conducted mainly to test the existing response plans or acquired knowledge/skills. Such exercises are also conducted to make people aware

about the consequences of earthquakes and proper behaviour, response and rescue methods during and after earthquake disaster.



Photo 1: Conduction of Earthquake Evacuation Drill

3. AWARENESS FOR COMMUNITY

3.1. Community Level Trainings

NSET provides many professional responders trainings under its regional (PEER) program. However, realizing the fact, in case of any disasters, the first responder is the victim him/herself then the family and community; it is providing basic skills such as Light Search and Rescue (Photo 2) Vulnerability and Capacity Assessment and First Aid etc. These courses aim to make aware individuals of the community on the associated hazards and vulnerabilities; prepositioning the emergency supplies; making response plan; and make capable to cope with disasters using locally available resources. Many squads, containing 6 responders in each, are prepared so far in different communities, who have successfully responded for saving lives in the real disasters. However, considering the national scenario many thousands of such squads are required.



Photo 2: Light Search & Rescue (LSAR) Training for Community

3.2. Earthquake Vulnerability Tour

The Earthquake Vulnerability Tour is an innovative awareness tool initiated by NSET. It is a guided tour in a defined route / location to observe different vulnerability factors (Photo: 3). The tour aims to point out how vulnerable the city's buildings and critical facilities, such as schools and fire stations, are to earthquakes. NSET believes that this tour will help to know the ground reality of our cities which may help to reduce the level of earthquake risk in our cities. The tour mainly focuses on qualitative observation of building conditions along with lifeline and their combinations. Selection of the route is based on the visitor's interest, time, and level of their knowledge. It is anticipated that "champions" volunteers will create similar guide and tour for similar cities. So far NSET has conducted more than 100 earthquake vulnerability tours for national and international experts, decision makers, responders, media personnel and community leaders in one of the most risk cities of the world, Kathmandu.



Photo 3: Earthquake Vulnerability Tour in City Core of Kathmandu

3.3. Earthquake Mobile Clinic

As rapid growth of population, the pace of new building construction is increasing day-by-day in Nepalese cities. However, among the new buildings being constructed, large numbers of them are non-engineered, and are not constructed according to the Building Code. It is evident that the ongoing process has contributed to reduce vulnerabilities in buildings by conducting mason training, training for engineers, orientation for contractors, house owners etc. Complementing these efforts, "Earthquake Mobile Clinic" is an innovative initiative of NSET where a team of earthquake/structural engineer, technician and masons visit different locations/building construction sites in and around the city and provides technical advice on earthquake-resistant construction. The clinic is conducted with an objective to bring knowledge of safer building construction at the construction site of informal buildings, assist Building Code implementation at site level, monitor impact of earthquake awareness and further stimulate the house owners, builders to consider earthquake risk. During these years, the clinic has covered thousands of buildings within Kathmandu and has successfully served as a mean to support implementation of Building Code. Remarkable improvements in building construction have been observed. Most of house owners got to know about the earthquake risk in their city and they were convinced on the benefits of seismic-resistant construction and its economy. Therefore, they have started to involve engineers for supervising their buildings construction (Figure 2), which has added safer buildings in the city and indirectly stopped the community for adding risk. Thus through Earthquake Mobile Clinics, knowledge of safer building construction has been disseminated in a very effective manner.

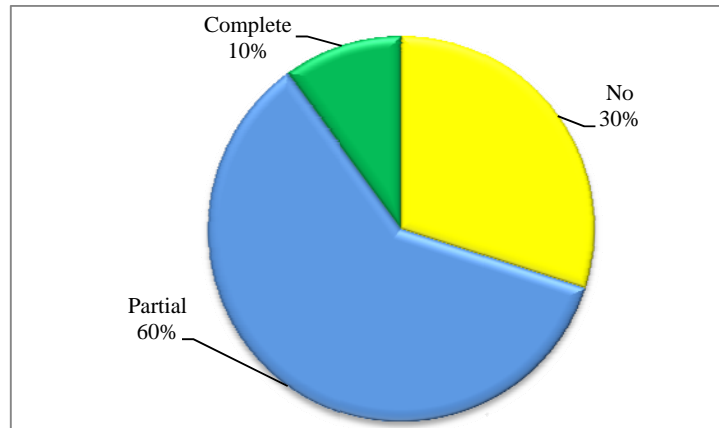


Figure 2: Buildings Construction Supervised by Engineer

3.4. Free Earthquake Clinic (Friday Free Clinic)

NSET has been providing, every Friday afternoon, free consultations to the public. Initially, the program was targeted for house owners or potential house owners providing consultation for safer buildings. However, this program also provides the orientations and guidance for earthquake preparedness for individuals and family. All are encouraged to register their name in advance and invited at NSET for receiving free consultation. The concept of "incremental safety" is adopted. As shown in Figure 3, it is getting popular among the people and the visitors for both purposes. During last ten years more than 1,800 people visited NSET. Moreover, it has been observed that during last two years people are more concerned about building construction; it may be the indirect impact of devastating earthquakes in Haiti, Chile and Japan.

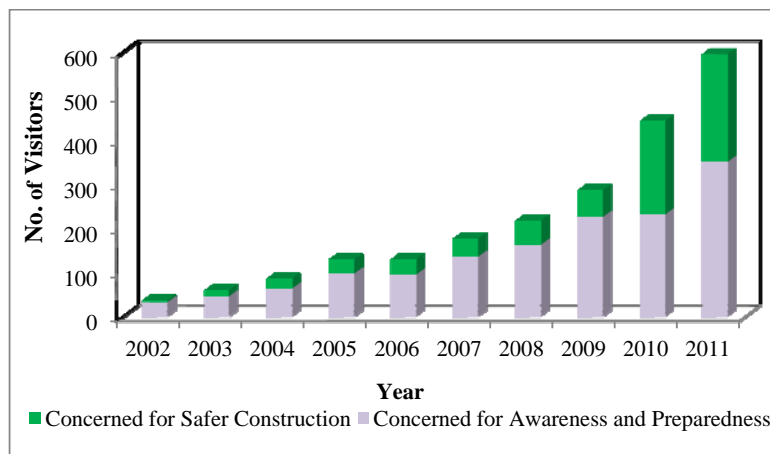


Figure 3: Visitors for Friday Free Clinic

4. MASS/PUBLIC AWARENESS PROGRAMS

4.1. Earthquake Safety Day (ESD)

It is very important and essential to create awareness among the people as well as the policy makers about the consequence of earthquake so that steps can be taken to mitigate the impact in time. Keeping

this reality in mind, Government of Nepal at NSET's request declared second day of the month of Magh (15 or 16 January as per the English calendar) as National Earthquake Safety Day (ESD), annually in commemoration of the Great Bihar-Nepal Earthquake of 1934. Apart from creating awareness about earthquakes, another objective of the day is to share knowledge and information about safety measures and disaster risk management. It is, in fact, the culmination of earthquake risk management works implemented in the country in the preceding 12 months, and allows taking stock of the achievements and shortcomings. Every year since 1999, Nepal observes the ESD by organizing activities with the purpose of raising awareness on earthquake risk reduction and preparedness with wide participation of government organizations, municipalities, I/NGOs and local community. NSET manages ESD programs as a part of the national program, approved by the ESD National Committee, chaired by Hon. Minister for Home Affairs. Almost the whole 1st week of Magh seems busy with earthquake related events in the country.

4.1.1. National Drill- "Duck Cover and Hold" and formation of Human Chain

On the occasion of Earthquake Safety Day (ESD), since 2008 every year the "Duck Cover and Hold", National Drill, is being conducted in collaboration with the Government of Nepal. The Radio Nepal plays the siren indicating earthquake shaking all over the nation every year sharply at 14:24 on Magh 2 (the time of occurrence of 1934 earthquake) for one minute. During this time everybody in the country is supposed to do the "Duck Cover and Hold" (Photo 4).



Photo 4: Delegates at ESD, Performing "Duck, Cover and Hold"

The national and international delegates invited in ESD main ceremony perform this activity at the same time with millions of people in the country. The exercise "Duck Cover and Hold" has been accepted worldwide as the first step to be taken by every individual during an earthquake to be safer from physical injury and possible death. Further, after completion of drill everybody is asked to hold the hand of the person nearby and form a chain to resemble the integrity and the need of the neighbour at the time of disaster. When the disaster occurs before the rescue team comes or any other organization for the relief arrives, the community is the first to act as the first responder. Hence holding hands of each other for one minute and forming a chain is to emphasize the same fact.

4.1.2. Earthquake Safety Exhibition

Earthquake Safety Exhibition is another major activity during ESD. Many exhibition stalls are managed by various governments, non-government and DRR related agencies providing different information about disaster preparedness, response, rescue and recovery. The exhibition takes place for four days, and is free to all general people. Each year the event is observed by more than 50 thousands

people representing from academic institutions, scientists, masons, contractors, security forces, humanitarian agencies, communities etc. This platform facilitates the process of information, knowledge and ideas dissemination and/or sharing in regard to ERM/DRM efforts among the stakeholders and commoner people. Main contents of the exhibition are to demonstrating earthquake safer construction technologies, knowledge and skills required for earthquake safety and initiatives for earthquake risk reduction by different agencies.

4.1.3. Shaking Table Demonstration

The Shake-table designed by NSET is an award-winning model for technology transfer and to spread awareness on the effectiveness of earthquake-resistant construction. The tool won the San Jose Tech Museum Award under Microsoft Education Category in 2004. The low-tech innovation has been highly effective in educating people about the structural shifts in buildings during earthquakes and for raising awareness about safe building construction. The Shake-table is essentially a building built to a given scale and mounted on a table which is put through certain force to see the effects of similar jolts that buildings go through during an earthquake.



Photo 5: Shake Table Demonstration as Public Awareness

NSET demonstrated its first Shake-table in January 1999. It has so far been demonstrated in many countries of the Asia-Pacific region including Afghanistan, India, Indonesia, Iran, Pakistan, and Tajikistan. NSET has also assisted many partner institutions to design their own shake-tables to spread awareness on safe building construction. The Shake-table essentially has two identical buildings of the same shape and size scaled to 1:10 of the actual sizes (Photo 5). One of the buildings is built using earthquake resistant techniques and the other is done traditionally – or without taking any special measures. Both buildings are placed on the same shaking platform (table) and thus exposed to forces, similar to that buildings have to endure during earthquakes. Increasing load is applied to the table through which the force is transferred to the scaled models, and the weaker one made without earthquake-resistant elements progressively collapses. The tables are used to demonstrate how risk-reduction techniques in construction can help buildings withstand the forces during an earthquake and convince them of the simplicity of integrating earthquake-resistance into the buildings. NSET has conducted more than 30 such demonstrations in Nepal. An A3 size (300 x 420mm) shake-table has also been developed for use with small-scale models for demonstrations at schools. The shake table demo, in combination with other tools, has helped to raise earthquake awareness greatly. It has helped them to change their mind-set from fatalism to proactive approach towards improving earthquake safety in their houses. This is the biggest achievement of this demonstration.

4.1.4. Earthquake Safety Rally

On the occasion of ESD every year, the country observes the earthquake safety rally. The rally is considered as one of the effective means of public awareness organized by the national ESD organizing committee and lead by senior national figures, which is participated by central government agencies, international/national non-governmental agencies, communities, volunteers, celebrities and other stakeholders wearing the aprons with the earthquake preparedness slogans. The rally goes through the city cores, vulnerable areas, communities displaying the banners and placards with earthquake awareness messages (Photo 6).



Photo 6: Earthquake Safety Rally

4.1.5. Earthquake Safety Walkathon

Earthquake safety walkathon is another activity during the annual ESD programs. The main objectives of the walk are: create awareness on general public about the necessity of earthquake safety; create volunteerism among walkers and influence other people to associate in earthquake safety issues and motivate people and make the feeling that disaster safety is for us and is our first priority to start with. The walk is not a race or competition but is a fun walk with messages on earthquake safety. Hence the participants walk peacefully throughout the route as per the guidance of leader, national marathon runner. The route of the walk usually is defined by ESD Organizing Committee. The walk is participated by sport personnel, celebrities, representatives from I/NGOs, CBOs, UN and, Government agencies. Marching footsteps of all the participants join this noble cause carrying placards of Earthquake Safety messages with the view to sensitize local people and propagating the message of safety promotion. Thousands of people participate this event every year.

4.1.6. Street Drama

One of the popular events for raising awareness against earthquake is street drama. The professional players perform roles in different characters to give the messages of earthquake preparedness creating stories based on existing traditional beliefs, preparedness and risk reduction measures etc. Such programs can easily convince the people with entertainment; and can mainly help to create awareness among the general people who are not accessed through other scheduled programs; and spent significant time on the street/roads.

4.2. Media (Radio/TV Programs) and Publications

NSET has been cooperating with many national and local media such as FM Radio and TV Channels from different regions of the country for disseminating earthquake awareness and preparedness message throughout the country. Mainly the message on earthquake preparedness has been aired via FM Radios in each corner of the country. Different programs are designed on weekly and daily basis aiming to enhance earthquake awareness and influencing policy on disaster management by creating public demand. The programs also inform people on Do's and Don'ts before, during and after an earthquake.

One of the effective means of disseminating information on earthquake safety is publication. NSET has published many printed materials on earthquake awareness and preparedness, such as newsletters, manuals, handbooks, posters, instructional leaflets, calendars etc. It has helped to understand the facts about the earthquake, possible measures of risk reduction, mitigation and preparedness in different levels. The reading materials are published targeting different levels of readers so that most of the people from the society will be aware of earthquake. Further, it has been assisting academicians for conducting researches; reporters for publishing real events and experiences; and the scientists for bringing out their facts findings. Most of the publications are made available in NSET's web site, and are widely used.

5. AWARENESS TO POLICY MAKERS

5.1. Workshop/Seminars

Creating awareness among policy makers about the consequence of earthquake is crucial for appropriate planning and prompt implementation. Keeping this reality in mind, NSET has been conducting talk programs, seminars, workshops and conferences in different levels in cooperation with Government of Nepal and other stakeholders. Such activities have provided very good platform for sharing experiences among the professionals, developing national/ international linkages with similar agencies, improve coordination mechanism among the stakeholders and keeping updated with the recent global achievements in the field of earthquake risk reduction.

5.2. Policy /Strategy Formulation

NSET has provided technical assistance to Government of Nepal for implementing the National Building Code. Further, it has provided technical services to develop the National Strategy for Disaster Risk Management (NSDRM) based on Hyogo Framework of Action (HFA); incorporating DRR aspects in the higher educational curriculum, developing and examining the National Emergency Operation Centre (NEOC) and assisting the local Government for developing response and recovery plans, risk sensitive land use plans, bylaws, guidelines, which has ultimately helped the government stepping ahead for earthquake risk reduction and preparedness in the country.

6. LESSONS LEARNED

Earthquake awareness and preparedness is not accomplished overnight. It takes place in a series of small steps taken at home, at work, at school, in community and the region. It is accomplished through actions by individuals, families, organizations/institutions, and government. Though in case of earthquake, the hazard cannot be stopped, the impact can be significantly reduced by effective preparedness and mitigation measures in advance, which has been experienced during recent earthquake of September 2011 in Nepal. A field survey conducted immediately after earthquake shown that more than 80 percent saved their lives following the safe behaviour during shaking. However, existing efforts on earthquake awareness and preparedness should be scaled-up to prepare the nation for next big earthquake. To achieve this, everybody in the community and the government

should take the ownership and responsibility; all stakeholders including individuals should work in close cooperation. In this effort, community awareness is vital. Especially, in developing countries like Nepal, the communities are highly governed by the socio-cultural aspects, and by indigenous knowledge and traditional (mis)beliefs. Sometime, these may increase and/or reduce the risk. Therefore, awareness raising programs should be focused on the local communities; and spell out its specific role taking into consideration the community's needs and their level of understanding. The awareness among the general people will create the demand of safety, which ultimately push the government for solid plans of actions. In this regard, the need of sensitization for policy/decision makers is also equally important so that the government will give high priority to public awareness; and formulate the policies/regulations and action plans to be followed and implemented in the real world.

7. CONCLUSIONS

The earthquake risk of Nepal is extremely high. As experienced in Haiti, Pakistan, China and Japan during recent earthquakes, Nepal may suffer death of tens of thousands of people, destruction of development achieved during the past hundred years and so on in case of major earthquake. We cannot stop earthquakes to occur; the only way to reduce the risk is increasing the capacity of potential victims to cope with its impact. In general term the capacity is the capability of individuals or communities to reduce the impact during an earthquake, which comes through awareness and preparedness. Considering this fact, NSET is more focused on earthquake risk reduction through awareness and preparedness activities. Awareness in different level of stakeholders can change the preparedness; and the effective preparedness can make difference during earthquake. Therefore, having understood that the country's high earthquake risk, it is urgent need to be focused on earthquake awareness rather than analyzing the hazard alone.

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