SaferSociety

NSET's decade-long efforts to make communities earthquake-safe

and

Annual Report 2008

National Society for Earthquake Technology - Nepal (NSET)

NSET

June 2009

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And Annual Report 2008

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From the desk of
EDITORS

BHOOKAMPA PRAVIDHI RASHTRIYA SAMAJ NEPAL (भूकम्प प्रविधि राष्ट्रिय समाज-नेपाल) or the National society for Earthquake Technology–Nepal (NSET), established in the year 1993, has now grown to be a leading organization in the field of earthquake risk management in Nepal and its activities have spread to different parts of the world that have been affected by earthquakes and other natural hazards. NSET envisions "Earthquake Safe Communities in Nepal by 2020". To accompany with this vision, NSET has clearly outlined its mission, goals and strategic objectives with well set pattern of extensive activities of its own and numerous initiatives from various corners of society. NSET feels very much privileged to bring this very first edition of Safer Society with the view to share and documenting its decade-long experiences, lessons learnt and all the endeavors it has made; together with its Annual Report 2008.

Safer Society is hence an aperture to peer what NSET aims to pay its efforts and has been paying since more than a decade 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. Number of activities and programs that NSET executes and advocates for are having one very common element as an in-built, and that is the idea to enhance safer society. To make the society safer from earthquake and other disasters is the only round-sound motto of NSET initiatives whether that could have been carried on within or beyond the boundaries of Nepal.

Safer Society is just the composition of NSET journeys. Various areas of NSET works like creating and raising awareness, exhibiting drills and simulations, conducting trainings, executing risk assessments of existing structures, implementing corrective measures, promoting earthquake resistant constructions, post- disaster activities and even policy level interventions have paved the path of NSET. Safer Society is thus a self-assessment of NSET activities or it's the way of looking-self-in-mirror so that forthcoming activities and strategies could be more accurately designed towards meeting targeted goals. We would like to thank all those contributors who have made journey of NSET as well as earthquake safety strengthened, and due to which we have been able to come with this issue of Safer Society. Feedbacks on any part of this publication will be highly appreciated!

Safer Society wishes to build our society safer!

Thankfully,
The Editorial Team

From the desk of
PRESIDENT

THE UDAYAPUR EARTHQUAKE OF 1988 WAS AN "EYE OPENER" for Nepal not only as regards the extent of damages that tremors could cause, but also in terms of the understanding why preventive measures are important.

The impact of the 6.6 magnitude earthquake with the epicentre located around 60km from the surface was exceptionally high largely because of destruction of non-engineered houses and the total lack of knowledge on earthquake safety and preparedness at both the academic and administrative levels. It was apparent that a fundamental paradigm shift was necessary to mobilize resources for greater use of the available scientific and engineering knowledge on earthquakes. This knowledge needed to be taken to vulnerable communities for creating an environment for effective implementation of earthquake risk reduction measures. A group of dedicated Nepali professionals took up the challenge and started implementing initiatives on earthquake awareness. It was a long challenging journey with no roadmap to start with.

NSET was formally established in 1993-1994, when conceptual support to such an initiative was received from international initiatives such as the International Decade for Natural Disaster Reduction (IDNDR) and the World Seismic Safety Initiative (WSSI), an undertaking of the International Association for Earthquake Engineering (IAEE). The WSSI, Geohazards International (GHI), Asian Disaster Preparedness Centre (ADPC), UN System, IDNDR, International Strategy for Disaster Risk Reduction (ISDR), World Health Organization (WHO) and our long-term partner Office of Foreign Disaster Assistance/United States International Development Agency (OFDA/ USAID) helped us in our quest to overcome the hurdles.

NSET believes that earthquake protection of people can be achieved by enhancing the awareness of communities: helping them to understand the seismic risks and providing simple solutions in non-technical languages. NSET understands that cost effective and simple solutions are better than high-tech measures that might work better, but are outside the reach of the common people.

We are proud that our work has been accepted by the Nepali people in general and the poorest of the poor in the South Asia region. Our measures have assisted grassroots communities as well as public institutions in the cities.

NSET's approach, methodologies, and innovative initiatives have been recognized in Nepal and in the region. NSET was invited to and has assisted communities and agencies in Afghanistan, Bangladesh, India, Indonesia (Banda Aceh), Kazakhstan, Pakistan and Tajikistan. The support included training local professionals as well as masons and home owner-builders on earthquake safety.

Our first regional undertaking under the Asian Urban Disaster Mitigation Program (AUDMP) helped in developing a model of international cooperation between the implementing agency (ADPC), the technical assistance provider GHI, the donor OFDA and the implementer in Nepal, NSET for Kathmandu Valley Earthquake Risk Management Project (KVERMP).

NSET continues to lead the institutionalization of Earthquake Safety in Nepal and the region. To keep up with the pace of the changing world, we are also adjusting ourselves to the emerging concepts of multi-hazards risk reduction, climate change adaptation, and mainstreaming disaster risk reduction in development planning and execution.

NSET will continue to strive towards making our communities safer. We are confident we can achieve our goal with your support and participation.

Shiva B. Pradhanang
President

From the desk of

EXECUTIVE DIRECTOR

NSET WAS BORN FROM THE RUINS OF THE 1988 EARTHQUAKE IN NEPAL. The devastation caused by the "medium" (M 6.6) earthquake raised two questions among professionals in Nepal. Why such devastation and what did we do wrong and what we should do to reduce the potential devastation from future earthquakes?

NSET was created in the process of trying to find answers to the two questions. New approaches were needed for empowering communities with scientific knowledge on disaster risks and risk reduction measures and to help them in implementing the measures by enhancing communities' capacities in disaster preparedness. At the same time, it was also necessary to advocate for disaster risk reduction and assist central and local governments to develop and implement appropriate strategies, policies and programs. NSET adopted these approaches as its modus operandi, focusing its programs on improving seismic performance of non-engineered buildings and targeting critical facilities such as public schools, hospitals, water supply system and municipalities, village development committee and ward level disaster risk reduction groups, and formal and informal training centres.

Several innovative initiatives and processes have been developed since. The School Earthquake Safety Program (SESP) was started in 1997 and is still being implemented; Nepal began observing Earthquake Safety Day in January 1999 and the ownership of this program is shared by government, academic and private sector institutions as well as the communities. Nepal now observes Earthquake Safety Day nationwide on 15 January. Similarly, the innovative methodology of earthquake damage risk assessment and action planning risk management was first completed in Kathmandu Valley and is being replicated in several municipalities.

Other initiatives taken up by NSET are Earthquake Mobile Clinics, Vulnerability Tours, training of masons and petty contractors in earthquake-resistant construction, development of methodologies for seismic vulnerability assessment of health institutions and enhancing emergency response capacities of formal institutions and informal community groups. Many of these initiatives have been endorsed by reputed universities and research institutes in Nepal, India, Japan, and the United States of America and by the United Nations. Some of the approaches have been replicated in other countries: in India after the Gujarat Earthquake (2001), Iran after the Bam Earthquake of 1999, India after the Kashmir Earthquake of 2005 and in countries affected by the Tsunami of 2004.

NSET understands that mere implementation of successful model projects and development of methodologies is not enough. These programs and approaches need to be scaled up and institutionalized in order to achieve the goal of earthquake safety for all. Accordingly, we have redesigned our programs to expand outreach and partnerships with local institution.

We thank all our international and national partners for the continuous support they have provided in our quest to make societies safer. We are particularly thankful to USAID/ OFDA which provided us the support needed to do what we believe has to be done for building safer societies.

Amod Mani Dixit
Executive Director

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ABBREVIATIONS

AAN	Action Aid Nepal
ADPC	Asian Disaster Preparedness Centre
ADRC	Asian Disaster Reduction Centre
ADRRN	Asian Disaster Reduction and Response Network
AJK	Ajad Jammu and Kashmir
APIP	Action Plan Implementation Project
BCPR	Bureau of Crisis Prevention and Discovery
BDPC	Bangladesh Disaster Preparedness Centre
BPKIHS	B.P. Koirala Institute of Health Sciences
BRI/Japan	Building Research Institute/ Japan
BTRTC	Building Technology Research and Training Centre
CASiFiCA	Case Station and Field Campus
CBDMP	Community Based Disaster Management Program
CBKMP	Capacity Building and Knowledge Management Program
CBOs	Community Based Organization
CDMG	Community Disaster Management Groups
CMM	Core Member Meeting
COGSS	Coalition for Global School Safety
CPReC	Centre for Policy Research and Consultancy
CSSR	Collapsed Structure Search and Rescue
DEAN	Diploma Engineers Association Nepal
DEMP	Dharan Environmental Mapping Project
DHS	Department of Health Services
DHWG	Disaster Health Working Group
DNet	Development Network (P) Ltd
DPNet	Disaster Preparedness Network Nepal
DPRI	Disaster Prevention Research Institute
DPRP	Disaster Preparedness and Response Plan Framework
DRH	Disaster Reduction Hyper-base
DRM	Disaster Risk Management
DTW	Deep Tube Well
DUDBC	Department of Urban Development and Building Construction
DWSS	Department of Water Supply and Sewerage
EAP	Earthquake Awareness Program
EDCD	Epidemiology and Disease Control Division
EDNet	Education Network
EMP	Environmental Mapping Project

ERRA	Earthquake Reconstruction and Rehabilitation Authority
ESD	Earthquake Safety Day
GHI	Geo-hazards International
GSDMA	Gujarat State Disaster Management Authority
GRIPS	Graduate Institute for Policy Studies
HESI	Housing Earthquake Safety Initiative
HFA	Hyogo Framework of Action
HOPE	Hospital Preparedness for Emergencies
HRC	Housing Reconstruction Centers
IAEE	International Association for Earthquake Engineering
ICERM	International Conference on Earthquake Risk Management
ICIMOD	International Centre for Integrated Mountain Development
ICLA	Information Counseling and Legal Assistance
IDNDR	International Decade for Natural Disaster Reduction
IITB	Indian Institute of Technology Bombay
INGO	International Non -government Organization
IRG	International Resources Group
ISDR	International Strategy for Disaster Reduction
ITB	Institute of Technology
ITC	International Institute for Geo-Information Science and Earth Observation
KMC	Kathmandu Metropolitan City
KVEPI	Kathmandu Valley Earthquake Preparedness Initiative
KVERM-APIP	Kathmandu Valley Earthquake Risk Management Action Plan Implementation Project
KVERMP	Kathmandu Valley Earthquake Risk Management Project
LARED	Latin American Network of Social Studies on Disaster Prevention
LSAR	Light Search and Rescue
LSMC	Lalitpur Sub Metropolitan City
LWF	Lutheran World Federation
MERMP	Municipal Earthquake Risk Management Program
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MFR	Medical First Responder
MIW	Master Instructors' Workshop
ML	Local Magnitude
MOLD	Ministry of Local Development
MPPW	Ministry of Physical Planning and Works
NCDM	Nepal Centre for Disaster Management
NEC	Nepal Engineering College

NEFEJ	Nepal Forum For Environmental Journalists
NERMP	Nepal Earthquake Risk Management Project
NGMET	Nepal Gujarat Mason Exchange and Training Program
NGOs	Non-government organizations
NIED	National Research Institute for Earth Science and Disaster Prevention
NRCS	Nepal Red Cross Society
NSDRM	National Strategy for Disaster Risk Management
NWFP	North West Frontier Province
NWSC	Nepal Water Supply Corporation
OFDA	Office of Foreign Disaster Assistance
PEER	Program for Enhancement of Emergency Response
PNY	Patanka Navajeevan Yojana
PO	Partnering Organizations
PPERS	Project for Pre-positioning of Emergency Rescue Stores
RADIUS	Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disaster
RUDO	Regional Urban Development Office
SEEDS	Sustainable Environment and Ecological Development Society
SESP	School Earthquake Safety Program
SIDE	Support for International Disaster Education
Tell Net	International Live Lessons Transfer Network
TFI	Training for Instructors
TOT	Training of Trainers
TSERR	Training Support for Earthquake Resistant Reconstruction
TVERMP	Thimpu Valley Earthquake Risk Management Program
UMN	United Mission to Nepal
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States International Development Agency
USD	US Dollar
VCA	Vulnerability Capacity Assessment
VDC	Village Development Committee
WCDR	World Conference in Disaster Reduction
WCEE	World Congress on Earthquake Engineering
WDMC	Ward level Disaster Management Committee
WHO	World Health Organization
WSSI	World Seismic Safety Initiative

Chapter 1

NSET – A Brief

INTRODUCTION

Bhookampa Pravidhi Rashtriya Samaj Nepal or the National Society for Earthquake Technology – Nepal (NSET) was founded by a meeting of professionals on June 18, 1993. The meeting, convened by Amod Mani Dixit and Mahesh Nakarmi, was attended by around 15 professionals from the Ministry of Housing and Physical Planning and its departments, seismologists, university professors, civil engineers and journalists. The purpose was to discuss the possibility of establishing an organization for expanding the use of science and technology, and devising simple solutions for public safety during earthquakes.[1] Bringing "substantial change in the application of technology to the many facets of earthquake disaster management for saving the life of the people" has been the guiding philosophy of NSET ever since. The meeting also selected an interim Management Committee comprising of:

Shiva Bahadur Pradhanang	President
Amod Mani Dixit	General Secretary
Jyoti Prasad Pradhan	Member
Madhav Raj Pandey	Member
Ms. Shanti Malla	Member
Mukunda Prakash Singh Pradhan	Member
Mahesh Nakarmi	Member
Yogeshwor Krishna Parajuli	Member
Shree Ram Singh Basnet	Member

NSET was registered at the District Administration Office, Kathmandu on April 28, 1994 and at the Social Welfare Council on August 10, 1998. Today, NSET is Nepal's foremost institution working on earthquake risk management. Its seismic risk reduction activities are now being carried out in various parts of the world.

OBJECTIVES

The founders of NSET had outlined the objectives of the organization. The goal was "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."[2] The founders also decided that the Society would have representation from the Department of Mines and Geology, Ministry of Housing and Physical Planning and the Ministry of Home Affairs in its Management Committee in the organization.[3]

NSET's Charter approved by the District Administration Office of Kathmandu on April 28, 1994 lists the following objectives:

- To raise public awareness in order to reduce loss of lives and damages caused by earthquakes;
- To contribute towards the development and use of science and technology related to earthquakes;
- To play an active role in safeguarding the country against earthquakes and to reduce earthquake risk by developing and implementing scientific measures;
- To encourage professionalism and scientific ethics in the sector; and
- To further the objectives and policies of the International Association for Earthquake Engineering as applicable to Nepal.[4] , and
- To provide emergency assistance to communities impacted by an earthquake.

NSET's Statute has been amended twice since registration but its main focus remains unchanged. It also has an indicative list of activities of the organization, which are summarized as follows:

- Establish coordination between different Nepali government and non-governmental agencies working in the area of seismic safety, provide assistance to and seek help from such agencies, represent Nepal in the national/international arena on earthquake technology;
- Develop cooperation with other professional national/international societies and work in

[1] Minutes (1993), First meeting for founding the society, 18 June 1993, Kathmandu (unpublished).
[2] Minutes (1993), First meeting for founding the society, 18 June 1993, Kathmandu (unpublished).
[3] This provision was later deleted by the District Administration Office when NSET sought approval of the Office of the first amendment of its constitution on 1998/7/10
[4] Bhookampa Pravidhi Rashtriya Samaj – Nepal ko Bidhan. 2050. (NSET- Statute, 1993), unofficial translation (unpublished)

close association and coordination towards seismic safety, improving professional standards, discipline and ethics;
- Facilitate studies, undertake research and actions in earthquake technology including geology, geophysics, seismology, earthquake engineering, architecture, civil engineering, urban planning, water resources engineering, earthquake hazard preparedness and disaster management;
- Organize scientific meetings, seminars and training programs;
- Develop international linkages with similar agencies for facilitating an effective flow of information and serve as a node in the international network for seismic safety;
- Provide advice and assistance to national educational institutions in the development and upgrading of curricula;
- Provide advice and assistance to the national disaster reduction institutions for developing, upgrading and implementing earthquake risk reduction programs;
- Provide advice and assistance to governmental, non-governmental and other agencies on matters related to earthquake safety, among others.

Vision, Mission, Strategic Objectives

In the decade since establishment NSET has grown into a leading organization on earthquake risk management in Nepal and its activities have spread to different regions of the world that have been affected by earthquakes and other natural disasters. The Vision, Mission and Objectives that guide NSET are:

Vision:

Earthquake Safe Communities in Nepal by 2020

Mission:

To assist all communities in Nepal to become earthquake-safer by developing and implementing organized approaches to managing and minimizing earthquake risks

Strategic Objectives:

NSET's three strategic objectives are:
- To sensitize, educate and facilitate all institutions to undertake organized approaches to managing and minimizing earthquake risk by transferring information, technical knowledge and skills, and helping them to mobilize resources for that purpose.
- To advocate for favorable and supportive policies, legal mechanisms, increased improvements and a unified and effective national earthquake response mechanism and a system of incentives and disincentives to enable communities to become earthquake safe.
- To build a strong, well-resourced and credible institution that will be the national focal point for earthquake risk management actions, a facilitator and coordinator in the network of earthquake disaster management and a source of all available information on the subject.

Management Committee

NSET has 32 members who meet once every year to monitor activities vis-à-vis the set policies and once every five years to elect a Management Committee. The nine-member Management Committee is its main policy-making and supervisory body. It includes five members elected by the general membership, two nominated by the committee, and the immediate past president. The elected members select the main office bearers.

Box 1: NSET Management Committee (July 2005-2010)

Shiva B. Pradhanang	President
Amod Mani Dixit	General Secretary
Yogeshwor K. Parajuli	Treasurer
Mukunda Pradhan	Member
Shreeram Singh Basnet	Member
Varun Prasad Shrestha	Member
Mahesh Nakarmi	Member
Tika Sharma	Member

NSET – AFFILIATIONS

NSET is the member of the International Association for Earthquake Engineering (IAEE). Since 1993, it has also been a member of the World Seismic Safety Initiative (WSSI) and is represented in a number of disaster reduction networks worldwide. It is a founder member of the following organizations:

- Asian Disaster Reduction and Response Network (ADRRN) (also a board member)
- Coalition for Global School Safety (COGSS)
- International Live Lessons Transfer Network (TeLLNet), and
- Disaster Preparedness Network Nepal (DPNet).

AWARDS

In 2001 NSET was awarded the United Nations Sasakawa Award for Disaster Reduction (Certificate of Merit), an appreciation for its outstanding contribution to disaster reduction and (for) furthering the goals of the International Strategy for Disaster Reduction (ISDR).

In 2004, NSET's well-known "Shake Table" was awarded the Tech Museum Award 2004 under the Microsoft Education Award Category. The award was setup to honor individuals and organizations that are using technology to address the 15 "most urgent" challenges facing humanity and the environment as identified by the United Nations.

Certificate of Merit Sasakawa Award, 2001

Mr. Amod M. Dixit receiving the Tech Award, 2004

"EARTHQUAKES DO NOT KILL PEOPLE - UNSAFE BUILDINGS DO"

LETS MAKE OUR BUILDING EARTHQUAKE-RESISTANT BY COMPLYING TO BUILDING CODE AND GUIDELINES

Box 2: Shake Table Demonstration

The "Shake Table Demonstration" has been a regular activity of NSET's earthquake risk management work. The low-tech innovative tool has been highly effective in educating non-technicians (ordinary people) about the behaviour of buildings during earthquakes, in demonstrating the simple measures to improve seismic performance of local buildings, in developing confidence of people in their capacity to construct earthquake-resistant buildings, and for building public support for safer construction. NSET used the Shake Table for the first time January 1999. Since then it has demonstrated the technology in various parts of Nepal and the world including Bam (Iran), Gujarat (India), Kabul (Afghanistan), Dushanbe (Tajikistan), Banda Aceh (Indonesia), Baghdad (Iraq), Dhaka (Bangladesh) and Muzarrafabad (Pakistan). The Shake Table is used both as a public awareness tool and a training aid. NSET also organised a demonstration as special event at the World Conference in Disaster Reduction (WCDR), Kobe, Japan in January 2005. The demonstration was organised in partnership with the United Nations Centre for Regional Development, (UNCRD), Disaster Management Planning Hyogo Office, and Kobe, Japan.

The Shake Table is a simple shaking platform with two identical models of traditional buildings, one with earthquake-resistant technology and another without the preventive measures. An earthquake is simulated by shaking the table and the resulting damage/collapse of the weaker building demonstrates the wisdom of incorporating earthquake resistant technologies in building construction.

Chapter 2

BACKGROUND

Why bother about earthquakes?

The Asian continent is most prone to earthquakes compared to other regions of the world and it remains one of the major causes of loss of life and property. Damages caused by earthquakes are of a long-term nature and often cause severe setbacks to the entire development process, especially in resource-poor countries. Global data on the number of people killed and the damages caused by earthquakes suggest that between 1992 and 2001, 52 percent of all earthquakes occurred in Asia and the total damages added up to USD 170,119 million or almost 72 percent of the global total.[5] Asia also leads the rest of the world in the deaths caused by earthquakes.

Earthquakes in South Asia

South Asia has had several strong and damaging earthquakes in the past. The most seismically active areas lie in the Himalaya and in the Andaman and Nicobar Islands region. The peninsular Indian Subcontinent was generally thought to be "seismically safe". Major earthquakes in the recent past, however, suggest that the peninsula is not devoid of seismic activity.

The October 8, 2005 Pakistan earthquake of magnitude 7.6 (on the Richter[6] scale) caused the highest number of earthquake-induced fatalities in South Asia. It resulted in the death of over 73,000 people. Another 83,000 were injured. The quake also rendered more than 3.3 million people homeless.

Damages caused by the October 8, 2005 quake in Pakistan

TABLE 1: Impact of Earthquakes and Tsunami (1992-2006)

Date	1992-1993	1994-1995	1996-1997	1998-1999	2000-2001	2002-2003	2004-2005	2006
Killed	14,049	9,208	3,658	28,282	21,559	31,251	303,558	6,692
Affected	1,057,000	3,759,000	2,589,000	5,771,000	21,765,000	5,045,000	7,07,5000	3,851,000
Damages (USD million)	1,942	186,318	5,952	33,792	9,612	10,994	42,705	3,431

Source: World Disasters Report, 2006, 2007

[5] Suvit Yodmani. 2004. "Earthquake vulnerability reduction – future challenges". In A.M.Dixit (eds) Proceedings of the Symposium on Seismology, Earthquake Hazard Assessment and Risk Management, 24-26 November, Kathmandu. p12.

[6] The Richter scale is in use since 1935 and is named after the American seismologist Charles F. Richter. Generally, earthquakes with a value of 3 on the scale are felt by human beings.

[7] http://asc-india.org/

TABLE 2: Major earthquakes since 1900

Year	Location	Deaths
2005	Muzaffarabad, Pakistan	73,000 +
2004	Sumatraa	+180,000
2001	Bhuj	13,805
1935	Quetta	35,000 (approx.)
1934	Nepal-Bihar	15,772
1905	Kangra	28,000

a The same earthquake had affected Andaman & Nicobar Islands.
Source: http://asc-india.org/

The direct economic loss caused by the quake was estimated to be over US$5bn. The Sumatra-Andaman earthquake of 2004 – magnitude 9.1 on the Richter scale and the resulting tsunami – also caused a large number of fatalities in South Asia. The number of confirmed deaths in South Asia was 41,886 and another 11,340 people went missing or were presumed dead. The earthquake caused severe damage on Katchall in the Nicobar Islands, where 86.7 percent of the population were either killed or reported missing.[7] The 1935 earthquake in Quetta, Pakistan (magnitude 7.8), had killed about 35,000 people. The largest number of earthquake casualties in the Indian peninsula was 13,805 at Bhuj, Gujarat (quake magnitude 7.6). The casualties were high because most of the quakes had occurred either at night or in the early hours of the morning when people were still inside their houses – most of which were unsafe.

The tsunamis triggered by the Andaman & Nicobar earthquake caused widespread damage in the coastal areas of Indonesia, India, Sri Lanka, Thailand, Malaysia, Bangladesh and the Maldives. Damages were also reported in some coastal nations of Africa. It was the third strongest earthquake to have occurred in the world after 1900.

Nepal in the earthquake zone

Geologically, Nepal straddles on the boundary of the Indo-Australian and Eurasian tectonic plates. These plates are moving towards each other at the rate of 2cm per year – as part of the geological process. The Indo-Australian plate is "diving" beneath or pushing under the Eurasian plate, at a rate of about 3cm per year. The geological movements explain the formation of the Himalayas and are also reasons for sudden and violent jolts in the rock formations at the earth's interior that can be felt on the surface. These jolts are what we know as earthquakes.

Kathmandu Valley – the seat of Nepal's capital – suffered a devastating earthquake (Magnitude 8.4 on the Richter scale) in the early afternoon of January 16, 1934. The shaking damaged 126,355 buildings, of which around 80,893 houses were completely, destroyed leading to 8,519 deaths. The government had spent NRs. 206,500 on relief from a newly-established Earthquake Relief Fund in the Kathmandu Valley area.[8] Another earthquake (magnitude 6.5) in Bajhang District in Far-west Nepal killed about 180 people and damaged about 40,000 homes in 1980. Still another earthquake (magnitude 6.6) in Udayapur District

Damage caused by the 1934 Earthquake, Kathmandu

Damage caused by the 1988 Earthquake, Dharan

[8] Shree Prabal Gorkha Dakshin Bahu Major General Brahma Samsher Janga Bahadur Rana, " Nepalko Mahabhukampa (1990 BS)"

TABLE 3: MAJOR EARTHQUAKES IN NEPAL

Year	Date	Earthquakes epicenter	Human		Building/Temples	
			Death	Injuries	Collapsed	Damaged
1993		Jajarkot	NA	NA	40% of the buildings were estimated to be affected	
1988	21 Aug	Udayapur	721	6453	22328	49045
1980	04 Aug	Bajhang	46	236	12817	13298
1934	15 Jan	Bihar/Nepal	8519	NA	80893	126355

Source: Development of Building Materials and Technology, NBCDP

in East Nepal had killed over 721 people and 1,600 domesticated animals in 22 of Nepal's 75 districts. The tremor damaged around 60,000 houses. The direct total loss caused by the Udayapur earthquake was estimated at NRs. 5 billion.

Earthquake safety and NSET

A range of options are available for mitigating the impacts of both natural and human-induced disasters. Similarly, there are ways in which damages caused by earthquakes can be reduced. Much of that has to do with risk-reduction before the earthquake. Empowering people to take preventive measures – the best "insurance" against earthquakes – remains the single most important goal of NSET. Since its establishment NSET has been advocating for, and carrying out, a range of loss reduction measures ranging from vulnerability and risk assessments, generating information on attributes of earthquakes, advocating enforcement of building codes and land-use regulations, and awareness-raising and capacity building for risk reduction.

NSET carries out these activities in partnerships with a large number of central and local government institutions, civil society organizations, the private sector and international organizations. Specific interventions have ranged from making schools and hospitals safer, encouraging reinforcement of individual homes, simulating post-earthquake scenarios and carrying out evacuation drills. NSET uses almost every medium available for raising awareness on ways to reduce the loss of life and property during earthquakes.

Organization of the report

This report summarizes the activities of NSET Nepal over the past 15 years and also includes an Annual Report for 2008.

Box 3: Earthquake-speak: Some definitions

Structural components of buildings: The components of a building that bear the forces of gravity, earthquake, wind and other kinds of loads to help them remain standing are called the structural components. The structural components include walls, floors and roof in masonry buildings. In framed buildings foundations, columns, beams and slabs are typical structural components.
In engineered constructions, the structure is typically analyzed and designed by structural engineers. Non-engineered structures are those constructions that are built by contractors and masons, without proper inputs by structural engineers or architects.
Non-structural components of buildings: These are objects that are not a part of the structural framework. This includes bookshelves, cupboards, windows, television sets, computers, water heaters and tanks, lights, utensils, office equipment, in-fill walls, partition walls, ceiling fans etc. These can become hazards during an earthquake because they are thrown down, moved or toppled resulting in damages and injuries. Proper location and management of the non-structural components – such as anchoring cupboards to the walls – can help reduce the risk.

Source: Adapted from: NSET 2004. Handbook on Non-structural Vulnerability Assessment and Mitigation Measures. (Draft)

Box 4: Measuring earthquakes

The Richter scale

The Richter scale or the local magnitude (ML) scale assigns a single number to quantify the amount of seismic energy released by an earthquake. The Richter magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs (adjustments are included to compensate for the variation in the distance between the various seismographs and the epicentre). Because of the logarithmic basis of the scale, an increase by a whole number in magnitude represents a 10-fold increase in amplitude; in terms of energy an increase by a whole number, corresponds to an increase of about 32 times the amount of energy released.

The Modified Mercalli Intensity (MMI) Scale

The MMI scale is used for measuring the intensity of earthquake. It quantifies the effects of an earthquake on the earth's surface, human beings, object of nature and man-made structures on a scale of MMI I through MMI XII. MMI I denotes the lowest intensity, and a shaking of MMI XII can cause total destruction. The strongest shaking usually occurs near the epicenter (epi-central intensity) and the intensity of shaking decreases with the increase of distance from the epicenter. This decrease is called "attenuation" and the mathematical expression of the decrease in the level of shaking is called "Attenuation Relationship". The scale is commonly abbreviated as MMI.

Govt to make rules for Building Code

By a Post Reporter

KATHMANDU, Oct 28 - Minister for Housing and Physical Planning Rajendra Shrestha today said that the government is working on to ... rules and regulations ... Building Code.

disseminating information to make people aware."

Following the 1988 six-plus magnitude earthquake, with epicentre in eastern Nepal, the Ministry implemented the National Building Code with assistance from UNDP. Recently, the parliament has enacted the Building Council Act to provide the basis for the implementation of Building Code.

(AUDMP), said that the workshop will come up with an action plan to reduce earthquake risk in Kathmandu Valley.

Thousands of people were killed in the Valley during the 1934 earthquake--the biggest quake of the century--while thousands of others were injured. The eight-plus magnitude quake, with epicentre in eastern Nepal, reportedly devastated the whole of the northern Indian state of Bihar and central Nepal.

Sixty-four years on, the ... of the Valley has ... over four folds--to 1.2 million. ... the toll, in case ... quake, which could ... any time, will be ... larger than in 1934.

governmental organisations are participating in the workshop. Shedding light on the project's activities, project manager with KVERMP, Mahesh Nakarmi said, that the project has already begun awareness programme ... earthquake risks mitiga... wards of Lalitpur Sub-Metropolitan City (LSM... through disaster manage... committees, recently for... each wards.

Stressing on the need t... awareness campaigns from ... grass-root level, Mayor of LS... appealed all the citizens of th... Valley to be spiritual and trust... God. "The much terrorized ... possible earthquake of 2018 B... (1962 AD)...

Earthquake Safety Day marked

Janakpurdham, Jan. 17 (RSS):

The district administration office, Dhanusha, organised a talk... seminar here Sunday on the occasion of the Earthquake Safety Day.

The main objective of the seminar is to raise awareness on the safety measures to be adopted to reduce the damage of life and property from earthquake.

On the occasion, former minister Ananda Prasad Dhungana, ... stressed the need for creating awareness and construction... earthquake resistant buildings in the countryside and parts to minimise the devastating effects of the earthquake. District Officer Binod ... recalled the heavy loss of ... damage caused by the ... of 1990 B.S. in which ... people are said to ...

others also expressed their views. In Rajbiraj, the District Natural Calamities Relief Committee and the district administration office, Saptari, jointly organised a colloquium on "Earthquake and Safety from Earthquake" here on Sunday to mark the Earthquake Safety Day.

Speaking on the occasion, deputy mayor of Rajbiraj Municipality Lalit Kumar Kantha said ... houses should be constructed according to the safety standards set by the government and the municipality should only approve ... new constructions on the basis of ... confirmation from the house ... and urban development office ... the town development committee.

Chief District Officer Balkrishna Prasad pointed out the need for adopting earthquake-re... technology.

Assistant Chief District Officer Laxmi Prasad Bhattarai also ... the importance ... of the earthquake ...

Day-2000.

They have displayed those ... materials to general public awareness on earthquake safety measures and how to construct ... quake resistant houses. ... association ... the devastating ... Kathmandu ... In Mahen... Earthquake Safe... been observed in ... with a variety of ... commemorating ... earthquake ... On the occasion, ... earned has decided ... knowledge to carpenters ... sons on how to build ... resistant houses and ... school students about ... safeguard ... during ...

Preparedness to mitigate quake damage stressed

...alitpur, Sept. 29 (RSS):

...Minister for Housing and ...sical Planning Balaram ...rtmagar has said that all ...tors including the social, ...itical and educational should ...ously pay attention to the ...tural disaster like ... which has the ...voc to life ...ooke of the ... ...ising awareness ...damage caused ...disasters.

chairman of KVERMP advisory committee Dr Kishore Kumar Gurugharana, from the chair, remarked that as Kathmandu valley is not the heritage of Nepal only, but of the entire world, both ... the ...

cities also, but cooperation from the central and local governments is indispensable, he added.

Chairman of Geohaza... International ...

PM recalls 1934 quake, warns builders

THE KATHMANDU POST SUNDAY, JANUARY 17, 1999

By a Post Reporter

KATHMANDU, Jan. 16 ...

'Quake risk ...anagement discussed

...lpur, Jan. 15 (RSS):

...mposium on "E... ...ake risk managm... ...ake Safety Day-2...

...anised by National... ...thquake Technolog... ...in collaboration w... ...of Engineering (IOE)... ...rs' Association (... ...ring Firm (SCAEF)... ...of Nepalese Archi... ...the one-day' sympo... ...together about 100 pers... ...al, India, Japan, Thail... ..., Indonesia and Pakista... ...ymposium was organi... ...jective of sharing experie... ...mation on activities bein... ...t in the field of earthqua...

'Govt should pay due attention to dev of science & technology'

Kathmandu, Jan 16 (RSS):

Nepali Congress President and former prime minister ... Prasad Koirala has said the government should pay due ... development of science and technology.

Mr Koirala made this remark while inaugurating ... jointly organised by the Earthquake Safety Day Nepal, the Ministry of Science and Technology and the National Earthquake Technology, Nepal on the occasion of ... Day today.

Stating that government should make efforts ... the construction of earthquake resistant buildings ... public awareness is the only effective way to ... On the occasion, Mr Koirala also ... students of painting, chart and poster com... Earthquake Safety Day National Committee ... In essay contest, Pushpanjali Shre... Aryal came out first, second ... third.

Earthquake safety in schools discussed

Kathmandu, Nov 21 (RSS):

A daylong headmasters' interaction seminar on "earthquake safety in schools" ... organised by the ...

Speaking from the chai... headmistress of Kanya Mand... Higher Secondary School Sant... Kumari Nepal expressed the view that in the present context ... be fruitful as ...

EARTHQUAKE HAZARD CENTRE NEWSLETTER

Kathmandu Valley's Earthquake Scenario

This is one product of the Kathmandu Valley Earthquake Risk Management Project implemented by the National Society for Earthquake Technology-Nepal (NSET-Nepal) and GeoHazards International (GHI).

...scenario describes the possible ...impact due to earthquake ... occurred in the 1934 ... This scenario is part of ... 5866 of the second to last ...nd Centre Newsletters, (Vol.2 ...itially a very effective tool ...esequences of a serious ... summarised version of the ...

...sky has been overcast since ...Kathmandu Valley are ...ay. Schools have re... ...ses, and students are busy ...l day in Kathmandu ...

One Week Later

Preliminary data shows that the death toll fro... earthquake is approximately 30 thousand and ... number of seriously injured victims is over 80 ... Some people argue that these figures underestim... casualties. The percentage of buildings which ha... significantly damaged is estimated at about 60 p... Kathmandu, 60 percent in Lalitpur, 75 percent in ... Bhaktapur and 60 percent in the valley as a whole. ... Houses with more than two storeys and built with ... concrete pillar construction have suffered the most ... damage. Arrangements have been made to coll... complete numbers of those killed and seri... community police posts, but this is a ... records were not well kept in the ... ately after the earthquake.

...are bellowing out of many buildings in the ... of each city in the valley, caused by overcurr... fires, or electrical sparks from damaged wire...

One Month Later

Day to day life of the people ... slowly getting back to normal ... Now, there is not much fear the ... occur too soon, and people are ... has been officially confirmed that ... died, and 95 thousand people were ... quake. The number of dead also exc...

KATHMANDU, WEDNESDAY, MARCH 4, 1998

Waking up to earthquakes

By A Staff Reporter

Kathmanduites need to wake up to the hazards of a major earthquake

Fear is gnawing the experts. When the 1988 earthquake struck Nepal, it gave a big jolt. "From a half-minute of shaking, the government, donors and the experts panicked," says Amod Mani Dixit an expert who has done a lot of work on earthquake preparedness.

"There was a realization," Dixit says, "that if such earthquakes occured frequently, then it would greatly hamper our development effort."

What resulted from the earthquake was a spate of activities on seismic hazard mapping and risk assessment and further studies. It resulted in a further jolt.

"We found that Kathmandu Valley was nearly equal in earthquake vulnerability ... California," Dixit says ... really jolted ...

Bhaktapur

THE KATHMANDU POST WEDNESDAY, JULY 1, 1998

Kathmanduites, beware of quake

By a Post Reporter

KATHMANDU, June 3 ... Kathmanduites have to re... aware, alert, and prepare ... confront with the devast... earthquakes which are na... dumped underneath the Hi... so as to minimize the ris... With the substantial ... in the population ... unplanned urbanization ... earthquake ha...

Kathmandu valley will be thoroughly devastated as the city has not been planned.

"From telecommunication ... from ... electricity and from ... work to ... system to the ... take a long time ... and recover", ... urged the inhabita... the fact that th... vulnerable to qu... pared for confront... urged the governm... necessary manpo... the effect. ... importantly, the ... gency to imple... ng Code Act pass... s of the Parliame... ding built as per th... the Act will d... ever, they added.

THE RISING NEPAL, KATHMANDU, FEBRUARY 27, 1998 FRIDAY

Asian disaster meet held

Kathmandu, Feb. 26 (RSS): People from 13 countries gathered here this week for the third annual working group meeting of the Asian Urban Disaster Mitigation Program (AUDMP).

They discussed about how to make their city, and other cities in Asia, safer from disasters, according to a press release.

AUDMP is a regional programme run by the Bangkok-based Asian Disaster Preparedness Centre (ADPC) which aims to reduce the vulnerability of cities in Asia to disasters, such as earthquakes, floods, landslides, and industrial hazards.

The programme works with local institutions in the region to do natural determinant projects, training, and information and networking activities.

The programme currently ... community, the US Agency for International Development (USAID), ... and key representatives from project partner institutions in the region to review the progress of the programme and make decisions about future directions.

This year's meeting was attended by over 40 participants representing Australia, Bangladesh, Cambodia, India, Indonesia, Jamaica, Japan, Nepal, the Philippines, Sri Lanka, Thailand and the United States.

The National Society for Earthquake Technology Nepal (NSET) assisted to host the meeting.

This year, Kathmandu was chosen as the meeting site due to the progress in one of the AUDMP projects, the Kathmandu Valley Earthquake ... Risk Management Project ...

...colleagues to the AUDMP programme.

As part of the meeting programme, NSET also took the group on a "earthquake vulnerability tour" to point out how many of the city's buildings and critical facilities, such as schools and ... systems, are vulnerable to earthquakes.

The group made on-spot decisions on how to improve design and management of the ... retrofit demonstration projects, training and information and networking activities.

Project partners were able to learn from each other's experiences and take away new ideas on how to best promote their goal of disaster mitigation.

At the closing ceremony of the working group meeting each participant was given a ...

...sia's Risk-Prone Cities

...is the most disaster-prone region of the world. With the increasing ...ntration of population and economic activity in rapidly growing cities, ...n areas are more vulnerable than ever.

...APAN

...

KATHMANDU VALLEY, NEPAL

...

...PHILIPPINES

KOIRALA: Prizes distributed

...Chaudhary, from the chair, underlined the need for including in school curriculum measures to be safe from natural disasters.

Secretary of the Ministry of Science and Technology Poshendra Dubal and Joint Secretary Punya Prasad Neupane said Magh 2 has been observed as Earthquake Safety Day since last year in keeping with the government's decision.

Various other speakers including senior manager Dave Molnster, Director of the United Nations Regional Assistance ...

Fig. 1 A lively scene ...

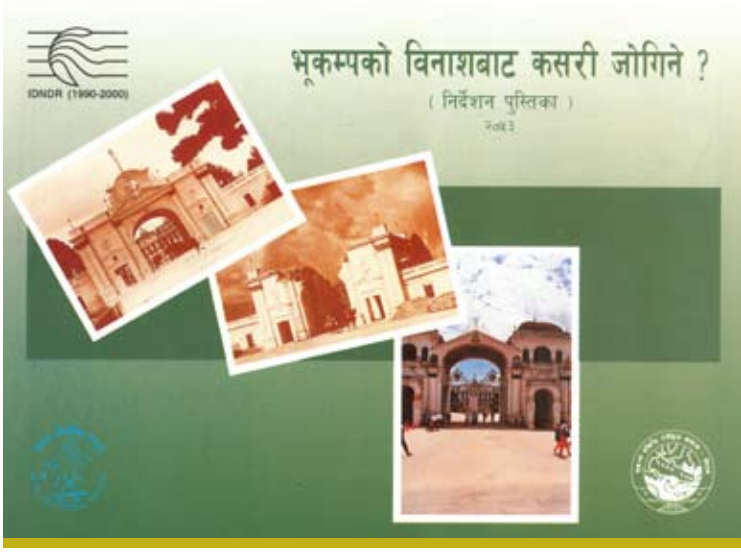
Chapter 3

A DECADE IN REVIEW

THE EARLY YEARS (1993 – 1997)

The idea of setting up a specialized centre for reducing potential damages by earthquakes occurred to the founders of NSET after the Udayapur earthquake of 1988. The founders were among those Nepali professionals who were involved in the damage assessment and later, in the reconstruction and rehabilitation efforts. The damages were widespread and the earthquake became a turning point in terms of policy-making for responding to disasters. In other words, the Udayapur earthquake was a "wake-up call" for Nepal not only on the extent of damages that tremors could cause, but also as regards the understanding of why preventive measures were so important.

Nepal began efforts for introducing a National Building Code in 1992 and many of NSET's would-be founders were involved in the process. It was also in 1992 that Nepal observed the first International Decade for Natural Disaster Reduction (IDNDR) Day which triggered discussions on safety initiatives. One member of the to-be-formed NSET had attended the First World Seismic Safety Initiative (WSSI) Workshop in Bangkok, Thailand in 1993. The workshop was an opportunity for building networks with experts and institutions working on reducing seismic risks in different parts of the world. NSET was established the same year. After establishment, NSET assisted UNDP/Nepal to organise the first National Conference on Disaster Management. A high level meeting of senior policy makers in Kathmandu was also organized in association with the World Seismic Safety Initiative (WSSI). After registration as an institution, NSET became a member of the IDNDR National Committee and became involved in preparation of the National Action Plan for Disaster Management. Its founder-members were also closely involved in drafting the National Building Code which produced a consolidated catalogue on earthquakes and earthquake hazard maps. (http://www.nset.org.np/nset/html/ publication/ PDF Files/ Earthquake Catalog of Nepal. PDF). In 1994 NSET began conceptualizing the Kathmandu Valley Earthquake Risk Management Project (KVERMP) and published its first handbook on earthquake safety.



First Handbook on Earthquake Safety

As a step towards enhancing advocacy, in 1995 NSET organised a training course for journalists. The purpose of the training was to inform media personnel on the importance of reporting disasters and ways in which they could assist in damage reduction – through factual, correct reporting and the dissemination of information grounded on knowledge. There was renewed interest on reporting disasters after the training and NSET became the hub for all seeking information on damages caused by earthquakes and other natural disasters.

Since 1996, NSET has been a national member of the International Association for Earthquake Engineering. It was inducted as member at the

BOX 5: Earthquake risks in Kathmandu Valley

The earthquake scenario prepared under the KVERMP suggested that Kathmandu was the most vulnerable or "at risk" city compared to metropolitan areas around the world in terms of possible casualties. There were suggestions that an earthquake of the intensity comparable to that of 1934 in the mid-1990s could result in the following damages:

- Heavy damage of up to 60% of all buildings, many damaged beyond repair
- Almost half of all bridges in Kathmandu Valley would be unusable, and 10% of all paved roads would have "moderate" damage. The country's only international airport could be inaccessible and the extremely narrow inner-city roads could be blocked by debris, creating additional problems in rescue and recovery.
- About 95% of water pipes and 50% of other water system components could suffer serious damage, together with almost all telephone exchange buildings cutting down almost 60% of all telephone connections. The shaking could also damage almost 40% of all electricity transmission lines.

Using the same casualty percentage of 1934 to estimate casualties in the event of a quake in the 1990s, NSET suggested that there could be about 40,000 deaths and about 90,000 injuries requiring hospitalisation.

11th World Congress on Earthquake Engineering (WCEE). NSET organised first training course on earthquake preparedness for school teachers the same year. The school program has grown into a major activity of NSET.

Kathmandu Valley Earthquake Risk Management Project-KVERMP (1997–2000): The Institution Building

In September 1997, NSET started implementation of the Kathmandu Valley Earthquake Risk Management Project (KVERMP) in partnership with the Asian Disaster Preparedness Centre (ADPC). The project was a part of ADPC's Asian Urban Disaster Mitigation Program (AUDMP) and was funded by the Office of Foreign Disaster Assistance (OFDA) of the United States International Development Agency (USAID). The project was implemented jointly with Geo-Hazards International (GHI), an American non-profit organization.

By early 1990, there was realization that a large earthquake near Kathmandu Valley could cause significantly high loss of life and property. The KVERMP was the first organized effort towards

The Institution Building - Strategic Planning Workshop

managing the risk in Kathmandu, and later, the entire country. Specifically, the project sought to:

- Evaluate Kathmandu Valley's earthquake risk and prescribe an action plan for its management
- Reduce the vulnerability of public schools to earthquake-caused damage
- Raise the awareness of the general public, Nepali government officials, international community residing in Kathmandu Valley and international agencies about the earthquake risks, and
- Build local institutions to sustain the work begun by the project.

The project was implemented with 66 partner organizations including government institutions, autonomous government bodies, non-government organizations (NGOs), professional societies, business organizations, municipalities and international agencies.

Loss estimation and earthquake scenario.

The KVERMP successfully assessed the earthquake risk of Kathmandu Valley, prepared and published a scenario document describing the extent of damages in the event of a major earthquake, and published an Action Plan mapping roughly 80 Nepali institutions entrusted with managing disasters. The Action Plan was completed and released by the Prime Minister on the occasion of the first Earthquake Safety Day in January 1999.

The action plan.

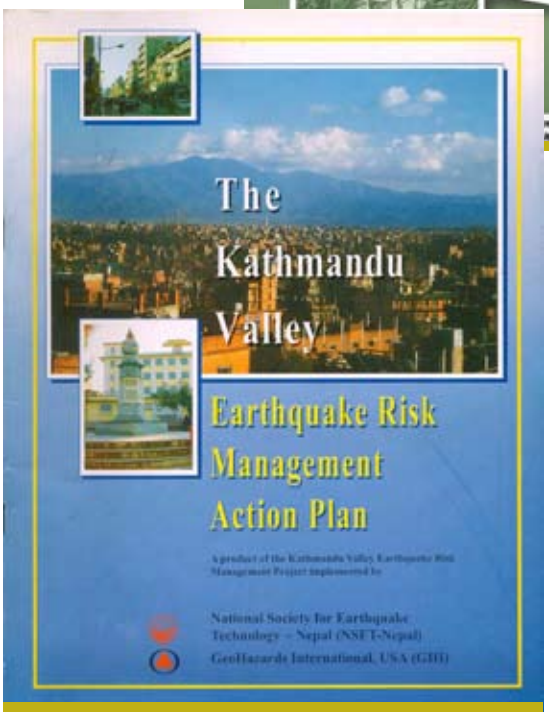
The purpose of the action plan was to assist the Government of Nepal, concerned agencies and the municipalities in Kathmandu Valley to reduce the earthquake risk over time by identifying, coordinating and focusing risk management activities. Some of the actions suggested were:

- Mitigation and Preparedness Actions
- Emergency Relief and Response Actions
- Rehabilitation and Reconstruction Actions

A set of 10 priority actions were collectively identified and responsible organizations to implement the initiatives within specified time frame and budget were given the tasks. The Box 6 lists the Priority Actions.

Safer schools- The School Earthquake Safety Program of NSET.

The School Earthquake Safety component of the project assessed the vulnerability of schools. The Bhubaneshori Lower Secondary School was the first school building that was assessed and then retrofitted to enhance its safety. The KVERMP also demolished an adjoining building and rebuilt it with earthquake resistant features. These activities were intended to assure school safety while also training local masons on safe construction techniques.



BOX 6: Priority for Action identified for the Action Plan

INITIATIVE 1:

NSET will request HMGN to (1) constitute the National Disaster Management Council (NDMC) headed by the Prime Minister; and (2) direct the NDMC to define an integrated national disaster management system that describes the roles and reporting relationships for each involved agency at the national, district, municipal or village, and ward levels of government. NSET will work with the Prime Minister's office and other concerned authorities to see that these steps are taken and to provide technical advice and assistance upon request.

INITIATIVE 2:

Once constituted, the National Disaster Management Council should (1) provide guidance for the preparation of new (or revision of existing) integrated emergency response plans that identify internal and external relationships for every responsible organization including government and non government agencies, public and private utilities, hospitals and schools; and (2) direct these organizations to prepare plans according to the guidance and to assess communications equipment, facilities and training needed to execute the plans during an earthquake disaster.

INITIATIVE 3:

NSET will work with the Ministry of Science and Technology to design a comprehensive program to raise public awareness about earthquake risk and mitigation options.

INITIATIVE 4:

NSET will work with the municipalities of Kathmandu, Lalitpur, Bhaktapur, Madhyapur and Kirtipur and the three District Development Committees to create Municipal Disaster Management Committees and District Disaster Management Committees, and to design a program of activities, including public awareness programs, for these committees.

INITIATIVE 5:

NSET will request the Ministry of Housing and Physical Planning to (1) constitute the Building Council and direct it to draft the rules and procedures for implementing and enforcing the building code, and (2) formally adopt requirements to implement and enforce the building Code by municipal governments through the existing building permit process.

INITIATIVE 6:

NSET will work with the Ministry of Housing and Physical Planning, Department of Building, professional societies, engineering colleges, and other organizations to prepare training materials and provide training for building inspectors, masons and engineers on applied aspects of design and construction of buildings to conform to the Building Code.

INITIATIVE 7:

NSET will manage and coordinate the "School Earthquake Safety Project" which will (1) inform school management committees, district education offices, parents, and teachers about the vulnerability of selected schools (based on a valley-wide school vulnerability assessment conducted by KVERMP), and what can be done to reduce the risk at those schools by using a specialist trained in working at the community level; (2) prepare school-specific plans for improvements in seismic safety (structural and non-structural) for those communities interested in improving their schools; (3) mobilize support and resources from the community and others to improve the safety of the school buildings; and (4) identify an affordable, replicable process to improve the safety of Kathmandu Valley's existing school buildings.

INITIATIVE 8:

NSET will create handbooks, posters, handbills, stickers and other information products to explain what non-structural hazards are (such as furnishings, light fixtures, decorations that could fall and injure someone or important equipment that could be damaged and malfunction), and explain how to mitigate non-structural hazards in typical Nepali homes and offices. These materials will be aimed at both literate and non-literate Nepali audiences. NSET will develop a strategy to maximize the impact of these materials and to incorporate them into other awareness raising programs.

INITIATIVE 9:

NSET will encourage the Nepal Telecommunications Corporation to assess the vulnerability of its system to earthquakes, identify the most vulnerable elements, and develop a program to improve its performance after earthquakes. This assessment will be used as a model for all of the other utilities in the valley to conduct similar assessments in future years.

INITIATIVE 10:

NSET will encourage engineering institutes to develop and offer short courses for practicing engineers on earthquake engineering principles and procedures.

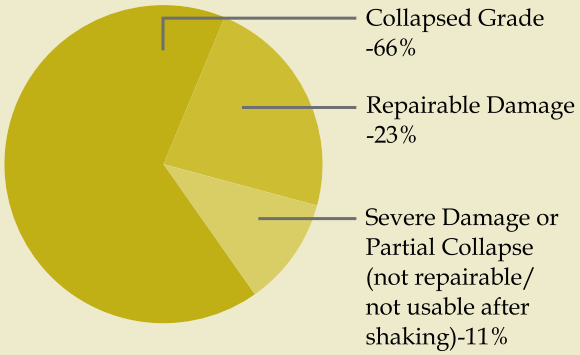


Figure 1: PIE Chart on School Assessment

The vulnerability assessments conducted in Kathmandu Valley revealed that over 60 percent of public schools were unsafe. The finding caused NSET to focus attention on ways to make the school buildings safer. Besides saving lives and damage to property, the school safety program also had potential to serve other purposes:

- It would ensure that children at school were exposed to lesser risk
- The work at schools would help to better disseminate information on safety within communities, and

Schools could be potential emergency shelters for communities during earthquakes and natural disasters. This work on securing schools developed into the School Earthquake Safety Program, which NSET has been implementing since 1999. The concept has also crossed the international boundaries: The United Nation's International Strategy for Disaster Reduction (UNISDR) declared 2006-2007 as the campaign year for safer schools.

The SESP involves structural interventions as well as training and technology-transfer. The activities comprise assistance to reinforce buildings in order to make them safe, fixing cupboards and other non-structural items, training masons, developing Emergency Response Plan and training teachers, parents and students on safety measures, including safety drills.

BOX-7: Bhubaneshori School

The Bhubaneshori Lower Secondary School at Nangkhel Village Development Committee (VDC) of Bhaktapur district is the first site where NSET implemented its School Earthquake Safety Program (SESP) in 1998. The school was set up in 1964 and had 195 students in different classes up to grade 8. The school catered to a largely homogenous community of Newars who made a living by working as construction workers.

NSET's vulnerability assessment revealed that the school was in need of major interventions for securing it against an earthquake. The interventions at Bhubaneshori School included retrofitting one school building and building brand new earthquake-resistant building using load-bearing brick masonry and cement mortar. The school now has two blocks, one two-storied 8-room building and another two storied four-room unit.

Originally the school had one four-room block of brick masonry in mud mortar, which had been expanded in 1978 to add four more rooms. The second block was also made of brick masonry in mud mortar. The first block was retrofitted in 1999 and the second one was reconstructed in 2000. The school building now has the following earthquake safety features: doors that open outside, stitches, splints and bandages and stronger roof with tie-up roofing, among others.

Bhubaneshori Lower Secondary School-**Before**

Bhubaneshori Lower Secondary School-**After**


HAIKO
HAIKO SCHOOL
JAPAN

The SESP has the following objectives:

- To assess structural, non–structural and functional vulnerability of public school buildings,
- To identify and implement measures to reduce the vulnerability,
- To raise awareness of earthquake risk and preparedness,
- To develop and implement Earthquake Preparedness Plan and conduct earthquake drills, and
- To lead and encourage communities to adopt an earthquake-safe way of life.

Typical SESP activities include:

- Survey of schools and school buildings,
- Analysis of data and classification of schools according to their structures, construction material,
- Assessment of vulnerability of different groups of school buildings and the threats faced by teachers, students, etc.
- Identification of structural measures – such as retrofitting – and non-structural interventions, such as drills, "hazard hunts", fixing furniture to walls, and evacuation plans,
- Implementation of retrofitting and other structural enhancements,

BOX-8: First Earthquake Safety Day (1999)

The government of Nepal began celebrating 2 Magh (or January 16) as the Earthquake Safety Day in 1999. It was a response to intense lobbying and advocacy by NSET and its partners during the KVERMP.

Nepal observed the first Earthquake Safety Day on January 16, 1999. The event was flagged off by Nepal's Prime Minister Girija Prasad Koirala, where he recounted his memories of the 1934 earthquake and committed to formulate policies aimed at reducing risk. He added that the focus should be on raising public awareness, enforcement of the building code and reinforcing vulnerable structures. The event was also attended by the Minister for Science and Technology, Bhim Rawal. Minister Rawal said the government was open to cooperating with the nongovernmental sector for devising mechanisms to minimize earthquake risks. He said, purpose of designating Magh 2 as Earthquake Safety Day was to raise public awareness on the risks and risk-reduction options. He said, science has not yet been able to devise a system to prevent earthquakes or predict them accurately, but it does provide measures to reduce risk and enhance safety. The first ESD function was jointly organized by the Ministry of Science and Technology and NSET.

The prime minister also affixed the postage cancellation marks on stamps issued to mark the Earthquake Safety Day and gave away prizes to winners of painting and essay competitions that were organized. He also released the Kathmandu Valley Earthquake Risk Management Action Plan and The Earthquake Scenario for Kathmandu Valley published by KVERMP.

Explaining NSET's activities on earthquake risk reduction activities Amod Mani Dixit, Project Director of KVERMP and Secretary General of NSET said the Action Plan was a result of efforts of over 90 organizations. Dave Hollister, Director of Asian Disaster Preparedness Centre, Bangkok attended the first ESD and praised the government's commitment to carry out risk-reduction activities. Brian E. Tucker, President of Geohazards International, one of NSET's partners in KVERMP, also attended the ESD event.

(The declaration of January 16 as the Earthquake Safety Day resulted from continuous advocacy by NSET on the need for raising public awareness about the risks and prevention measures).

(Adapted from various newspapers).

Observing the First Earthquake Safety Day

Students attending the orientation lecture on Earthquake Preparedness

- Training masons on-the-job as well as in theoretical sessions,
- Development of Earthquake Preparedness Plan,
- Development of curriculum on Disaster Risk Reduction and Emergency Response, and
- Conducting/ organizing seminars for teachers in school earthquake safety and earthquake awareness contests among children.

Besides securing the schools against earthquakes, the project has also helped NSET to introduce earthquake-resistant construction techniques in the community with audiences made up largely of construction workers, parents, teachers and members of school management. The successful retrofitting of schools and construction of new buildings using earthquake-safe techniques also assisted NSET to demonstrate ways to reduce risks in existing buildings.

One area where real technology-transfer has taken place is through the masons trained by NSET. The trained masons have been training others they work with after completing NSET projects and construction methods used during school building and retrofitting are now being employed in the construction of private houses.

Key lessons from the SESP:

- Schools are the best entry points for raising earthquake awareness in communities,
- The SESP is an appropriate platform to develop and disseminate appropriate technology,
- The SESP management model can work in other community development projects, because it is both transparent and participatory, and retrofitting is a solution for making schools safer in poor countries.

Public Awareness.

A major public awareness activity under KVERMP was lobbying the government for declaring January 16 as Earthquake Safety Day (ESD). The date was a reminder of the strong earthquake (8.4 on the Richter scale) of 1934 and the resulting damages in Kathmandu Valley. Nepal began celebrating ESD from January 1999. NSET and its partners organize public awareness rallies and activities, lectures and safety drills to remind the general public of the possibility of another earthquake and the safety measures they can take to reduce damages.

Other activities under the project included institution building and training of municipal officials in disaster management. It also included capacity-building of NSET staff.

BOX-9: IMPACT OF KVERMP

Awareness	KVERMP significantly helped to raise awareness on earthquake risk and mitigation possibilities
NSET authority established	NSET was better known as a reliable and dedicated institution.
Scenario	The US Embassy (Nepal) and the UNDP (Nepal) accepted the earthquake scenario prepared by the KVERMP as a standard for formulating preparedness plans.
School safety	Demand for School Earthquake Safety increased. District Development Committees began funding installation of safety measures for those schools on NSET's priority list.
International impact	NSET's methodology of 'scenario and action plan development' was accepted and employed by Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disasters (RADIUS).
	WSSI accepted KVERMP as a successful case for replication

Source: Adapted from Asian Disaster Preparedness Center's Project Completion Report on the KVERMP, September 2000.

Impacts and Key lessons.

Prior to KVERMP earthquakes were rarely considered a major issue, let alone plan for risk reduction. Since Nepal did not have an official building code, much of the construction taking place in Nepal including Kathmandu Valley at the time was haphazard, unsafe, and prone to seismic risks. Technical information on earthquakes remained scattered and the general public was largely unaware about the possibilities of reducing risk. The activities of the KVERMP (September 1997 to December 1999) were instrumental in facilitating the necessary research for generating knowledge and spreading awareness about risk reduction. Two other major activities during the period were the preliminary assessment of the structural and functional vulnerability of Bir Hospital – Nepal's largest -- and the Lincoln School, a school attended by children of resident foreigners. The assessments were done by NSET and the Corps of Engineers, US Army. In end 1998, NSET had done vulnerability assessments of 1,100 buildings belonging to 643 public schools.

The main lessons learnt from the KVERMP were:

- Low-tech solutions and approaches are best-suited for reducing the risks associated with earthquakes
- Transferring ownership of knowledge on risk reduction to communities can ensure greater dissemination and use
- Community involvement is key to ensuring social acceptance of the proposed approaches, and
- Technology transfer and institutional development should take place side-by-side, especially while working with communities.

Nepal's parliament approved the Building Council Act in 1998 following which a Disaster Management Section was established at the Kathmandu Metropolitan City office. As an extension of its advocacy activities, in 1998, NSET organized a workshop on the Health and Medical Implications of Earthquake Disasters.

During the scenario workshop

Mass gathered to observe the ESD

The KVERM APIP (2000 – 2005): Translating Plans into Action

Kathmandu Valley seemed "safer" when no information on the earthquake risks it faced was available. The KVERMP served as an eye-opener for everyone. It was possible through the awareness activities carried out by NSET. However, pointing out a problem was not enough and therefore, the next challenge for NSET was to devise solutions. The answer came in the form of Kathmandu Valley Earthquake Risk Management Action Plan Implementation Project or KVERM APIP or APIP. The project was supported by Office of Foreign Disaster Assistance (OFDA) of USAID and was implemented from September 13, 2000 until August 31, 2005.

Activities conducted during the Action Plan Implementation Project

Goals and Objectives of APIP.

The goals of the project were to:

- Significantly reduce the level of earthquake risks in Kathmandu Valley
- Establish institutions and processes that can sustainably continue the preventive measures

The specific objectives of the APIP were:

- To make significant progress in earthquake risk management in Kathmandu Valley by implementing two risk reduction actions identified in the Kathmandu Valley Earthquake Risk Management Action Plan (such as retrofitting schools and public buildings)
- To monitor and update the Kathmandu Valley Earthquake Risk Management Action Plan, to transition from a published plan into a long-term planning process, and
- To strengthen the capability of NSET to implement and promote earthquake risk management works in an ongoing and sustainable manner.

Figure 2, illustrates the overall goal, objectives and activities of the APIP.

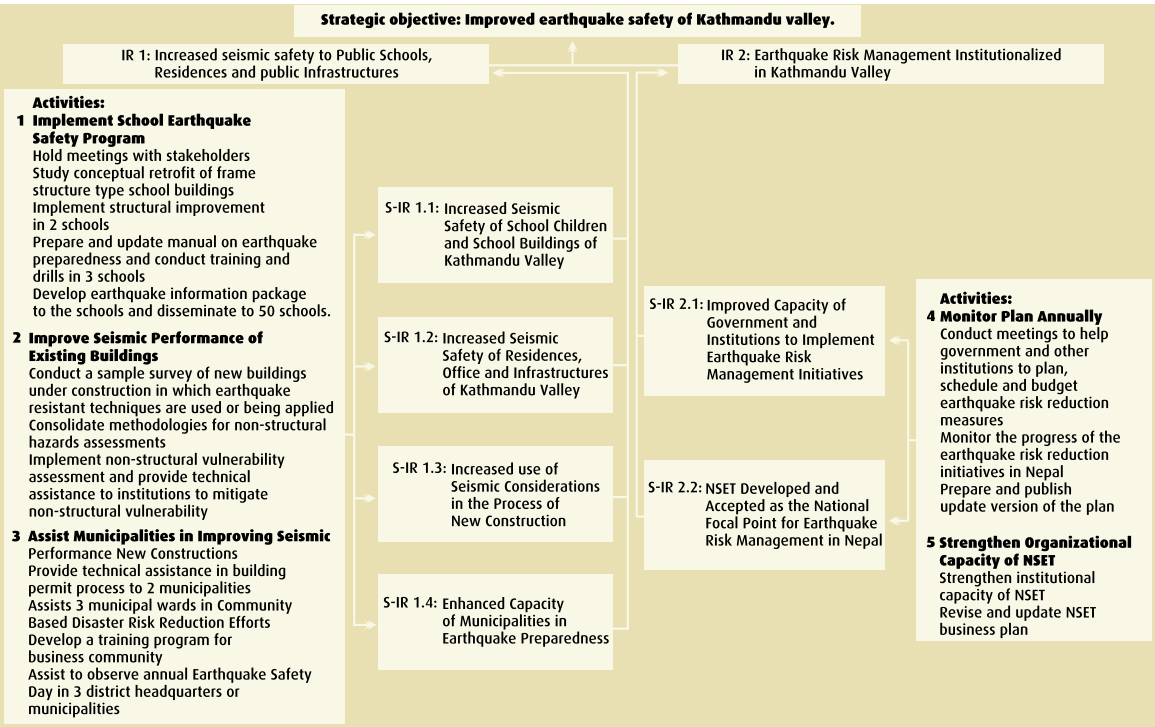


Figure 2: Objective tree of KVERM-APIP

Main activities under APIP.

The activities under the project included the School Earthquake Safety Program (SESP) and enhancing information dissemination on non-structural vulnerability reductions and risk mitigation measures. The policy-level interventions included assisting municipalities in implementing the building code, initiating community-based disaster reduction efforts and monitoring the risk management plan and its implementation on an annual basis. Several measures were developed to assist the retrofitting or new earthquake-resistance construction demands from the local communities. Some of the results were very visible by the time the project came to an end.

Training Programs on Earthquake-resistant Construction for Masons and other Stakeholders of Building Industry.

NSET has developed training courses targeting various stakeholders involved in earthquake risk reduction. These courses include training of masons/contractors, technicians, junior engineers, engineers, schoolteachers and policy/decision makers. The training programs are organized in collaboration with the Department of Urban Development and Building Construction (DUDBC), municipalities, professional societies, business community and other international and national partnering institutions.

Earthquake Clinics.

In 2004 NSET launched Mobile Earthquake Clinics to provide on-site consultations on earthquake-resistant building construction. A team comprising of an earthquake engineer/ structural engineer, technician and masons visit building construction sites at different locations in and around Kathmandu valley to provide technical advice on earthquake- resistant construction. The main objective of the exercise is to spread knowledge of safer building construction at the community level, assist the implementation of the building code at site level, monitor impact of earthquake awareness and to encourage house owners and builders to consider and incorporate measures to reduce the risks.

Over the years NSET clinics have reached out to hundreds of builders in and around Kathmandu and have served as an effective tool for monitoring implementation of the building code.

Masons during the practical sessions of Mason Training Program

NSET professional briefing the house owners and the masons involved

House owners' consultations: NSET has set aside Friday afternoons for providing free consultations to house owners and potential house owners for making their homes earthquake safe. The consultations are open to everyone seeking information on earthquake-resistant construction techniques and methods.

In the process, NSET technicians have observed remarkable improvements in building construction in regard to stirrup shapes, sizes and spacing, sizes

of columns and improved detailing of connections (beam-column joints), protection of infill walls, etc. Hundreds of house owners have also been convinced about the need to incorporate safety-measures during construction.

Seismic Vulnerability Assessment of Buildings.

Building collapses during earthquakes are major causes of loss of life and property. This was true in the case of earthquakes in Bhuj, Gujarat (2001), Bam, Iran (2003) and Pakistan (2005). Therefore vulnerability assessments and remedial measures are vital for risk and harm reduction. NSET carries out vulnerability assessment of buildings as an ongoing activity. The assessments are part of its knowledge, technology-transfer and out-reach activities.

The main objectives in an assessment are:

- To assess the seismic vulnerability of structural and non-structural components
- To suggest appropriate remedial measures for reinforcing the structures
- To identify relatively safe and unsafe areas, and
- To build awareness on risk reduction and safety during earthquakes.

An assessment report identifies both structural and non-structural vulnerabilities in buildings as well as the relatively safe and un-safe areas. NSET also recommends reinforcements for buildings needing structural adjustments. The enhancements are preceded by a detail design of the retrofitting works, complete with an estimate of the cost.

NSET professional involved in building assessment work

Until November 2008, NSET had carried out assessments of over 90 residential and office buildings, including those belonging to different diplomatic mission and development agencies based in Nepal. Although most of the buildings assessed were engineered, the assessments revealed that they could still suffer moderate damages in case of intensity IX MMI earthquake. Generally, the buildings were relatively safer compared to the majority of structures in Kathmandu Valley, most of which are non-engineered – or those built by contractors and masons without proper structural engineering. NSET was also involved in assessing the vulnerability of 26 masonry buildings used by the British Embassy in Tehran, Iran (2004) and assisted the UN Habitat to undertake similar assessments for buildings rented by the United Nations in Muzaffarabad.

Enhance emergency preparedness in health services.

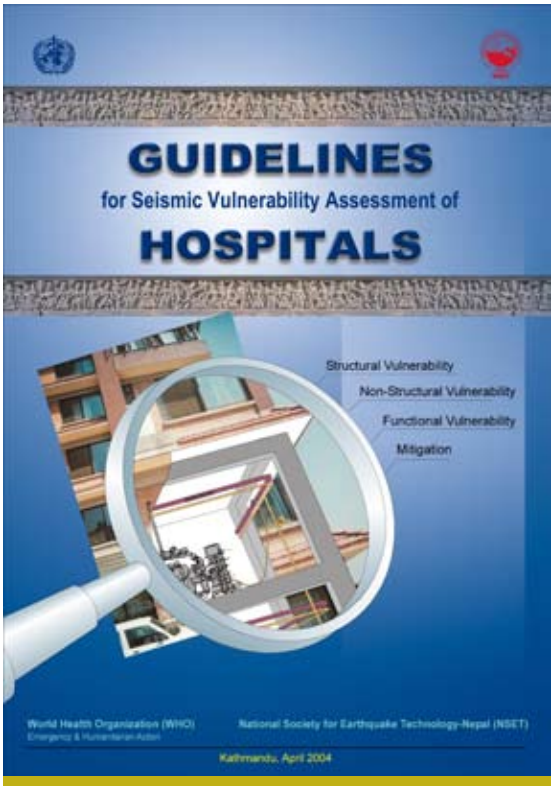
NSET assisted in preparing an Emergency Preparedness and Disaster Response Plan – for the Health Sector in Nepal and joined the Disaster Health Working Group (DHWG) at the Ministry of Health in the year 2002. The plan aims to ensure human survival and well-being – particularly the health needs of the most vulnerable groups – is assured during emergencies. The vulnerable groups comprise of children, pregnant and lactating women, elderly and people from low-income and excluded groups. The plan adopts a two-pronged response approach:

- For frequent and somewhat manageable emergencies: To respond through contingency programs and plans regularly updated by the concerned agencies under supervision of the Disaster Health Response Group.
- For infrequent and catastrophic emergencies: For responding to emergencies of the scale and severity that exceed the response capacity of health agencies and those for which international support would be needed.

The DHWG prepared the plan in collaboration with the government, United Nations agencies and non-government organisations. The plan outlines the health effects of anticipated hazards and the response, search and rescue, mass casualty management and managing post-disaster situations.

Seismic Vulnerability Assessment of Hospitals.

Seismic vulnerability evaluation studies carried out by NSET at Bir Hospital in 2000 indicated that Kathmandu hospitals had to be secured in order to make them capable of assisting victims of disasters. This was followed up with a study on the "Structural Assessment of Hospitals and Health Institutions of Kathmandu Valley" in 2001. The project was supported by the World Health Organization (WHO) Nepal and the Ministry of Health. The findings suggested that most hospitals could withstand the earthquakes of VII MMI. But it also found that only 10 percent of the hospitals could continue functioning while 30 percent could be rendered partially functional. The remaining 60 percent could cease to function. The functions were likely to be disrupted by non-structural damages. The study recommended carrying out detailed non-structural assessment of major hospitals.



WHO Nepal supported the follow up project that sought to study the non-structural vulnerability of hospitals in Nepal. The studies were part of the Health Sector Emergency Preparedness and Disaster Response Plan Nepal prepared by the Disaster Health Working Group, Epidemiology and Disease Control Division (EDCD), Department of Health Services (DHS), the Ministry of Health and WHO-Nepal.

Objectives

Development of a systematic approach towards assessment of structural and non-structural vulnerabilities of hospital buildings and health institutions by implementing the assessment at hospitals in Kathmandu Valley,

- Identification of appropriate measures for improving earthquake resilience of existing health infrastructure,
- Transfer of technology and development of local capacity for such work, and
- Dissemination of findings for facilitating implementation of the identified earthquake risk reduction measures.

The main project activities included the following:

- Collection and review of secondary data for familiarization with the status of health facilities and identification of requirements of the assessment methodology,
- Selection of target hospitals for assessment taking into account the geographical distribution and regional importance,
- Development of an appropriate methodology for seismic vulnerability assessment of hospitals in Nepal,
- Structural, non-structural and functional vulnerability assessment of selected hospitals using the developed methodology and identifying expected performance of individual hospitals after different level of earthquakes,
- Comparison of existing expected performance of hospitals to standard of expected performance as set by the code of good practice internationally,
- Identification of structural and non-structural retrofitting options to increase functional capacity of the selected hospitals,
- Cost estimations for different interventions options,

- Prioritization of identified interventions options taking into consideration the cost involved as well as the and technical difficulties in implementation, and
- Dissemination of the outcome of the study among stakeholders.

The comparison of the expected performance of existing hospitals to the standard expected performance revealed that all hospitals would cease functioning even after an earthquake of (MMI VII) scale. At intensity MMI VIII, 80 percent of the assessed hospitals were likely to cease functioning posing life-threatening hazards to medical staff and patients while as remaining 20 percent would not be threat to the life and safety but could cease to function for a long period after the earthquake.

The study also assessed possible improvements of performance of hospitals through implementation of phased interventions. It was found that after implementing phase I intervention options – comprising of non-structural mitigation measures costing about USD150,000 (2004 costs) – most of the assessed hospitals (90%) could be expected to remain functional after an earthquake of the same intensity (MMI VIII). The remaining 10 percent would remain fully operational after the quake. The study also revealed that almost all the assessed hospitals would remain fully operational after a MMI VIII shaking if Phase II interventions (costing about USD5.2 million) were undertaken. Phase II interventions also include structural enhancements.

Outputs

- Assessment of hospitals based on the analysis of structural and non-structural vulnerabilities to buildings and critical systems and facilities. The functional assessment was based on two different earthquake scenarios,
- Identification of Vulnerability Reduction Measures including non-structural risk reduction measures for immediate implementation, such as improving safety of Operation Theatres,
- A systematic approach for assessing structural and non-structural vulnerability of hospitals in Nepal was developed based on the studies carried out at 20 major hospitals. The findings were widely disseminated.

Vulnerability Assessment of Kathmandu Valley's water supply pipe network.

In 2002, NSET carried out a vulnerability assessment of the water-supply system of Kathmandu Valley. Water pipes can be dislodged during earthquakes and rapid system restoration is vital for effective rescue and rehabilitation. Experience elsewhere shows that repair of damaged pipe networks and restoration can take between a few days to a few months, depending on the level of damage and preparedness. NSET carried out the assessment in collaboration with Development Network (P) Ltd. (DNet). The assessment was supported by UNICEF-Nepal.

The Kathmandu Valley Earthquake Risk Management Project (KVERMP) had suggested that roughly "95 percent of water pipes and 50 percent of other water system components (pumping stations, treatment plants, etc.) could be damaged seriously" and that several locations would be without piped water for several months in the event of an earthquake of the magnitude comparable to that in 1934. The study sought to gather data for compiling baseline information needed for planning preparedness and mitigation measures.

Objectives

- To collect information on the roles and responsibilities of the key water supply agencies and water supply infrastructure

Probable Evacuation Points in Kathmandu Metropolitan City

networks in the three municipalities of Kathmandu Valley through a review of literature and discussions with the concerned agencies (MPPW, DWSS, NWSC and three municipal authorities),
- To assess seismic vulnerability and potential damage to the system based on visits to major water sources, water points (reservoir, transmission and distribution lines) and other key structures,
- To propose how access to safe drinking water could be secured after a major earthquake,
- To identify key responsible agencies and stakeholders that would be required to deal with emergency management during a major earthquake and indicate the major areas of support required by the agencies, and
- To disseminate the findings of the study among stakeholders and incorporate useful notes/ comments provided into the assessment.

Output:
NSET developed a practical methodology for assessing the seismic vulnerability of the water supply networks. The study identified several network system damage scenarios and identified optimum routes for most expedient restoration of the water supply services for meeting a minimum level of services.

Public awareness

Almost all activities of NSET consist of public awareness-raising components. Some important stand-alone public awareness programs are: Earthquake Safety Day, Earthquake Safety Radio Program, Orientation Lectures, House Owners Consultation Program, Mobile Earthquake Clinics and Community Based Disaster Risk Management Program.

Institutionalization of Emergency Response Management (ERM).

Disaster Inventory/ Information Management System - DesInventar

In 2003 NSET began establishing an inventory of disasters in Nepal with the support of the United Nations Development Program (UNDP). Disaster information was collected from various sources using the DesInventar System, a tool developed by the Latin American Network of Social Studies on Disaster Prevention (LARED). The database provides information on natural disasters in Nepal and covers a 33-year period. The study involved
- Identifying the types of disasters in Nepal regionally, district-wise and up to the municipal and Village Development Committee (VDC) level,
- Studying the time variation (cycles) between natural disasters in different geographical units,
- Assessing and estimating the damage to life and property,
- Prioritizing areas most affected by natural disasters for preventive interventions, and
- Developing a national database on natural disasters.

NSET continued the data management effort with its own resources after completion of the project. It has updated the DesInventar up to 2007. NSET plans to install the DesInventar system at Disaster Information Management System (DIMS) at the Ministry of Home Affairs and train personnel on its use for institutionalizing the data management system.

BOX-10: Earthquake safety on the airwaves.

NSET began using radio for raising awareness on earthquake risk-reduction in August 2000. The 15-minute interaction program was aired on Radio Sagarmatha, a community FM Radio Station in Kathmandu. The program time was increased to 30 minutes from 2001. NSET has also begun collaborating with FM stations outside Kathmandu. The weekly broadcasts on Annapurna FM Pokhara were launched in 2003. In 2007 Capital FM in Kathmandu started airing 5-minutes tips on earthquake safety daily at8:00 hours in the morning. The radio programs have helped spread awareness of earthquake risks and safety measures. By December 2008 NSET had produced and broadcasted over 391 radio programs on Radio Sagarmatha.

Project for Pre-positioning of Emergency Rescue Stores (PPERS)

NSET provided technical assistance to a project to place and reserve essential tools and equipment for responding to disasters in collaboration with the Civil Affairs Group of the British Army. The project was implemented jointly with Ward Disaster Management Committees in Kathmandu Valley. It sought to assist the "first responders" on the ground – the neighbors – to help each other. It involved setting up local disaster management committees and community emergency response teams and assisting them to store emergency response equipment and train the volunteers to undertake Light Search and Rescue (LSAR).

PPERS involved colleting light search-and-rescue tools and storing them at one place that is relatively better-protected. Such stores are located in eight locations across Kathmandu Valley. The stores (ISO containers) hold set pieces of locally-purchased emergency response equipment, including ladders, picks, shovels, ropes, sledgehammers, wheelbarrows and first-aid kits. The local leaders retain the keys to the containers.

In 2008, NSET was commissioned by UNDP Nepal to implement a study on Disaster-Poverty linkage, as a Nepal pilot study of the Global Assessment Report executed by the UN International Strategy for Disaster Reduction (UN/ISDR). The DesInventar database together with the data of the Nepal Living Standards Surveys (NLSS) and the Ilaka level poverty related data obtained from the study "Small Area Estimation of Poverty, Caloric Intake and Malnutrition" (CBS and WFP 2006) were the main inputs for the study.

Kathmandu Valley Earthquake Preparedness Initiative (KVEPI)

2004 NSET and the Nepal Red Cross Society (NRCS) implemented the Kathmandu Valley Earthquake Preparedness Initiative (2004-2005). The project involved pre-positioning critical relief supplies and rescue equipment, drilling water points, training people in basic first aid and rescue techniques, and helping the general public to identify and advocate safer building practices. The project was supported by the American Red Cross under a grant from the US Office of foreign Disaster Assistance (US OFDA) of the USAID, was implemented in 10 wards of five municipalities in Kathmandu Valley. The program had three main objectives:

- To build the disaster management capacity of the NRCS at the national, district, and sub-chapter level,
- To build the preparedness and response capability of 10 wards, and
- To increase public awareness about earthquake safety and preparedness at the ward level.

Pre-positioning the emergency rescue equipments

Participants of the KVEPI training involved in group work

The main activities involved organizing national and district-level disaster management training including training of trainers (TOT), inventory and warehouse management and earthquake preparedness. It also involved positioning basic relief supplies in four strategic locations in the Kathmandu Valley and preparing a community level search and rescue training course. Two 30-meter tube-wells were drilled at Tundikhel for use only during major earthquakes.

The project also conducted ward-level training on disaster management, basic first aid, and light search and rescue and tested the disaster management plans and organized "tours" of the wards to identify hazardous and safe building practices. The major achievements of the year-long project were:

- Formulation of ward-level Disaster Management Committees,
- Placement of four sets of rescue equipment at the wards,
- Training on a range of disaster management related subjects,
- Construction of two tube-well at Tundikhel for emergency use, to be maintained by NRCS,
- Supported NRCS and ward-level human resource capacity and volunteer base to provide disaster management training and technical assistance, and
- Informed the general public of the hazards and safety measures and enhanced the capacity of partners in delivering relief to vulnerable groups.

Achievements and lessons from APIP.

The KVERM-APIP project directly benefited over 43,000 beneficiaries and another 355,000 indirect beneficiaries with earthquake risk reduction solutions, including information. The number is an estimate and does not include beneficiaries of outcomes that were difficult to quantify and measure.

One remarkable achievement of NSET's risk reduction efforts was the enforcement of the building code by the government in August 2005. During the KVERM-APIP, NSET reached agreements with over 30 government institutions, municipal bodies and educational institutions for carrying out earthquake risk management activities, including awareness programs. The government of Nepal approved the National Building Code 2060 on July 28, 2005. Other APIP achievements included improvements in building construction practices and greater commitment toward the implementation of the building code. There were also indications of increased awareness, manifested by the demand for literature on earthquake safety and safe-construction technologies at NSET.

The APIP yielded a number of important lessons. One major learning point was that even though retrofitting was a solution, it was expensive, especially for individuals. However, the benefit-cost ratio increases drastically, even in short-term, with full involvement and ownership of the community. Further, the technology had a specific advantage: it was useful for building awareness on risk reduction because it is visible, especially for public buildings such as schools, hospitals, etc. The project also resulted in specific lessons on the technical solutions for particular types of buildings, such as promoting "stitching walls, providing bands, tying roofs and floors and placing vertical rods at corners" for masonry buildings and improving ductile detailing and work quality for reinforced concrete buildings.

The MERMP – 2003: Consolidating the Experiences of KVERMP

The Municipal Earthquake Risk Management Project (MERMP) was implemented in three municipalities – Banepa, Dharan and Vyas with support from the Asian Urban Disaster Mitigation Program (AUDMP) of Asian Disaster Preparedness Centre (ADPC) and sought to prepare earthquake damage scenario action plans for earthquake risk management and risk reduction activities. The objectives included:

- Raising earthquake awareness of the municipal authorities and residents,
- Implement the School Earthquake Safety Program in collaboration with municipal and educational authorities and communities, and

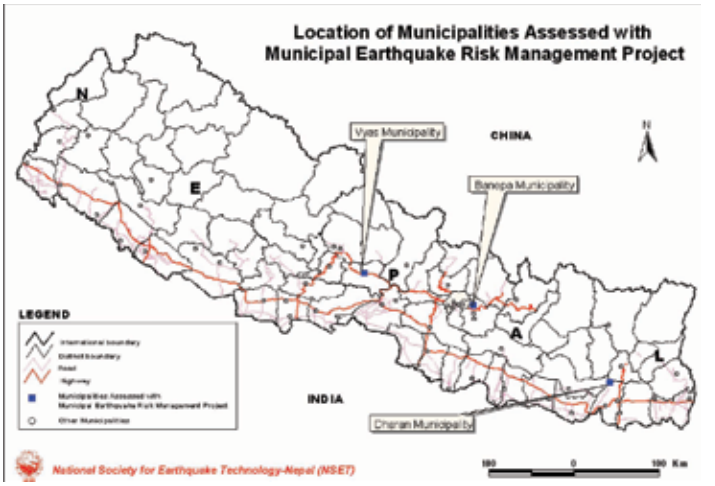


Figure 3: Location map of municipalities assessed with Municipal Earthquake Risk Management Project

- Establish disaster management committees at the municipal level for responding to earthquakes and other disasters.

The activities included preparing Earthquake Damage Scenarios and Action Plans (for response) using the Risk Assessment Tools for Diagnosis of Urban Area Against Seismic Disasters (RADIUS), preparing maps and discussing the forecasted damage and risk-reduction with residents. The public awareness and capacity building activities included special rallies, exhibitions, Shake Table demonstrations, quiz competitions and training of local masons in low-risk construction techniques. The projects were implemented by the municipalities of Vyas and Dharan with technical assistance from NSET. The successful implementation of the program has caused NSET to plan replication to cover all 58 municipalities of Nepal.

Output:

- Increased earthquake awareness within the municipalities and among the residents,
- Enhanced capacity of municipalities to implement earthquake risk reduction and preparedness programs,
- Visible changes in construction practices: many earthquake-resistant features have now "standard" in buildings,
- Greater political will for implementing seismic building code,
- Inclusion of disaster risk management activities into the regular programs of the municipalities (with budget) and its incorporation in the development plan,
- Trickle-down of risk-reduction techniques to neighboring villages and urban centers,
- Interest generated among district authorities for implementing earthquake risk management initiatives throughout the districts, and
- Endorsement of program by the Ministry of Local Development (MOLD).
- NSET plans to implement MERMP in all 58 municipalities of Nepal in the next 5-10 years.

Participants of contractors training conducted in Dharan municipality under the MERMP

Briefing the participants during the mason training conducted in Vyas municipality under the MERMP

Lessons:
The MERMP helped NSET to understand the entire process of earthquake risk management in cities – from risk assessment to action planning and implementation of demonstration projects. NSET has been using this knowledge in the municipalities of Nepal, and also in Muzaffarabad, Manshera and Quetta of Pakistan under a UNDP-Pakistan and National Disaster Management Authority program. The same methodology is to be applied in Maputo of Mozambique where NSET has been invited by the UN Bureau of Crisis Prevention and Recovery (BCPR) to assist the local municipal government to assess earthquake risk and to use the knowledge for planning preparedness, including emergency shelter planning.

Other Cross Cutting Issues and Programs

Environmental mapping projects

Realizing that earthquake risk reduction intervention begins with knowledge generation, NSET became involved in municipal environmental mapping in 1999. The first Environmental Mapping Project (EMP) was carried out at Madhyapur Thimi Municipality in 1998;those days many municipalities of Nepal did not have any comprehensive digital maps for environmental indicators including sensitive areas, noise pollution, water quality, geologic conditions etc. NSET carried out similar mapping at Kirtipur, Dharan and Banepa Municipalities in 1999, 2000 and 2001 respectively. The environmental mapping activities were supported by a grant from the Regional Urban Development Office (RUDO)/ South Asia of the USAID. Its purpose was to assess the situation and develop urban development plans. The activities under the EMP comprised of:

- Collection of secondary data and generation of base GIS maps,
- Collection of primary data for generating baseline information on the quality of surface and sub-surface water, and the levels of air and water pollution,
- Analysis and interpretation of data, generation of thematic maps for use in urban planning (population, water supply network, electricity

Box-11: Other activities in 2002/2003

Besides the major project, NSET accomplished the following tasks in 2002/2003

- Published a manual for designers and builders on the Protection of Educational Buildings against Earthquakes,
- Launched a weekly structural safety program for house-owners and builders,
- Organized the first ever mass casualty drill involving the emergency rescue teams and hospitals, and
- Completed seismic vulnerability assessment of 14 hospitals in collaboration with the Ministry of Health and the World Health Organization
- Retrofitted five schools under the SESP program,
- Conducted and published non-structural vulnerability assessment methodology of nine hospitals,
- Introduced DesInventar system in Nepal with assistance of UNDP/BCPR. Prepared Nepal's 33-year inventory of natural disasters,
- Established RADIUS at the Kathmandu Metropolitan City and
- Supported the Lalitpur Sub-Metropolitan City to become the first municipality to make the Nepal National Building Code mandatory.

Preparing maps for the Environmental Mapping Project

network, telecommunication network, road network, land use, geology, etc.),
- Identification of the key issues related to the development of a comprehensive action plan for urban environmental improvement,
- Preparation of a comprehensive report with urban environmental maps, and
- Presentation of the plan at a public workshop.

The plans were intended for use by the municipalities for managing future growth in a manner that was conducive to earthquake safety. One key lesson learnt from the project was the importance of environmental plans, not only for managing growth, but also for ensuring that growth and development was done in a manner that would support disaster mitigation and emergency response during disasters.

Feasibility study of community-based solid waste management

NSET carried out a feasibility study for solid waste management in Dharan Municipality as follow-up to the Dharan Environmental Mapping Project (DEMP). The project was supported by the Regional Urban Environment Policy and Management Program of Regional Urban Development Office (RUDO) for South Asia, USAID India and was carried out in collaboration with Zero Waste Nepal.

The DEMP identified solid waste as the next most important issue facing the municipality after water supply. The specific objectives of the project were to:
- Identify problems faced by the municipality in collection and disposal of solid waste,
- Study and recommend suitable infrastructures for waste collection and disposal,
- Technical and financial analysis of the solid waste management capability,
- Suggest a mechanism for involving local communities, NGOs/ CBOs and a suitable plan of action for disposal of solid waste generated in the municipal area, and
- Capacity building of local municipal agencies.

Knowledge, Technology Transfer

NSET began sharing its knowledge on earthquake risk reduction regionally after the devastating earthquake in Gujarat, India (2001). The earthquake killed more than 13,000 people. Regional experience sharing was done through a mason exchange and training program. The Gujarat State Disaster Management Authority (GSDMA), Sustainable Environment and Ecological Development Society (SEEDS) and the United Nations Centre for Regional Development (UNCRD) designed the Patanka Navajeevan Yojana (PNY) for helping the victims in Patanka village of Patan district of Gujarat to re-start their lives. The project involved rebuilding earthquake-resistant homes and implementing a number of activities for rehabilitating communities, with their participation. The Nepal-Gujarat Mason Exchange and Training Program (NGMET) was a joint program of NSET-Nepal and SEEDS. It began in August 2001 and continued until the completion of the PNY in 2004. The idea was to transfer earthquake-safe construction techniques, a very successful concept of NSET– to masons in Gujarat so that safety messages and solutions would be passed directly to the communities. The NGMET sought to start mitigation and preparedness activities through training and awareness at the community level. The specific objectives of the project were to:
- Train at least 20 masons from Patanka in earthquake resistant construction while rehabilitating and re-building houses damaged by the quake,
- Organize at least three exposure visits of masons from NSET and Patanka, and
- Document and disseminate the outcomes and explore its replication potential elsewhere.

Within the program, six masons (the first batch traveled to Gujarat on 14 August, 2001) worked in Patanka Village for about a year under the supervision of an engineer from NSET. The engineer from Nepal trained Gujarati engineers and architects. Gujarati masons and engineers also

visited Nepal to observe NSETs work at different sites. The activities included analysis of the situation, including assessment of the rehabilitation processes and priorities, and recommending appropriate interventions and their execution. Other activities included:

- Upgrading construction quality focusing on workmanship, quality control and bar-bending,
- Using Stone -crete, a new construction material, to replace stone masonry wall,

With the local residents in Gujarat

Sharing of experience between the Nepali and Gujarati masons

- Seismic strengthening of existing buildings,
- Training of masons on building techniques and Shake Table demonstrations for demonstrating the effectiveness of earthquake resistant components in buildings, and
- Exchange visit of Nepali and Indian masons between Nepal and India for training and learning from each other.

Key lessons from Gujarat

Construction on the scale that had to be done in Gujarat was not only a technical issue. Rather it is an issue with long-term social and economic implications and therefore success depends on the extent of community involvement and acceptance of the solutions. Such projects can work when they are process-oriented rather than being product or solution-driven. The successful technology-transfer experience suggested that language was not a barrier in exchange of technological know-how, especially if the process is participatory and demonstration-based methods are applied.

Briefing the masons on earthquake-resistant construction in Pakistan

Youths in Pakistan going through the earthquake awareness posters

Assisting recovery in Pakistan.

NSET began supporting earthquake recovery and reconstruction in Pakistan on 19 November 2005. The program involved training technicians on earthquake-safe construction techniques and demonstrating how such an approach could save lives and property. The earthquake (7.6 on the Richter scale) that jolted northern Pakistan on October 8, 2005 caused the deaths of over 73,000 people and injured another 83,000. It also rendered more than 3.3 million people homeless. The direct economic losses were estimated at over US$5 billion.

The earthquake caused major damages in Pakistan's northern regions, including areas in Azad Jammu and Kashmir (territory of Kashmir to the west of the line of control between India and Pakistan). The worst damages occurred in scattered rural settlements spread across large distances. The reconstruction effort involved building over 350,000 homes, repairing infrastructures and helping people to re-start their lives.

The Capacity Building for Reconstruction of Earthquake-Affected Areas of Pakistan (Bagh and Muzaffarabad) was implemented with the support of the United Nations Development Programme (UNDP), Pakistan from November 2005 to March 2006. NSET provided technical assistance including demonstration of people-centered, cost-effective, environment-friendly transitional shelters and for preparing a housing strategy incorporating earthquake-resistant techniques in permanent reconstruction.

The technical assistance sought to transfer knowledge on earthquake resistant construction to builders and assist in the confidence-building processes by taking these techniques to rural communities. The specific activities were:

- Training construction industry stakeholders on earthquake-resistant techniques of building new houses and on safe repair and retrofitting of damaged buildings, and
- Shake Table demonstration for earthquake awareness, and construction of model buildings for demonstration, awareness and technology transfer.

The demonstration component involved building two model houses, and organizing two Shake Table demonstrations. The training was conducted in two tiers. First NSET resource persons conducted end-

Box-12: NSET Training in Pakistan

NSET assisted the Earthquake Reconstruction and Rehabilitation Authority (ERRA) of Pakistan by providing technical assistance in policy support and capacity enhancement for earthquake resistant reconstruction. The program was implemented under a grant from the US Office for Foreign Disaster Assistance (US OFDA) of USAID in co-ordination with UN-Habitat.

Training Support for Earthquake Resistant Reconstruction in Pakistan (TSERR) comprised of assistance in the development of training policies and capacity enhancement of technical and non-technical personnel involved in reconstruction of houses in Ajad Jammu and Kashmir (AJK) and the North West Frontier Province (NWFP) of Pakistan.

The training programs were implemented through 12 Housing Reconstruction Centers (HRC) spread across the two provinces. NSET trained technicians of the HRC and Partnering Organizations (PO) to become trainers in earthquake resistant reconstruction and supervised and monitored the training programs conducted by the potential master trainers and mobile team members. (A Partnering Organization was a local or international non-governmental organization working within the jurisdiction of a Union Council for providing support to the communities.)

NSET developed training curricula and training materials for various target groups based on its experience in conducting similar training programs in Nepal and elsewhere. The curricula were adapted to the match the socioeconomic realities of the earthquake-affected areas. The similarities of topography, geology and building typologies in Nepal and Pakistan helped NSET to develop the training materials. The ability of Nepali technicians to communicate in Urdu added to the effectiveness of the training programs.

Participants during the training of master trainers

NSET also provided training on damage assessment and earthquake-resistant construction to the engineering unit of the Pakistan Army that had been assigned to undertake damage assessment and provide technical inputs for reconstruction in several Union Councils, especially those in the remote areas of northern Pakistan.

The most important impact of the hierarchical system of awareness and training conceptualized and implemented by NSET is that it could positively influence the "Build Back Better" earthquake-resistant housing reconstruction of Pakistan by creating a significant number of instructor, master instructors and capable construction work force. Table 4 highlights the achievements.

Table-4: Achievements From Training And Awareness Programs Conducted Directly By NSET During Period Nov. 2005 – May 2007 (Under The Awareness And Training System)

Description	Achievement (No. of Training programs, trained people)
Total number of different training programs conducted	66
Total number of professionals and people trained	2,580
Total number of instructors/trainers developed	850
Total number of master instructors developed	28
Total number of masons trained	700
Total number of other beneficiaries	1,030

user training on earthquake-resistant construction for engineers and technicians. Trainees with the potential of serving as trainers were identified and given a follow up Training of Trainers (TOT). Subsequently, the local trainers were given the responsibility of conducting classes under the guidance, supervision and facilitation of NSET instructors. Out of 90 graduates of the TOT, seven were involved in training in rural areas and others continued training activities at their organizations. Six experts and four technicians from NSET spent 104 person-months in Pakistan under the program.

Outputs

The scale of damage in Pakistan called for a massive intervention in terms of capacity building and training against popular expectations for immediate relief. Therefore, much of the time was spent in confidence-building and reassuring people on the need of safe-reconstruction. Despite the apparent mismatch between the people's expectations and services NSET offered, the project received full acceptance and was able to attain all training targets.

Lessons

The key lesson learned from the project was the realization of the need to integrate earthquake mitigation and preparedness measures even during the relief and early recovery phases. The combination of relief and recovery with earthquake mitigation and preparedness programs not only had the obvious long-term benefits but also assisted in preparing people for the aftershocks which also resulted in significant damages.

NSET's support/ involvement in other regional activities.

The following are some of the regional activities implemented by NSET with the aim of sharing knowledge, experiences and methodologies:

- NSET supported the recovery efforts after the earthquakes in Iran 2003 and Indonesia (Banda Aceh) in 2004. NSET provided technical assistance in raising public awareness and for building capacity of technicians involved in rescue, recovery and rehabilitation efforts.
- NSET provided consultant services to the European Commission in identifying the disaster preparedness program especially on earthquake hazards and risk mitigation in Bangladesh.
- NSET provided consultant services to UN-HABITAT for the implementation of the Community-based Disaster Management Program to the Government of Afghanistan in order to develop Guidelines for Earthquake-resistant Buildings and Earthquake Preparedness and conducted Training for Trainers (TOT) for Afghan professionals for Earthquake-resistant Building Construction.
- NSET provided consultant services to the Disaster Preparedness and Education Program of Bogazici University (Istanbul, Turkey) and Geohazards International (USA) under the project Central Asia Region Earthquake Safety Initiative (CAR-ESI) for conducting Training for Trainers program for professionals from Turkey and Central Asia.
- NSET provided technical assistance to MERCY Malaysia to conduct a three-day workshop on "Rebuilding a Safer Aceh" held in Banda Aceh, Indonesia. The workshop gathered a group of experts specializing in earthquake resistant construction of buildings as well as community based disaster management.
- NSET provided consultant services to SEEDS/ India to implement Post Tsunami Recovery Project in the Andaman Island, India.
- NSET has been involved with International Transfer Live Lessons Network (TeLL-Net), established during the UN-World Conference in Disaster Reduction in January 2005 in Japan, as one of its active members and has been participating in its assembly meetings. NSET intends to carry out Transfer Live Lessons activities through exhibitions in its proposed new community learning centre.
- NSET provided technical assistance to JICA/ Pakistan in association with Tokyo University to conduct a Shake Table demonstration of model buildings with PP Band technology in Muzaffarabad and Bagh (earthquake affected areas) of Pakistan.
- NSET provided technical assistance to The World Bank/Indonesia in association with Building Research Institute (BRI)/Japan to conduct a Shake Table demonstration of model buildings in Banda Aceh.

Program for Enhancement of Emergency Response (PEER)

In 2003 NSET took on the responsibility of implementing a regional program on earthquake risk reduction. The Program for Enhancement of Emergency Response (PEER) is a regional training initiative supported by the USAID/OFDA and has been underway since 1998. PEER-II or phase two of the program aims to reduce earthquake risks in Bangladesh, India, Indonesia, Nepal, Philippines and Pakistan (Bangladesh was included in 2003, Pakistan in 2006). Since 2003 NSET has been managing the PEER-II program in collaboration with its three main subcontracting partners – the International Resources Group (IRG), Johns Hopkins University/ Centre for International Emergencies and Refugee Studies and Safety Solutions Inc. The ADPC had implemented the first phase of PEER I during 2001 – 2003.

Figure 4: PEER implemented countries

Objectives

The overall goal of the PEER-II program is to reduce mortality during mass casualty events and increase the survival rates of disaster victims. The specific objectives are to:

- Establish and strengthen the capability of PEER countries to provide collapsed structure search and rescue and basic and advanced life support, begin¬ning with the first responder and continuing through the medical facilities,
- Develop a train¬ing system that continually provides disaster response with qualified personnel for search and rescue, medi¬cal first response and medi¬cal facilities prepared to receive victims, and
- Establish a coordinating network of emergency and medical response, and training institutions and individuals in PEER countries that ensure the continuation of the PEER process and further promote its evolution.

The objectives seek to address the need to build greater ownership and accountability for PEER in the program countries, while demonstrating that the intended results are attainable. Besides delivering training, the program also seeks to set up management systems for quality assurance and control and provide participating countries with expertise to design, develop, produce, maintain and adapt their own courses. PEER-II also specifically seeks to integrate the Hospital Disaster Preparedness component within the program and to ensure that equipment needed for the two main courses – MFR and CSSR – are based on local resources. Other activities include identifying

TRAINING COURSES

Main courses:	Medical First-responder Course (MFR)
	Collapsed Structure Search and Rescue (CSSR)
	Hospital Preparedness for Emergencies (HOPE)
Instructor Development	Training for Instructors (TFI)
Courses:	MFR Instructors' Workshop
	CSSR Instructors' Workshop
	Master Instructors' Workshop
Subsidiary courses:	Course Design and Development
	Course Adaptation Workshop
	Refreshers training Course

Breaching the concrete wall using Rotory Rescue Saw during CSSR course

Splinting the leg during MFR course

selected institutional, policy, regulatory and budgetary deficiencies and assist their rectification as well as building closer ties with existing professional societies and associations working on disaster harm and risk reduction.

Approach

The training courses are sequential; the MFR is a prerequisite for CSSR. HOPE was integrated as a third basic course in PEER-II. The focus of the trainings is on precise life-saving skills during emergencies. The training programs are designed in a manner that they are performance oriented, objectives-based, interactive and evaluated. As an offshoot of the core program, PEER-II also partially supports training of emergency personnel in countries where the demand is greater than that envisaged by the program. Typically, the partially-supported programs have support from the government of the country concerned.

Achievements

PEER-II conducted 119 different training activities in the program region between March 2003 and November 2008. The number of graduates from PEER-II programs is given in Table-5:

Practicing on-site Triage during HOPE course

TABLE-5: PEER-II ACHIEVEMENTS UP TO NOVEMBER 2008

Country	Graduated MFR Graduates	Instructors	CSSR Graduates	Instructors	TFI Graduates	HOPE Graduates	Instructors	MIW Instructors
Bangladesh	89	34	72	34	53	63	9	13
India	114	55	71	47	75	102	84	59
Indonesia	123	36	82	29	62	43	1	27
Nepal	123	70	110	45	133	152	26	17
Pakistan	125	41	92	37	43	91	23	0
Philippines	215	76	185	63	139	100	34	19
Total	789	312	612	255	505	551	177	135

MFR-Medical First Responder Course
CSSR-Collapsed Structure Search and Rescue Course
TFI-Training for Instructors Course
MFRIW-MFR Instructors Course
CSSRIW-CSSR Instructor Workshop
HOPE-Hospital Preparedness for Emergencies

TABLE-6: PEER-II NODAL AGENCIES AND PARTNER INSTITUTES

Country	Nodal Agency	Identified Training Institution for MFR and CSSR Programming	National Partners	Focal Institution for HOPE Programming
BANGLADESH	Ministry of Food and Disaster Mgmt	Fire Service and Civil Defense	Fire Service and Civil Defense	National Institute of Preventive and Social Medicine (NIPSOM)
INDIA	Ministry of Home Affairs	• Central Industrial Security Force (CISF) • Indo-Tibetan Border Police (ITBP)	• Central Industrial Security Force (CISF) • Indo-Tibetan Border Police (ITBP) • Border Security Force (BSF) • Central Reserve Police Force (CRPF)	Emergency Medical Relief (EMR)
INDONESIA	BAKORNAS	Central Industrial Security Force (CISF)	• Jakarta Fire Services • Ambullan118 • BASARNAS	Indonesian College of Surgeon
NEPAL	Ministry of Home Affairs	National Police Academy	• Nepal Police • Armed Police Force • Nepal Army • Nepal Red Cross Society	Institute of Medicine (IOM)
PAKISTAN	National Disaster Management Authority	• Emergency Services Academy • Military College of Engineering	• National Emergency Services • Pakistan Army • Civil Defense • Pakistan Red Crescent Society • FOCUS • Fire Services • Pakistan Rangers • Elite Police Force	Health Services Academy
PHILIPPINES	National Disaster Coordination Council-Office of Civil Defense	• Amity Public Safety Academy (APSA) • Fire National Training Institute (FNTI)	• Amity Public Safety Academy (APSA) • Bureau of Fire Protection • Department of Health • Office of Civil Defense • Metro Manila Development Authority • Emergency Rescue Unit Foundation • Philippine Army • Philippine National Red Cross	Department of Health

Nepal Earthquake Risk Management Program (NERMP)

An empirical study by NSET in 1997 (under KVERMP) had estimated that about half of all buildings in Kathmandu Valley could be damaged beyond repair in the event of an earthquake of the IX MMI level (equivalent to the tremor that shook Kathmandu Valley during Bihar-Nepal Earthquake of 1934). The study also estimated that most of the critical facilities such as telephones, electricity and water supply would be disrupted. Nepal Earthquake Risk Management Program (NERMP) came as follow up to efforts initiated under KVERMP and were followed up by the KVERM-APIP. The NERMP was launched on October 1, 2005 with the support of Office of the Foreign Disaster Assistance (OFDA), USAID and is to continue until August 2008.

Goals and objectives

The goal of NERMP is to improve earthquake safety through earthquake vulnerability reduction and preparedness initiatives. The project has two objectives:

- To improve seismic safety of public and private schools, critical facilities, residences and public infrastructures
- Institutionalize earthquake risk management practice in Nepal
- The NERMP seeks to attain the first objective by attaining the following results:
  - Improved seismic safety of public and private school system of Kathmandu Valley though the School Earthquake Safety Program (SESP),
  - Improved seismic safety of hospitals and water supply system Kathmandu Valley, and
  - Emergency response and disaster preparedness plan is developed and made operational in the critical facilities and systems.
- The second objective is to be attained through the following outcomes:
  - Improved earthquake preparedness in five municipalities in Kathmandu Valley,
  - Improved knowledge, skills and practices in earthquake-resistant construction including enhancement of municipal capacity of building inspection and certification process in Kathmandu Valley,
  - Significantly raised level of awareness on earthquake safety in urban areas of Kathmandu Valley, and
  - Enhanced community-based emergency response capacities in Kathmandu Valley.

The sub-activities of NERMP include continuing SESP and seismic improvements at schools; organizing earthquake preparedness drills; developing curricula on disaster risk reduction and emergency response for secondary schools; organizing earthquake awareness contests; publishing safety manuals; reducing risk at hospitals, water supply systems and advocating emergency response planning at critical facilities. It would also continue technical assistance to municipalities for building code implementation, mobile earthquake clinics, and earthquake safety clinics and make small grants to NGOs for implementing capacity-building and awareness raising programs.

Community and school students involved in the demolition of the old school building (SESP)

Networking and Outreach

Asian Seismological Commission

NSET organized the Fourth General Assembly of Asian Seismological Commission (ASC) in Kathmandu (24-26 November 2002). The ASC meeting was organized alongside a three-day Symposium on Seismology, Earthquake Hazard Assessment and Risk Management and a two-week pre-symposium training on Earthquake Vulnerability Reduction for Cities. The theme of the 2002 Symposium was "Experiences in Disaster Risk Management". There were two main sessions: one focused on international disaster management programs and the other on the situation in Nepal. About 150 seismologists, geologists, earthquake engineers, civil engineers, disaster managers, etc. from 22 countries participated the assembly.

ASC is a regional scientific organization affiliated to the International Association of Seismology and Physics of the Earth's Interior (IASPEI). ASC recognizes the high seismicity and very large population that combine to create the earthquake risk in Asia and the need to improve cooperation among Asian and Pacific nations to mitigate the catastrophic effects of large earthquakes. The first assembly of the ASC was held from 1 – 3 August 1996 at Tangshan, China, during the IASPEI regional assembly. The subsequent assemblies were held in 1998 and 2000, at India and Iran respectively. The 2008 assembly of ASC was held in Japan.

International Framework for Development of Disaster Reduction Technology List on Implementation Strategies

NSET organized the second regional workshop on International Framework for Development of Disaster Reduction Technology List on Implementation Strategies "Disaster Reduction Hyperbase" Core Member Meeting (CMM) II (For Asia-Pacific Region) in Kathmandu in November 2005. The meeting was jointly organized with the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan, National Research Institute for Earth Science and Disaster Prevention (NIED), Japan and the International Strategy for Disaster Reduction (UN/ISDR).

The workshop sought to establish a multilateral collaborative exchange mechanism for gathering and analyzing information on effective technologies and practices, and to build a platform or network of institutions (research, science and practice oriented with national nodes). Another goal was to facilitate the dissemination of this information, jointly with UN/ISDR, through a web-based database on disaster reduction technologies and implementation strategies.

Disaster Preparedness and Response Plan Framework (DPRP)

The pilot project on Disaster Preparedness and Response Plan (DPRP) Framework for Safe Drinking Water in Lalitpur Sub-metropolitan City (October 2006-May 2007) was a joint initiative of NSET, UNICEF and the Lalitpur Sub-metropolitan City. The project sought to contribute to the Disaster Response Preparedness of the municipal authority by enhancing its disaster management capacity, including preparing a comprehensive framework for a Disaster Preparedness and Response Plan. The activities included identifying potential evacuation sites for use during emergencies, selecting deep tube-wells from existing wells that are accessible to the evacuation sites, conducting earthquake vulnerability assessments of selected wells and making them earthquake-resistant and building new deep tube-wells accessible to the identified evacuation points.

National Strategy for Disaster Risk Management

In 2007, NSET provided technical assistance to UNDP in assisting the Government of Nepal in the preparation of the National Strategy for Disaster Risk Management (NSDRM). The National Strategy for Disaster Risk Management (NSDRM) is results as step towards implementing Nepal's commitments to the Hyogo Framework of Action (HFA) 2005-2015 on disaster reduction. Nepal had made the commitment at the UN World Conference on IDNDR (Yokohama, 1994) and the UN World Conference on Disaster Reduction,

Kobe, 2005 (WCDR 2005). The NSDRM is based on the HFA and consultations with relevant stakeholders. UNDP supported the Government of Nepal in the process by providing financial support from the European Commission through its Humanitarian Aid department.

The HFA 2005-2015 was adopted as a guide in the strategy formulation process because it recommends what each country should do for disaster reduction. The strategy – that was finalized in December 2007 – adapts the commitments made in the HFA to the ground realities and specific needs of Nepal. It also promises to bring together all existing opportunities in Disaster Risk Management (DRM) in Nepal in line with the international understanding, scientific progress and regional initiatives.

The draft strategy, written by NSET, covers eight sectors: Agriculture and Food Security, Health, Education, Shelter, Infrastructure and Physical Planning, Livelihood, Water and Sanitation, Information, Coordination and Logistics, Search and Rescue and Damage/Need Assessment. Human Rights and Protection, Gender and Social Inclusion, Staff Safety and Security and Decentralization and Local Self Governance are crosscutting issues.

NSDRM process:

As the preliminary step, a National workshop on Development of National Strategy for Disaster Risk Management (NSDRM) was organized to present the concept and process of NSDRM and to discuss the expectations and suggestions of stakeholders. Then as part of the strategy formulation exercise eight sector specific workshops were organized jointly with the Ministry of Home Affairs, other government ministries and the UNDP. The workshops aimed at introducing HFA and its components, review existing capacities, policies and programs in the sector and come up with recommendations for incorporation in the draft strategy. All workshops included introductory presentations on NSDRM and the HFA and SWOT exercises in five groups (government, donors, NGOs/Ingo's, corporate sector and the community) to discuss the applicability of HFA in Nepal. The participants produced complete SWOT analyses in groups that contributed to the national strategy. The workshop organized at the end and the individual consultations at different levels led to the preparation of a final draft NSDRM by NSET. The draft was shared with stakeholder representatives on June 2007. The purpose of the meeting was to seek comments and suggestions for incorporation in the final document.

Stakeholders involved in the NSDRM workshop

BOX-13: The Hyogo Framework of Action

In January 2005, 168 governments, including Nepal, adopted a 10-year plan to make the world safer from natural hazards at the UN World Conference on Disaster Reduction, held in Kobe, Hyogo, Japan. The Hyogo Framework of Action (HFA) is a global blueprint for disaster risk reduction efforts to be undertaken between 2005 and 2015. The goal is to substantially reduce disaster losses by 2015 – in lives, and in the social, economic, and environmental assets of communities and nations. The HFA priorities are:

- Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation,
- Identify, assess and monitor disaster risks and enhance early warning,
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels,
- Reduce the underlying risk factors, and
- Strengthen disaster preparedness for effective response at all level.

Sharing knowledge and experience

Nepal-Pakistan:
A 10-member team from Pakistan representing various organizations working on earthquake safety visited Nepal to observe the ESD activities. The team was in Nepal for a week (11-18 Jan, 2007) at the request of NSET. The team observed the ESD activities and also shared their experiences on rehabilitation and reconstruction in Pakistan with Nepali partners and stakeholders.

Capacity Building and Knowledge Management: Institutionalization of Earthquake Preparedness in Schools in Earthquake-affected Areas of Pakistan (CBKMP):
NSET implemented the CBKMP from November 2006 to April 2007. The program was supported by the UN-ISDR and it was implemented in collaboration with Focus Humanitarian Assistance Pakistan (FOCUS) and Aga Khan Education Services, Pakistan. The project aimed at contributing to building resilience of communities to disasters through capacity building of teachers and students in earthquake affected areas. It had three specific objectives: a) to introduce the knowledge and skills on earthquake-resistant construction of new buildings and seismic retrofitting of existing schools in Gilgit and northern areas of Pakistan by undertaking pilot demonstration program in

Participants of the Training on Earhtquake Preparedness in Schools for school teachers in Gakuch, Northern Areas of Pakistan

Box-14: Kathmandu Kobe Exchange Program

NSET began the Kobe-Kathmandu exchange program in 2002. The program has become an integral part of NSET's School Earthquake Safety Program (SESP). The program aims to enhance cooperation between the students of Kobe and Kathmandu through learning experiences and sharing knowledge in disaster mitigation. The goal is to raise awareness for disaster preparedness among students, teachers, and other members of the community. The program consists of: Exchange of Culture Box, Disaster Education Program, etc. Each year the students from Maiko High School of Kobe, Japan conduct educational and cultural visit to the schools that have been reconstructed and/or retrofitted under SESP. Ten students and three teachers from Maiko High School, Japan along with six members from "Support for International Disaster Education" (SIDE) from Kobe visited Nepal (18-30 August 2007). The Japanese visitors met and interacted with their counterparts at different public schools in Kathmandu Valley. The team performed various activities at different government schools of Kathmandu where the SESP is being implemented. The activities included:

Eloquence contest: An interschool eloquence contest was organized on 21 August 2007 jointly by Action Aid Nepal, Maiko High School and NSET on "Earthquake Preparedness in My School". The participants came from SESP schools. Ten schools participated in the contest.

• Exchange of Culture Box: Knowing each other's culture is vital for promoting international understanding and cooperation. The "Culture Box" is a symbolic representation of the culture of a country and exchanging them helps to expand the understanding of different cultures. The Culture Box exchange took place on 23 August 2007. Besides, students from Maiko High School from Kobe, Japan, and from Balbikas Secondary School, Alapot, also performed in a cultural program.

• Disaster education program: The SIDE team from Kobe organized a short training and awareness program for students of Balbikas Secondary School, Alapot and Shree Krishna Higher Secondary School, Dhapakhel, on 24 and 27 August. Around 50 students from grade eight to 10 from each school participated in the training program. The topics covered disaster mitigation and the curriculum on disaster studies, piloted by the Maiko High School of Kobe, Japan.

each area and conducting appropriate training for masons and school operators, b) to enhance earthquake awareness in the school system and institutionalize disaster preparedness and response planning, especially on seismic risks (on actions and measures to be taken before, during and after earthquakes, and development of safe school program, including check lists, evacuation drills, etc.), and c) to undertake a comparative research of lessons-learnt and best practices in the aftermath of earthquake rehabilitation and reconstruction process in India, Iran, Turkey and Pakistan.

Nepal-Iran (Exchange of Experiences):

Thirty-three engineers, government officials and representatives from UNDP Iran and other organizations visited Nepal on 31 January to 3 February 2007 for observing earthquake risk management initiatives at NSET and other Nepali organizations. The main objective of the tour was to enable the visitors to study various initiatives for earthquake risk management in Kathmandu Valley. It was organized as part of a 5-year program: "Strengthening Capacities for Disaster Risk Management in Iran 2005-2009". NSET and Asian Disaster Preparedness Centre (ADPC) have been providing technical support to this program through international consultancy, training courses, workshops and study tours. NSET was involved in the project from December 2006 to December 2007.

Up-streaming Community-based Approaches for Promoting Safer Building Construction:

NSET provided technical assistance to UNDP, Iran to implement the Up-streaming Community Based Approaches for Promoting Safer Building Construction in Lorestan, Iran. The overall objective of the program was to up-stream the community-based approaches for promoting safer building construction. Specifically, it sought to: a) to discuss community-based approaches for promoting safer building construction and explore potential for the use of such approaches in Iran, b) to select, localize, customize different tools already available and develop new tools for promoting safer building construction

through community mobilization and capacity development of end users, c) to discuss possible modes of implementation and the role of different stakeholders, and d) to identify the related policies for supporting these activities and to recommend possible policy options. The program began in December 2006 and ended in October 2007.

Program for Strengthening Capacities for Disaster Risk Management in Iran:
NSET together with Asian Disaster Preparedness Centre (ADPC)/Thailand provided technical support to the Joint National Program for Strengthening Capacities for Disaster Risk Management, a five-year program of UNDP-Government of Iran and UNDP-Iran. The goal of the program was the reduction of disaster vulnerability and prevention of loss of lives and damages to property, human settlements, infrastructure, and critical facilities.
NSET organized a series of capacity development activities like workshops and trainings in two pilot cities, Kerman and Gorgan, in the period of February–September, 2007. Workshops and trainings on a) Urban Earthquake Risk Management, b) Medical Infrastructure Safety, c) Community Based Disaster Risk Management, c) Improvement of Building Permit System, and d) Emergency Response Planning were organized for city officials and representatives from other government organizations.

Masons participating in discussion at the site during the training in Iran

Identifying the critical issues to be discussed with building workers

BOX-15: ProVention Consortium awards

Binod Shrestha, geotechnical engineer and Hima Shrestha, structural engineer at NSET were awarded Applied Grants for Disaster Risk Reduction in 2005-06. The award was funded by ProVention Consortium, which supports young scientists to conduct research on disaster risk-reduction technologies and approaches.
The awarded research topics were, "Developing a set of Standard Building Design Suitable for Nepal" and "Development of Seismic Retrofitting Scheme for Typical Nepali Non-engineered Masonry Infill Reinforced Concrete Framed Buildings". Both authors were published in Real Risk, a book published by Tudor Rose and ISDR. The publication was launched at the International Disaster Reduction Conference, Davos 2006. Two of three papers that were published in the book were written by NSET experts.

Nepal-Bhutan: NSET has an agreement with the Standards and Quality Control Authority of the Bhutan's Ministry of Works and Human Settlement for providing short-term technical advice on the Thimpu Valley Earthquake Risk Management Program (TVERMP). Under the agreement, NSET will conduct structural and non-structural seismic vulnerability assessment of buildings, identify retrofitting options, develop standard guidelines and train engineers on safe construction techniques. So far, NSET has conducted the seismic vulnerability assessment of two assigned buildings, conducted the seismic retrofitting design and provided training on seismic vulnerability assessment and retrofitting design. Preparation of guidelines for assessment and retrofit design as well as guidance on implementation of retrofitting is underway. The program will end in December 2008.

Risk-reduction in communities

NSET has been working with several communities at the ward level in Kathmandu to assist them in Pre-Positioning Emergency Response Stores (PPERS) at various locations and providing community-level training. It also assisted NRCS to implement Kathmandu Valley Preparedness Initiative (KVEPI), which included imparting training program and in locating pre-positioning of emergency response stores.

NSET has been working with UNICEF Nepal and Lalitpur Sub-Metropolitan City to pre-position contingency water supply for emergencies and to prepare a general Disaster Preparedness and Response Plan for Lalitpur Sub-Metropolitan City (LSMC).

NSET was also involved in implementing the Community Based Disaster Management Program (CBDM) in Kathmandu Valley supported by Oxfam GB, Nepal. UNDP is supporting the same program in six municipalities outside Kathmandu. The Kathmandu project was implemented in five wards of LSMC and aimed at enhancing the security of vulnerable communities through appropriate capacity building measures (awareness campaigns, trainings) and institutionalization of the process in the local governance system. It also aimed at forming ward-level disaster risk management committee (WDMC) in five wards and enhancing the capacity of WDMC members and volunteers for designing and implementing disaster risk reduction and preparedness activities.

Disaster Management Training: A seven-day Disaster Management Training for Community was held from 13 to 19 May, 2007 in Lalitpur (Staff College). The training was jointly organized by Lalitpur Sub-Metropolitan City (LSMC) and NSET under the project CBDMP-K. Thirty volunteers representing five wards and the municipal officials participated in the training.

Participants of the DM training observing the vulnerability during the field visit.

Participants during the CDBM training in Kathmandu.

Vulnerability and Capacity Assessment (VCA) Trainings/Workshop: A three-day VCA training and workshop was organized from 30 May to 1 June, 2007 for volunteers who participated the seven-day training on Disaster Management.

Vulnerability and Capacity Assessment (VCA) Field Study: NSET organized an extensive field study on VCA methodology and exercises for community volunteers from 6 - 12 June 2007. The study was conducted in the course of doing detailed risk assessment of the community.

Action Plan Workshop: A three-day Action Planning Workshop was held at Hakha Tole Community Building near Mangal Bazaar from 13 to 15 July, 2007. The Action Planning Workshop was a step towards preparing ward-level Disaster Response/Mitigation/ Preparedness plans.

The CBDM attained all of its objectives: Five ward-level disaster risk management committees were formed and 330 community members were oriented on disaster safety; 30 ward-level disaster management committee members and community volunteers were trained on community-based disaster risk management; and 30 community volunteers were trained on participatory vulnerability and capacity assessment. The project also conducted detail vulnerability and capacity assessment of all the five wards.

Community Based Disaster Management Project (CBDMP)

The Community Based Disaster Management Project (CBDMP) implemented with support from UNDP Nepal in six municipalities in Central and Western Nepal ended in September 2007. The project activities were carried out in three wards of the participating municipalities, which are as follows:

- Putali Bazar Municipality, Syangja
- Vyas Municipality, Tanahu
- Bharatpur Municipality, Chitwan
- Hetauda Municipality, Makwanpur
- Malangwa Municipality, Sarlahi
- Kamalamai Municipality, Sindhuli

The project sought to enhance the safety of communities vulnerable to natural disasters and to protect common property and community resources. The major activities of the project included:

- Public awareness-raising in the selected wards and municipalities,
- Formation of Community Disaster Management Groups (CDMG) in selected wards,
- Training on Community Based Disaster Risk Reduction,
- Vulnerability Assessment Training,
- Facilitation of planning and implementation of community level mitigation programs,
- Training on disaster management leadership for women,
- Training on HIV/Aids, violence against women and girl trafficking,
- Disaster risk reduction sensitization programs at schools,
- Training for building capacity of municipality professionals, and
- Earthquake vulnerability assessments.

Training participants involved in groupwork

Conducting ward level meeting

Other completed programs

School Earthquake Preparedness Program

NSET implemented the School Earthquake Preparedness Program in Jhapa, Rautahat and Kathmandu Valley in association with Lutheran World Federation (LWF) Nepal. The objectives of the program included development and publishing a manual on school earthquake preparedness for schoolteachers; training 140 teachers (20 from Jhapa, 20 from Rautahat, 100 from Kathmandu Valley in seven batches); preparing 70 School Earthquake Preparedness Plans (Action Plans) and conducting periodic earthquake preparedness classes and simulation exercises at each school.

Earthquake safety construction training for masons and construction technicians

(in Bhadrapur, Gaur, Bhaktapur, Madhyapur Thimi, Kirtipur Municipality and Kathmandu Metropolitan City)

NSET provided technical assistance in training masons and construction technicians in Bhardrapur, Gaur, Bhaktapur, Madhyapur Thimi, Kirtipur Municipalities and Kathmandu Metropolitan City. Other objectives of the program were a) Capacity enhancement of municipal construction technicians for incorporating earthquake-resistant construction technologies, disseminating the technology and implementing earthquake risk management activities; b) Dissemination of earthquake-resistant construction technology including retrofitting of existing buildings to the key role players involved in the construction process; and c) Include municipal authorities in training and assist them to initiate promotion of safer building construction practices. A total of 601 masons and technicians have been trained on earthquake-resistant construction technology in Bhadrapur Municipality of Jhapa, Gaur Municipality of Rautahat and Kathmandu Valley. Another 104 "self-builders" were also trained in Kathmandu Valley.

Evaluation of the "Post Flood Shelter Restoration Project, Barmer"

NSET provided consultant service for the evaluation of the ECHO Action in Rajasthan India i.e. "Post Flood Shelter Restoration Project, Barmer in order to assess the impact of different actions implemented with the support of DG ECHO and to allow for recommendations on the future response strategy of DG ECHO in India. The specific objective of the program was to have an independent structured evaluation of the results of the action ''Post Flood Shelter Restoration Project Barmer' implemented by Christian Aid and Sustainable Environment and Ecological Development Society (SEEDS) in Barmer District Rajasthan, India. The evaluation was done to obtain an overall view of the DG ECHO funded action in Barmer District, Rajasthan showing its intervention logic and relation to the overall objectives of the DG ECHO, to assess the results and the means employed as compared to the objectives mentioned and to draw conclusions and make recommendations for future strategy and improvements in methodology.

Achievements, Impacts and Lessons in the Decade

Since its establishment, NSET has been advocating for, and carrying out, a range of risk reduction measures ranging from vulnerability and risk assessments, generating information on attributes of earthquakes, advocating enforcement of building codes and land-use regulations, and awareness raising and capacity building for risk reduction.

NSET carried out these activities in partnerships in Nepal and other countries with a large number of central and local government institutions, civil society organizations and international agencies including the UN system. The specific interventions have ranged from making schools and hospitals safer during earthquakes,

encouraging reinforcement of individual homes, simulating post-earthquake scenarios and carrying out evacuation drills. As part of its advocacy efforts NSET uses almost every medium available for raising awareness on ways to reduce the loss of life and property during earthquakes.

There has been no thorough and formal survey on our achievements and impacts. One can, however, easily witness the remarkable changes that have taken place in terms of the earthquake awareness of people at large, professionals and officials in Nepal, which NSET believes has been instrumental in bringing about. This increased awareness is reflected in the increased participation of people and institutions in earthquake risk management initiatives, increased media coverage, and increased demand for more risk reduction activities from part of the country. The number of organizations that adopted DRM (with ERM) as one of their main agenda has increased. There has also been a considerable increase in investments of donor agencies in the field of Disaster Risk Management/ Earthquake Risk Management.

Credibility of NSET has been enhanced over the years, more than 64 institutions (government and non government in Nepal and abroad, UN Agencies, Academic institutions and private institutions have signed Memorandum of Understanding (MOU) with NSET. NSET today is also a partner in several international/regional initiatives (e.g. DRH, BRI, CASIFICA, Risk Red, TeLLNet, etc.)

There has been an increase in the number of municipalities incorporating Nepal National Building Code (NBC) in building permit process, which incorporates earthquake resistant features of building construction. Municipal bye-laws in Lalitpur Sub-Metropolitan City (LSMC), Kathmandu Municipality, and Dharan Municipality have already incorporated NBC and other municipalities are working towards doing the same.

Earthquake Safety Day initiated in January 1999 upon request of NSET has been one of the most successful advocacy initiatives. Its ownership is now shared by government, academic and private sector institutions as well as by local communities. The ESD is now observed in all of Nepal's 75 district headquarters.

The innovative methodology of earthquake risk assessment and action planning for earthquake risk management first completed in Kathmandu Valley, has been replicated in several other municipalities of Nepal. Other notable innovations are Earthquake Mobile Clinics, Vulnerability Tours, training of masons and petty contractors in earthquake-resistant construction, development of methodologies for seismic vulnerability assessment of health institutions and enhancing emergency response capacities of formal institutions and informal community groups.

The masons trained by NSET are spreading the technology of earthquake-resistant construction in their communities and replicating the technology while constructing new buildings. They are also training other masons. Thus the process of replication would multiply in future to set a new technological culture in construction. The experience thus gained has been published in the form of the Hand Book for Seismic Resistant Construction and Retrofitting of School Buildings in Nepal and the Mason Training Manual. In addition, the trained masons have formed their own association and are organizing training on their own initiatives.

In recent years the number of requests for technical assistance for the construction/retrofitting of public and private schools have been on the rise. Many agencies assisting communities to construct school building are now approaching NSET for technical assistance.

Many of the successes of NSET, especially the approaches, methodology and lessons learned

were found replicable in developing countries outside Nepal. For example, the experiences of SESP were taken to Bandung, Indonesia as part of RADIUS project. NSET took the experience of mason training and safer building construction to Patanka Village of Patan District, Gujarat, India, Iran and Pakistan. There are several other regional initiatives in which NSET has played key roles. NSET implemented the comparative evaluation of Community-Based Disaster Risk Reduction Programs implemented by UNCRD. NSET is the founding member of Asian Disaster Risk Reduction Network (ADRRN) and the representative of ADRRN in Nepal. Through its membership it was able to contribute in the post tsunami reconstruction of Banda Aceh, Indonesia and Andaman and Nicobar Islands, India by training local masons and technicians on earthquake-resistant construction technology.

These examples explain the contribution made by NSET in disaster risk reduction in Nepal and Asia. NSET has also been an important player in the development of the concept of disaster mitigation in Nepal and parts of Asia through the regional training program on Urban Disaster Mitigation and the Earthquake Vulnerability Reduction for Cities (EVRC) and recently in preparing the National Strategy for Disaster Risk Management of Nepal.

Chapter 4

THE YEAR 2007-08

2007/2008 was a remarkable as well as busy year for all in NSET. As in the previous years, NSET continued its efforts to bring about significant changes in the area of disaster risk reduction. Apart from the regular ongoing programs, various other programs in the area of risk reduction was carried out in Nepal and the region.

Towards Risk Reduction in the Region

Earthquake Vulnerability Reduction and Preparedness Program in Muzaffarabad and Mansehra Municipalities

NSET is working with United Nations Development Program (UNDP) Pakistan for providing technical support to National Disaster Management Authority (NDMA) of the Islamic Republic of Pakistan under the project "Earthquake Vulnerability Reduction and Preparedness Program" in Muzzaffarabad and Mansehra Municipalities since November 2007.

The project aims at building institutional structures, policies, and systems to integrate earthquake vulnerability reduction in the two municipalities. The project employs a multi-pronged strategy which combines technical knowledge with hands on practical experiences in earthquake vulnerability reduction and preparedness, which cuts across other themes such as capacity building, establishing a knowledge-base for informed decision making, human resource development, practical demonstration for education, awareness, training, and dissemination of learning and experiences locally, nationally and regionally. The project is built around a partnership approach where it brings together a range of different stakeholders like technical agencies, academic and research institutions, local governments, line agencies and civil society, while placing vulnerable communities in the middle, so as to demonstrate participation, partnership and use of local wisdom to promote context specific solutions to challenges posed to sustainable development, through a blend of structural and non-structural components of earthquake vulnerability reduction.

Earthquake Risk Assesment Training in Quatta, Pakistan

Building inventory survey in Muzaffarabad under EVRP

NSETs' approach for the technical support is to transfer the knowledge and skills on risk assessment, earthquake scenario development, action planning, demonstration projects, capacity building and training programs to project management team/professionals from Pakistan. Concept of tapering the NSET involvement as time line increase is adopted so that a core group of professionals are developed to conduct similar type of projects in other cities in Pakistan.

The major activities completed during the period are; development and finalization of risk assessment methodology, collection of secondary information, identification of stakeholders and initial meetings, development of survey formats and training to surveyors, development of data entry tool and training, building inventory survey, and preparation of vulnerability maps.

Seven different methodologies for risk assessment at city level were compiled based on the previous experiences and most suitable methodology for the risk assessment was decided. Methodology on developing hazard maps and methodology for collection of individual buildings level information for vulnerability mapping was also finalized. Based on the decided methodology a simple survey format covering the required physical as well as social information for risk as well as capacity assessment was developed. Data entry tool compatible to excel for compilation of collected information at individual building level was developed and trainings were given to data enumerators for both the cities. And about 14500 buildings in Muzaffarabad and 10000 buildings in Mansehra were surveyed for their physical conditions. Social information was also collected for social vulnerability mapping. Main stakeholders for implementing the project as well as potential users of the outcome were identified and initial meetings were organized to identify focal points in each organization to whom the project team can make continuous contact for arranging further interactions.

All the hazard and vulnerability evaluation will lead to the assessment of probable damage incase of potential earthquakes. Such damage scenarios will be used to interact with key stakeholders to help them to think over to the risk reduction and preparedness measures. Earthquakes Scenario and Acting Planning Workshops are planned in both the cities which will finalize the risk scenarios for both the cities and plan of actions for risk reduction.

Recently, a separate project consisting of similar objectives and activities is initiated for Quetta City in Balochistan Province. Training for local professionals on methodologies of earthquake risk assessment was conducted by NSET professionals in September 2008 and now the trained professionals are collecting, compiling and analyzing information and data required for the risk assessment. Similar risk assessment and action planning workshop will be organized in Quetta City also.

Technical support for Earthquake Resistant Reconstruction of Earthquake Affected areas of Pakistan: Progress review mission

NSET has been providing technical support for the reconstruction of earthquake affected areas of Pakistan through UNHABITAT Pakistan as technical advisor. Review and progress update visit was carried out on May 2008 to the affected areas where 6,00,000 houses are being reconstructed. Review on the reconstruction quality and progress was done and assistance for remedial measures to the non-compliant construction was provided.

Comprehensive Disaster Management Program – Bangladesh

The Comprehensive Disaster management Program (CDMP) of the Government of Bangladesh (GoB) is being implemented by the Ministry of Food and Disaster Management (MoFDM) of Bangladesh and is supported by United Nations Development Program (UNDP), Department for International Development-Bangladesh (DFID-B) and the European Commission (EC). CDMP is designed to strengthen the Bangladesh Disaster Management System and more specifically to achieve a paradigm shift from reactive response to a proactive risk reduction culture.

National Society for Earthquake Technology (NSET) in partnership with Asian Disaster Preparedness Centre (ADPC) together with Oyo International Corporation (OIC)-Japan, Asian Institute of technology (AIT)-Thailand and Bangladesh Disaster Preparedness Centre (BDPC) has been engaged under the CDMP project to provide technical services for the execution of;

- Seismic hazard and vulnerability mapping of Dhaka, Chittagong, and Sylhet city corporation areas
- Training, advocacy and awareness with regards to earthquake and tsunami hazard
- Contingency Planning for Dhaka, Chittagong and Sylhet city corporation areas

The objectives of the assignment under the three projects are ; to develop seismic hazard and corresponding vulnerability maps for the critical structures as well as the building stocks of Dhaka, Chittagong and Sylhet city corporations including their area and further extensions ; to develop a comprehensive geo-hazard risk reduction ; to

During the engineers training in Bangladesh

Breifing about the earthquake resistant technique during the mason training in Bangladesh

develop trainings, drills, advocacy and awareness in different cross-section of the people from government officials to community level in Dhaka, Chittogong and Sylhet City Corporation including their area under future expansions respectively.

Under this Comprehensive Disaster Management Program of Bangladesh, NSET professionals participated in various preparatory meetings, contingency planning meeting and discussions along with other participating institutions. They further assisted in the ongoing survey / building assessment works being carried out by local team as a part of Hazard, Vulnerability and Risk Assessment Component of CDMP.

A draft contingency plan with regard to earthquake hazard was prepared and a Technical Advisory Group (TAG) workshop was arranged to evaluate the prepared interim contingency plan. In addition training material for TOT for engineers and training for masons and bar binders were prepared and further steps has been initiated for the preparation of documentary to develop awareness of earthquake hazard and vulnerability.

Similarly the first and second phase of analysis and assessment regarding the Supervision and Guidance on Assessment of Physical Vulnerability of Buildings and Lifeline Infrastructure has also been completed.

Study Tour by Delegates from Bangladesh

22 delegates from Bangladesh comprising of engineers, government officials, representatives from UNDP Bangladesh, European Union, Ward level representative, representatives from Fire Department, Bangladesh University of Engineering and Technology (BUET) and other organizations conducted a study tour of Nepal in the period of March 31 – April 4, 2008 to familiarize with the main concepts, approaches and focus of Earthquake /Disaster Risk Management (ERM) activities in Nepal and evaluate possibilities of replication in Bangladesh. The specific objectives of the tour were to observe some major activities for earthquake awareness raising and risk reduction implemented in Nepal (e.g. School Earthquake Safety Program, Building Code implementation at the municipal level, Mason training programs and Community based disaster risk management in Nepal), to share current thoughts, plans programs of Bangladesh in terms of Disaster Risk Management and get suggestions from Nepalese stakeholders.

The study tour was coordinated by NSET as a part of the project Earthquake and Tsunami Preparedness Component of Comprehensive Disaster Management Program (CDMP), Bangladesh.

As the team was here to observe and learn from the earthquake risk reduction activities implemented in Nepal, they met the concerned representatives from government and other different sectors, visited the school retrofitting/ reconstruction site, observed the mason training program that have been jointly launched by the government and non-governmental organizations. In addition, they participated in the Experience Sharing Workshop on 'Disaster Risk Management Initiatives in Nepal and Bangladesh' organized by Ministry of Home Affairs, Government of Nepal and NSET in order to discuss, share and learn from the disaster related organizations in Nepal.

Risk Mapping and Shelter Response Planning for Maputo, Mozambique and Kathmandu, Nepal

The project 'Risk Mapping and Shelter Response Planning for Maputo, Mozambique and Kathmandu, Nepal-' is being jointly implemented by Global Risk Identification program (GRIP) of the United Nations Development Program/ Bureau for Crisis Prevention and Recovery, UNDP/BCPR and UN HABITAT with the involvement of NSET as a technical consultant.

The project aims at application of simplified RADIUS methodology to the cities of Kathmandu (Nepal) and Maputo (Mozambique) for effective pre-disaster and post-disaster shelter planning. The project also includes development of a guide and strategy for addressing shelter needs. This guide will introduce general issues in shelter planning, in relation to risk mapping and contingency planning, as well as use of the RADIUS tool to

facilitate this planning. The lessons learned from the pilot applications will be utilized to design a guide and training modules to facilitate the quick and effective large-scale implementation of this methodology.

The program activities of GRIP were officially launched in Mozambique as a demonstration country through a Launching Workshop organized on 7-8 May 2008. Mr. Surya Narayan Shrestha, Deputy Executive Director of NSET visited Maputo, the capital city of Mozambique, during 5-22 May 2008 to start the risk assessment and also to participate in the Launching Workshop. The other activities of the project accomplished so far in Maputo are training of municipal professionals on RADIUS and Preliminary work on earthquake risk assessment of Maputo city using RADIUS.

In line with overall goal and objectives of the project, the activities that have been conducted so far in Kathmandu are:

Identification of stakeholders and understanding with them: A number of key stakeholders (DUDBC, five municipalities, three District Development Committees) have been identified, discussions were made and understanding has been reached with them for shelter response planning and strategy development for Kathmandu Valley focusing on earthquake disasters;

Update of earthquake risk assessment for Kathmandu Valley: NSET is currently updating the input parameters such as demographic information, building typologies and building construction trends etc. to get updated earthquake risk assessment data.

Preparation of Draft Shelter Response Plan and Strategy Paper: Draft report on shelter response plan and strategy for Kathmandu Valley is under preparation. The shelter plan and strategy document will try to utilize the rich experiences of recent disaster response from around the world specifically the experiences from India, Pakistan and Indonesia. Also, it will try to look the immediate shelter response, transitional shelter response and long-term housing reconstruction and rehabilitation into a logical continuum and try to address the inter-linkage between all three phases.

Further, the update of earthquake risk assessment for Kathmandu Valley and the preparation of draft report is completed and a Shelter Response Planning Workshop was organized on 11 November 2008 in Kathmandu. Invitees to this workshop were the members of the Shelter Cluster, shelter related government institutions such as DUDBC and Ministry of Physical Planning and Works, municipalities and DDCs of Kathmandu Valley, UN System, NGOs and INGOs working in Nepal and corporate sector that supplies/, manufactures shelter construction materials. The workshop provided inputs on different aspects of shelter response and make decisions on key issues.

Risk Reduction in Country

Municipal Disaster Risk Reduction Program (MDRIP)

In order to improve disaster safety of urban areas of Nepal through participatory risk assessment, capacity building, planning and implementation of disaster risk reduction measures, NSET in close collaboration with UNDP and other Partnering Organizations (POs) is implementing the Municipal Disaster Risk Reduction Program (MDRIP) in Ilam and Panauti municipalities.

The major objectives formulated in order to achieve the goal are to;

- Enhance the capacity of Ilam and Panauti Municipality in Earthquake Risk Reduction and Emergency Response Capabilities.
- Institutionalize Disaster Risk Management Practices in Ilam and Panauti Municipalities of Nepal including Consolidation of past achievements for mainstreaming Disaster Risk Reduction into Municipal Development Planning Process.

There are five major activities planned for the project: i) Risk Assessment, ii) Disaster Risk Reduction and Response Master Planning, iii) Implementation of Disaster Risk Reduction Initiatives iv) Capacity Building, v) Community Education and Awareness, and out of these, the activities carried out so far are as follows;

Participating the Disaster Scenario and Action Planning workshop in Illam

Project initiation meeting were conducted and MOU's were signed with both Ilam and Panauti Municipalities to facilitate the smooth running of project activities.

The Baseline Survey and Building Inventory required for seismic risk evaluation was also carried out. The seismic risk evaluation of both the cities is being done by using RADIUS Tool.

In order to make the community members aware of the existing hazard risk and vulnerabilities in their community, Disaster Imagination Game (DIG) and Vulnerability Tour were organized in both the municipalities. 28 participants from each municipality comprising of representatives from political parties, teachers, students, businessmen, housewives, local influential persons and professionals actively participated in the DIG and Vulnerability Tour.

A one-day Kick off Meeting and Hazard Mapping Workshop was organized in both the municipalities. The first half of the day was devoted for MDRIP Kick off Meeting and the afternoon session was assigned for participatory hazard mapping of the entire municipality. The maps thus prepared are now being processed and final hazard/resource maps will be prepared in the near future.

The outcome of the preliminary RADIUS application in Ilam and Panauti showed that both the municipality is almost equally vulnerable to earthquake. Two different scenarios were prepared, one based on the 1934 Bihar Nepal Earthquake and the other based on the potential earthquake initiated by a potential fault nearest to the respective municipality.

As part of Disaster Risk Reduction Initiative, a mechanism for effective implementation of Nepal National Building Code has been developed. Ilam Municipality has declared a phase wise implementation of the Nepal National Building Code (NBC) with effect from July 2008. Panauti Municipality has decided to make all the preparations pertaining to implement NBC during this fiscal year so that it can be implemented from July 2009.

A five-day Basic Technical Training (BTT) Course on Design and Construction of Earthquake Resistant Buildings for engineers was conducted in Ilam from 25 to 29 August 2008. 23 persons actively participated in the training program conducted. The participants comprised of Engineers, Sub Engineers, Assistant Sub Engineers and Architects working within the municipality. The objective of the training was to enhance technical capabilities of the participants and introduce training techniques so that they could effectively transfer the technology to the masons.

Similarly, a five-day Masons Training Program on Construction of Earthquake Resistant Building was organized in Ilam from 1 – 5 September and from 22-26 September, 2008 at Panauti. The training program was organized with the objective of upgrading the skill of practicing masons in earthquake resistant construction of building.

In order to raise the awareness of the general people a one-day Awareness Program on Disaster Management and Earthquake Risk Reduction was organized in both municipalities during September 2008.

Comprehensive Risk Assessment and Action Planning in Ward no. 2 and 5 of Triyuga Municipality, Nepal (CRAAP)

NSET is implementing the project Comprehensive Risk Assessment and Action Planning in Ward No. 2 and 5 of Triyuga Municipality. The project is being funded by Action Aid Nepal as an additional initiative of Action Aid Nepal under the project "Surakshit Samudaya: Building Safer Community through Disaster Management Initiatives" being supported by European Commission through its Humanitarian Aid department under the Fourth DIPECHO Action Plan for South Asia. The main objective of the proposed study is to undertake a comprehensive multi-hazard risk mapping and develop appropriate DRR action plan for Ward No. 2 & 5 of Triyuga Municipality, Udaypur.

Scenario and Action Planning workshop in Triyuga, CRAAP

Education in Risk Reduction

NSET has begun the institutionalization of knowledge on disaster risk reduction and management by initiating collaborative education activities with established universities and colleges. It has launched two major programs in collaboration with academic institutions: The Case Station and Field Campus (CASIFICA) and Graduate Research Institute for Policy Studies (GRIPS).

Case Station and Field Campus

Since March 2006 NSET and the Disaster Prevention Research Institute (DPRI) of Kyoto University, Japan have been working on establishing a project for continuing education on risk education. The goal of the CASIFICA program is to conduct action research on disaster mitigation and disaster preparedness in five countries, including Nepal, and extend similar collaborative work regionally and internationally. The CASIFICA has two major objectives: Help institutionalize disaster risk education based on national/regional necessities and demands through linkages with academic institutions and research, and to provide academic assistance to disaster risk management initiatives of government and non-government organizations through a partnership of an NGO and an educational institution.

NSET and the Kathmandu University (KU) are implementing the CASIFICA program in Nepal in partnership with other government or non-government organizations. The projects include:

- Critical assessment of the impact of earthquake risk management works being done by NSET,
- Critical assessment of the School Earthquake Safety Program (SESP), and

- Critical assessment of disaster risk management activities in a particular geographical or administrative area within Nepal.

Major achievements:

The achievements of CASIFICA so far include:

- **Masters Degree Program on Environmental Studies at Kathmandu University:** NSET developed a curriculum on Disaster Risk Management for use in the M.Sc. program on environmental studies at Kathmandu University. The students from the university take classes on disaster risk management at NSET. The KU has gone to establish the Disaster Management and Sustainable Development Centre in collaboration with the University of North Umbria, New Castle upon Tyne, UK.
- **Masters Degree Thesis on Survey and Analysis of Health Institutions:** One student in the disaster risk management course has completed a M.Sc. thesis on "Survey and Analysis of Health Institutions of Kathmandu Valley" in terms of their disaster preparedness and emergency response capacity.
- **Masters Degree Program on DRM at the Nepal Engineering College:** NSET and the Nepal Engineering College (NEC) have collaborated on launching a Masters Degree Program on Disaster Risk Management. The curriculum was developed jointly and also involved other academic institutions.
- **PhD work:** A PhD candidate at the University of Kyoto completed his thesis on Knowledge Management and Implementation of Disaster Risk Reduction.
- Mr. Bijay Krishna Upadhyay, an Earthquake Technology Training Specialist, from NSET spent three months in Japan as visiting researcher at the Disaster Prevention Research Institute (DPRI). During his visit he shared the experiences of NSET in Nepal and collaborated in the CASIFICA research activities.

Collaboration with GRIPS

NSET has continuing collaboration with the Graduate Research Institute for Policy Studies (GRIPS) for research on disaster risk management. In 2006, NSET collaborated with GRIPS on effectiveness of non-formal disaster risk management education.

NSET and National Graduate Institute for Policy Studies (GRIPS) of Japan made two separate research agreements a) to conduct a field survey and analyze the result to better understand the earthquake risk perception among people and identify factors to affect actions for housing safety as a part of Collaborative Research and Development on Network of Research Institutes in Earthquake Prone Countries, and b) to collect information on disaster education of ordinary people at community people, mainly through the Internet and publications.

In September 2007, NSET and GRIPS organized joint workshops on Seismic Risk Assessment and Effective Dissemination of Safe Building technology in Kathmandu. The meeting was a part of the collaborative research and development project for mitigating disasters in earthquake prone areas in Asia. The partners involved in organizing the workshop were GRIPS of Japan and Nepal Engineering College (NEC). The objective of the workshop was to build capacity in research and development of disaster mitigation measures in Indonesia, Nepal, Pakistan, Turkey and Japan. The workshop objectives were: (i) To introduce the international research and development project to Nepali stakeholders, and (ii) To present the results and status of the R&D project Theme 1 (Seismic Risk Assessment Methodologies) and Theme 2 (Effective Dissemination of Safe Building Technology). It also included discussions on including the New Tool for Earthquake Risk/ Vulnerability Assessment in Cities of Developing Countries using "Google Earth" and GIS.

Preliminary Research on Earthquake Safety of Stone Masonry Buildings

NSET with support from Building Research Institute (BRI) is conducting a research on Earthquake Safety of Stone Masonry Buildings. The main research objectives are: Collection of findings on properties and performance of different stone masonry houses/elements; Identification of typical stone masonry houses in Nepal and the region; Collection and analysis of existing guidelines, ongoing researches, references and information dissemination materials; Identification of research direction and needs to conduct further research.

Documentation of Indigenous Knowledge and Coping Mechanism of Different Communities for Disaster Risk Reduction in South Asia

NSET provided consultant services for conducting the SAARC Disaster Management Centre- Asian Disaster Reduction Centre (SDMC-ADRC) Project on Documentation of Indigenous Knowledge and Coping Mechanism of Different Communities for Disaster Risk Reduction in South Asia during July- August 2008. The project was taken up in two parts. In the first part the existing literature on Indigenous Knowledge on Earthquake Resistant Housing Technology in Nepal was reviewed, analyzed and the implication of the lessons learnt for the development of policy framework on Indigenous Knowledge was studied. In the second part, a survey was conducted in an isolated community in the country to find out the genesis, structure and the dynamics of Indigenous Knowledge as it exists today to draw lessons for the future.

Study on Disaster-Poverty linkage

NSET is commissioned by UNDP Nepal to implement a study on Disaster-Poverty linkage as a Nepal pilot study of the Global Assessment Repot executed by the UN International Strategy for Disaster Reduction (UN/ISDR) and prepare a country report on "Study of natural disaster–poverty relationship" for the country of Nepal. The main objective of the study was to see the relationship between the disaster and poverty.

The DesInventar database (for hazard related data)together with the household level poverty related data of the Nepal Living Standards Surveys (NLSS) and the Ilaka level poverty related data obtained from the study "Small Area Estimation of Poverty, Caloric Intake and Malnutrition" (CBS and WFP 2006) were the main inputs for the study. The report covers the country profile of natural hazards-disasters, poverty profile and risk-poverty interface analysis for the country Nepal. This document is basically prepared to share the information about historic disasters and discuss the findings of the analysis of the Nepal disaster database as well as draw analysis.

Making Schools Safer Against Earthquake

NSET pioneered the School Earthquake Safety Program (SESP) in 1997 when it was included as a direct component of Kathmandu Valley Earthquake Risk Management Program (KVERMP) with the initiative of making schools safer against earthquakes that not only protects school children, but educates communities to protect themselves.

The program now is one of the successful ongoing programs of NSET in promoting community participation in all components of program activities and to raise earthquake awareness significantly. The masons trained during the program are now spreading the technology of earthquake-resistant construction in their communities and replicating the technology while constructing new buildings. Thus the process of replication (replicating the construction methods employed in school building to construct their private houses) would multiply in future to set a new technological culture in construction.

SESP of NSET has been implemented in altogether 32 schools till November 2008. Annex 7.

Present Status of the Ongoing Program Activities

NSET has been providing technical assistance to various schools under School Earthquake Safety Program through joint program with different Institutions.

Figure 5: Location Map of SESP implemented schools

SESP with World Bank

NSET signed agreement with the World Bank for the implementation of "Developing a Strategy for Improving Seismic Safety of Schools in Nepal". The program will be implemented jointly with the Department of Education, Ministry of Education; Government of Nepal. Two Districts, Lamjung and Nawalparasi have been selected for the implementation of pilot projects. The project components are preparing draft National Strategy on School Safety, Preparation of draft curriculum for school education, retrofitting of six school buildings, and training to local mason, teachers, students and community of the selected two districts. The project duration is August 2008 to July 2010. National level Steering Committee has been formed during project launching workshop conducted in Kathmandu on September 2008 for providing overall guidance during program implementation.

SESP under DRRSP with Action Aid Nepal

SESP has been implemented at eight schools of four districts of Nepal in association with Action Aid Nepal under Disaster Risk Reduction through School Projects which is in accordance with the Memorandum of Understanding (MOU) signed between NSET, Action Aid Nepal, Centre for Policy Research and Consultancy (CPReC), Education Network (ED Net) and Disaster Preparedness Network (DPNet) on 17 January 2007 for their involvement as national partners in Disaster Risk Reduction (DRR) through School Project. The program in Makawanpur District is at the final stage of completion and is in progress in Kathmandu, Banke and Rasuwa Districts. The program components are conducting HFA sensitization workshop, assessment of school buildings, retrofitting/ reconstruction of two schools of each four districts, training to local masons, teachers, students, disaster management committee members and the parents on disaster safety.

Evacuation drill conducted at Churiyamai Secondary School, Hetauda under DRRSP

SESP with Action Aid under DIPECHO Program

SESP has been implemented at two schools; one at Gaighat of Udayapur and another at Dharan of Sunsari district respectively in association of Action Aid under DIPECHO Program. The program components are retrofitting/ reconstruction of two schools of each four districts, training to local masons, teachers, students, disaster management committee members and the parents on disaster safety. Retrofitting of Laximipur Secondary school of Gaighat and Panchayat Secondary School of Dharan is in progress. The project will be completed on December 2008.

SESP with Room to Read

SESP has been implemented in Sakala Devi Primary School, Dibyapur of Nawalparasi district since April 2008 in association of Department of Education and Room to Read. New earthquake resistant building is being constructed and series of training programs to masons, students, teachers and parents have been conducted.

Students' Summit for Earthquake Safety- 2008

As a part of the School Earthquake Safety Program (SESP) being implemented by National Society for Earthquake Technology (NSET), the School Physical Improvement Program, being implemented by Department of Education (DOE), and as part of the Disaster Education Program of Maiko High School, Kobe, Japan the three institutions jointly organized the Students' Summit for Earthquake Safety- 2008 during 14-17 August 2008 at Kharipati, Bhaktapur, Nepal in close collaboration with ActionAid Nepal, Bank of Kathmandu Ltd, Japan International Cooperation Agency (JICA), Save the Children Alliance Nepal, UNICEF, and USAID.

The residential 3-day Summit drew a total of 127 participants including 96 students and 13 teachers from 26 public schools in 13 districts of Nepal, a delegation of 17 Japanese participants including 3 teachers and 10 students from Maiko High School of Kobe and 4 delegates from Support for International Disaster Education (SIDE) – a Japanese NGO created by previous students of Maiko High School.

Campaign theme of the Summit was **"Let's Keep Our Schools Safe from Earthquakes"**.

Maiko High School teacher Mr. Seiji Suwa addressing during Inugural session

Students with Placards during awareness rally

Evaluation and review of earthquake drill conducted

Objectives of the Summit were:

- Raising earthquake awareness of participating schools and institutions by sharing of knowledge and experience among schools of Nepal and between Nepalese schools and Maiko High School of Japan
- Promote in Nepal international good practices including rich experience of Japan on earthquake safety, especially after the Kobe Earthquake of 1995.
- Provide a common platform for cultural exchange among school children nationally and internationally and for discussing methods of developing and implementing School Earthquake Preparedness and Evacuation plan.
- Develop understanding and fraternity among school students of different parts of Nepal and with students from Kobe, Japan.

The 3-day Summit program included physical exercises and games, cultural programs, earthquake drills, lectures and discussion on aspects of earthquake and preparedness, and practical exercises on developing School Earthquake Preparedness/Response Plan.

Volunteers/Interns

NSET makes limited opportunities available to interested volunteers and interns. There isn't any deadline for applications, which are processed as received.

The following are the eligibility criteria for volunteers and interns:

- Applicants should have completed/enrolled in an undergraduate/ degree program both at the time of application and during the internship.
- Every Intern/Volunteer has to be a part of the ongoing program at NSET
- Recommendations from College/University/ Institutions
- All volunteers/ interns are required to work at NSET for a minimum of three months.
- Institutional volunteers are encouraged, but need references of their institutions
- All volunteers need to be proficient in English (Speaking as well as writing).
- All volunteers and interns are required to submit reports on the internship at the end of the period.
- NSET encourages volunteers/ interns to write a brief essay on what they expect to achieve for the purpose of evaluation/ selection.

Volunteers/Intern in 2007-08

Senior JICA Volunteer Yoshikiko Kori joined NSET in April 2007 as a volunteer for a period of two years from April 2007 to March 2009. He will be working with all Technical Directors and contribute his expertise to NSET activities as and when needed. He is also involved in translating an NSET publication (Awareness material on Earthquake Preparedness) into Japanese.

Ms Brigitte M. Balthasar (Catastrophe Analyst - Allianz Global Corporate & Specialty North America) joined NSET as an Intern for a period of three months (June – August 2007). She assisted in the activities under the Emergency Response and Preparedness Division of NSET.

Mr. Ciaran Tadgh Malik a student of Masters in Civil (Structural, Geotechnical and Environmental) Engineering of Cambridge University, England joined NSET as an Intern for a period of three months during August – October 2008. Mr. Mallik was involved in the Earthquake Engineering, Research and Training (EERT) Division of NSET. During his stay, he assisted in preparing the Mason training materials for PP- Band technology (Retrofitting). Apart from that he was also involved in other ongoing activities under the EERT division.

Mr. Jonathan Janardhan Surya Narayan a student of Masters in Public Health from Columbia University joined NSET as a Volunteer for a period of 4 weeks during November - December 2008.

Activities 2007-08

New cooperation agreements 2007-08

February 2, 2007: NSET signed a project agreement with the Social Welfare Council, Norwegian Refugee Council and the Nepal Bar Association for the Information, Counseling and Legal Assistance to the Internally Displaced in Nepal (ICLA) and the Shelter Program Component of a joint project. The project seeks to promote housing reconstruction through training, capacity building, cash-for-work and material inputs.

February 7, 2007: NSET signed a Memorandum of Understanding (MOU) with multiple partners—Action Aid Nepal, Centre for Policy Research and Consultancy (CPReC), Education Network (EDNet) and Disaster Preparedness Network (DPNet)—for promoting Disaster Risk Reduction through the School Project.

February 16, 2007: NSET signed an Agreement of Cooperation with FOCUS (Focus Humanitarian Assistance Pakistan) for implementing the Capacity Building and Knowledge Management Institutionalization of Earthquake Preparedness in Schools in Pakistan (CBKMP) program. CBKMP was implemented under an agreement with the UN International Strategy for Disaster Reduction (UNISDR)

March 16, 2007: NSET signed a MOU with the Mahendra Shanti Secondary School, Balkot, Bhaktapur to include the school under the School Earthquake Safety Program (SESP) of NSET under the Nepal Earthquake Risk Management Program (NERMP) supported by the US Office of Foreign Disaster Assistance (USAID/OFDA). Under SESP, NSET is to provide technical assistance, supporting the school in the design and construction of a new building with earthquake-resistant features. It signed a similar agreement with Mahendra Adarsha Secondary School at Imadol on 25 July 2007.

March 22, 2007: NSET signed a MOU with the National Research Institute for Earth Science and Disaster Prevention (NIED) for developing a Disaster Reduction Hyper-base (DRH).

April 24, 2007: NSET signed a MOU with the National Disaster Management of Pakistan on the need "to implement the PEER program in the best interest of Pakistan and create an environment of mutual cooperation towards its successful implementation." PEER is a six country program supported by OFDA/USAID.

November 8, 2007: NSET signed a MOU with PARADIGM-Nepal for undertaking earthquake risk management activities in Chitwan and other districts.

January 17, 2008: A Memorandum of Understanding (MOU) was signed among National Society for Earthquake Technology – Nepal (NSET), Action Aid Nepal, Centre for Policy Research and Consultancy (CPReC), Education Network (ED Net) and Disaster Preparedness Network (DPNet) for their involvement as national partners in Disaster Risk Reduction (DRR) through School Project. As per the agreement Disaster risk reduction through school is being implemented in 4 districts of Nepal

May 15,2008: A Memorandum of Understanding (MOU) was signed between National Society for Earthquake Technology (NSET) and Nepal Police on May 15, 2008 to set forth the environment of mutual understandings between the Nepal Police (Government of Nepal, Ministry of Home Affairs) and NSET on the need to implement the PEER program in the best interest of Nepal, and create an environment of mutual cooperation towards successful implementation of Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR) and TFI courses. The MOU was duly signed by Mr. Amod Mani Dixit, Executive Director of NSET and DIG Ramesh Chand Thakuri, Training Director, HRD, Nepal Police.

July 2008: A Memorandum of Understanding (MOU) was signed with Illam Municipality and Panauti Municipality, the two municipalities under the MDRIP program of NSET to implement the activities of the project in close coordination with the municipality on June 8 and July 1, 2008 respectively. MDRIP is being supported by the Global Risk Identification Program (GRIP/UNDP)

Yet another MOU was signed with Action Aid Nepal towards school retrofitting in Udayapur and Sunsari districts on June 15 2008.

Events

10th Earthquake Safety Day – 2008, 'Commemorating the 75th year of the 1934 Earthquake'

Year 2008 is the seventy fifth year of Great Nepal-Bihar Earthquake of 1934 (15 January 1934 A.D. or 2nd Magh 1990 in Bikram Sambat, the Nepali

Box-16: Earthquake Safety Day Celebrations outside the Valley

Butwal

On the occasion of 10th Earthquake Safety Day, 2008 various activities were conducted in Butwal. A Press Conference was organized on the evening of 15th January 2008 to inform the general public about the programs. The program in Butwal was coordinated by Friends Service Council and was participated by United Mission to Nepal (UMN), Nepal Red Cross Society Butwal, Center for Rural Community Development (CRCD), The Adventist Development and Relief Agency (ADRA) Nepal including Butwal Municipality and the area unit of District Administration Office, Rupandehi. National Society for Earthquake Technology-Nepal (NSET) provided the technical input for the overall program and conducted a Shake Table Demonstration with partial financial assistance from Action Aid Nepal. The day started with the Earthquake Awareness Rally from Puspalal Chowk which converted into a mass meeting at Kanti Sabha Griha. Around 500 participants participated the rally displaying placard and distributing pamphlets with various message and information on earthquake risk reduction. The Shake Table Demonstration was organized in the office premises of Butwal Municipality in presence of around 600 participants. Residents of Butwal also participated in the National drill on "Duck, Cover and Hold" carried out for 2 minutes at the exact time when Nepal was shaken by 1934 Bihar Nepal Earthquake followed by creating a human chain as a symbolic notion of the entire Nepali community to act jointly for disaster risk reduction and preparedness.

Biratnagar

On the occasion of 10th Earthquake Safety Day, 2008, an orientation program on Earthquake Preparedness and a Shake Table Demonstration was conducted in Biratnagar. Both of the program was coordinated by Department of Urban Development and Building Construction (DUDBC) Division Office Biratnagar and was organized jointly by Biratnagar Sub-metropolitan City (BSMC) and Morang District Development Committee (DDC). National Society for Earthquake Technology-Nepal (NSET) provided the technical input to both the programs. The Shake Table Demonstration program was conducted immediately after the orientation program on Earthquake Preparedness. So that the audience could very easily observe that the simple techniques briefed during the orientation can really make any building earthquake resistant.

In addition various other activities were conducted throughout the country as a part of ESD as:

Earthquake Memorial Meeting and Various Programs 16 January 2008, 75 Districts;

Earthquake Memorial Meeting and Various Programs 16 January 2008, 25 Division Offices of Department of Urban Development and Building Construction (DUDBC)

Calendar). The earthquake is one of the devastating earthquakes in the living memory of Nepalese people. More than eight thousand people lost their lives with massive destruction of property during the earthquake.

Each year, Nepal observes the National Earthquake Safety Day on January 15 or 16 (2nd of Magh as per Bikram Sambat) in commemoration of the devastating earthquake. In 1999, upon request from NSET, the Government of Nepal declared the day "2nd Magh" as the National Earthquake Safety Day (ESD) and since then Nepal has been observing the day with various awareness programs. Main objective of ESD is to create awareness and to share knowledge and information about safety measures and disaster risk management. Typically, the ESD is the culmination of earthquake risk management works implemented in the country in the preceding 12 months, and it allows taking stock of the achievements and shortcomings during the whole year.

ESD programs are managed and organized in a collaborative manner by many organizations working in Disaster Risk Management field and under the leadership of Earthquake Safety Day

National Committee (ESDNC), chaired by Hon. Minister for Home Affairs; the overall coordination and facilitation being done by NSET as Member Secretary of two sub-committees (Management Sub-committee and Information Campaign Sub-committee) formulated under the national committee.

This year, tenth National Earthquake Safety Day was observed throughout the country with various programs to create awareness among people on how to minimize risks during disasters. Apart from the regular activities some innovative initiatives were included as a part of the ESD program. The message on earthquake response that is "Duck Cover and Hold" was disseminated throughout the country through various communication means (radio, television, pamphlets) and in addition to that a national drill on "Duck, Cover and Hold" was carried out for 2 minutes at the exact time when Nepal was shaken by the 1934 earthquake followed by creating a "Human Chain" as a symbolic notion of the entire Nepali community to act jointly for disaster risk reduction and preparedness. An Earthquake Safety Monogram was also created this year to mark the 75th year of the 1934 Earthquake.

The main slogan this year was **"Ensuring Safety of Health Institutions and Uninterrupted Services During Disasters".** As in the previous years this year also various events were carried out in collaboration with Central Government, Local Government and other national and international institutions. Lalitpur was the focus this year and the 10th ESD kicked off with programs such as:

Basic Technical Training Course (BTT) on Earthquake-Resistant Construction of Buildings

There is a huge need to conduct training courses on earthquake-resistant construction for different target groups and for that there should be a group of considerable number of master instructors. Realizing the fact that, presently there exist a limited number of such master instructors, NSET and DUDBC decided to implement the master instructor development process. Basic Technical Training Course (BTT) is an initial training program of the master instructor development process as suggested by NSET and will be followed by number of other training courses.

NSET provided technical support to conduct the Basic Technical Training Course (BTT) on earthquake resistant construction for the engineers and junior engineers of Department of Urban Development and Building Construction (DUDBC) from all division. The training program was organized by Building Technology Research and Training Centre, DUDBC, Hetauda at the Vector Borne Disease Research and Training Centre Hall, Hetauda. The 5 days training held from 1-5 January 2008 was participated by 30 engineers and junior engineers of DUDBC.

Box-17: ESD Logogram

The Logogram is a symbol to mark the 75th year of the Great Bihar- Nepal 1934 earthquake. The Nepali words inscribed in the logo denotes respectively 'awareness', 'commitment' and 'implementation' (of disaster preparedness), the key lessons learned from the earthquake. The logogram is proposed to be used by different stakeholders working in earthquake risk management areas in their print and publication media (letterheads, stamps, campaigns) at national and local level during the period Jan 2008 – Jan 2009. Honorable State Minister for Home Affairs of Nepal, Mr. Ram Kumar Chaudhari inaugurated the logogram during the main Ceremonial function of National Meeting devoted to Earthquake Safety Day on January 16, 2008

Earthquake Resistant School Building Handover Program

An earthquake resistant school building handover ceremony was organized in Sainbhu Bhainsepati on the occasion of 10th Earthquake Safety Day on 13 January 2008. The building constructed for Jana Udaya Lower Secondary School at Sainbu V.D.C., Ward No 4, Bhaisepati, Lalitpur was handed over to the local community through School Management Committee. This is the 23rd school where NSET implemented School Earthquake Safety Program (SESP). Main objective of this program is to establish a culture of earthquake resistant construction by disseminating the technology in the local community. The program was jointly organized by NSET and School Management Committee of Janaudaya Lower Secondary School.

NSET provided technical support to retrofit the existing ground floor and construction of additional new floor complying fully with the seismic standards set by Nepal National Building Code. Besides, "On-the-Job Trainings" for local masons and awareness-raising activities for teachers, parents, students and local community were also conducted as part of the program. Major donors for implementing the program were World Vision International Nepal, Lalitpur Area Development Program; Sainbu V.D.C.; District Development Committee, Lalitpur and District Education Office, Lalitpur.

National Symposium on Experiences in Earthquake Risk Reduction and Response

A symposium on "Experience in Earthquake Risk Reduction and Response", took place at Hotel Himalaya, Lalitpur for two consecutive days (14-15 January). It was organized jointly by NSET, Department of Urban Development and Building Construction (DUDBC), Action Aid Nepal and OFDA/USAID. It was the 10th time that such a meeting of professionals' and decision makers was organized in the country in the occasion of Earthquake Safety Day. The basic target groups of the symposium were the professionals, decision makers in the government and outside government, international partners. The main aim of the symposium was to look back what we have done, what could have been done better and what are the left gap areas. The objective of the symposium was to share experiences of earthquake risk reduction and response between all stakeholders mainly among policymakers, decision makers and professionals.

The Symposium was inaugurated by Hon'ble Minister for Ministry of Physical Planning and Works, Ms. Hishila Yami and the opening

Honorable Minister franking special commemorative envelopes

Officials creating human chain after performing Duck Cover & Hold

Observing the exhibition on earthquake safety

Performing street drama on earthquake safety

Performing First Aid Demo

Glimpses of Earthquake Safety Day

ceremony was chaired by Mr. Uma Kanta Jha, Secretary, Ministry of Physical Planning and Works. 25 papers were presented in these sessions by the presenters representing different institutions both at the national and international level. Overall the symposium was a huge success participated by more than 150 participants representing the Government, Municipalities, INGOs, NGOs, Academic Institutions and Community Members. It in fact became a common platform for sharing experiences in earthquake risk reduction and responses of the whole region.

Earthquake Memorial Meeting at Bhugol Park, Kathmandu

An earthquake memorial meeting was organized at Bhugol Park New Road Kathmandu in the morning of 16 January, 2008, the main day of ESD. The function was organized jointly by Kathmandu Metropolitan City (KMC) and Nepal Engineers' Association (NEA). The program was attended by officials from KMC, NEA, NSET including government officials and local residents. KMC also requested the public within Kathmandu to observe a minute silence at 11:00 am including traffic halt during the silence period in the memory of those killed by the 1934 Earthquake.

Earthquake Safety Day Main Function

Various programs were organized by the Earthquake Safety Day National Committee to mark the 10th Earthquake Safety Day Main Function. The main day function was organized in Lalitpur Sub-metropolitan City and the programs were:

Earthquake Memorial Meeting/ Awareness Rally:

An Earthquake Memorial Meeting was organized at Earthquake Monument, Durbar Square, Lalitpur, which converted into a massive Earthquake Awareness Rally after paying homage to those deceased in the 1934 Earthquake. The rally went through various parts within Lalitpur Sub-metropolitan City. The rally consisted of Bands from Nepal Army, Nepal Police, Armed Police Force and Nepal Scout. The local music was also played by the Jyapu Samaj. High level government officials, municipality staff, representative of INGO's, NGOs, CBOs and community participated in the 1 km long rally. The rally converted into a mass meeting in the premises of Lalitpur Sub-metropolitan office. Participants of the rally distributed awareness/information materials to the public and displayed awareness messages on the placards.

National Meeting:

The 10th ESD Main Day Function was chaired by Mr. Bir Singh Maharjan, President of Jyapu Samaj Lalitpur. Honorable State Minister for Home Affairs, Mr. Ram Kumar Chaudhari was the chief guest of the function. Mr. Krishna Prasad Devkota the Chief and Executive Officer of LSMC welcomed all the guests and audience of the gathering. Chief Guest, Honorable State Minister, Mr. Ram Kumar Chaudhari inaugurated the program and revealed the 10th ESD Logogram. Mr. Surya Bhakta Sangachhen, Director General of DUDBC, Mr. Amod Mani Dixit, Executive Director, NSET highlighted the existing earthquake risk, the preparedness and mitigation activities

BOX-18: Quake "tours"

NSET conducted "earthquake vulnerability tours" for different groups of people in 2007. The tours are used as a vehicle for raising awareness and educating people on ways to reduce earthquake risks gradually. The participants are taken along certain pre-identified routes in the city and are encouraged to discuss the risks as well as measures to reduce them. These discussions are held during the tour to encourage local residents to join in. NSET has also developed a "guide book" for tour participants to take back. In 2007 NSET organized two such visits:

- NSET organized a Vulnerability Tour of the Patan Area for the DIPECHO/ ECHO officials, who were in Nepal for a workshop on 23 April, 2007. The tour began at Patan Dhoka and passed through Mikha Bahal, Suprekshyan Mahavihar, Balphal, Chandi Vidhyashram, Nyakha Chowk and ended in Nagbahal. It focused on the vulnerability of buildings and exit routes during disasters.
- NSET professionals conducted another Earthquake Vulnerability Tour in the core area of Kathmandu Metropolitan City (Naradevi–Bhedasingh–Machhindrabahal–Ason–Mahabaudha) for the representatives of USAID/ OFDA on 17 September, 2007.

Observing the vulnerability of the building during the tour

carried so far. They also urged the institutions and individuals to be more effectively united in making Nepal safe from earthquakes. Honorable Chief Guest in his remarks expressed his happiness to be in the function and promised that the Government will be equally concerned to reduce the existing earthquake risk in Nepal.

Earthquake Safety Exhibition

An Earthquake Safety Exhibition was also organized in the premises of Lalitpur Sub Metropolitan City Office. The exhibition was open to public after the formal inauguration by Honorable State Minister Mr. Ram Kumar Chaudhari for four days. In the exhibition, thirty four stalls of different government and non government organizations, security forces and international organizations displayed their equipment, materials, photos and their works related to disaster risk management. These stalls provided people with preventive measures to protect oneself during earthquake and exhibited models of earthquake resistant buildings as well.

Apart from the exhibition, other events were also carried out as a part of ESD events such as;

- Street Drama by Lumanti and Bimba Group
- Shake Table Demonstration
- "Duck Cover and Hold" National Drill, 16 January 2008

Further, in addition to the regular programs of ESD, a **Workshop on "Developing Consensus on Selection/Etymology of Nepali Words Pertaining to Disaster Risk Management"** was also organized by National Society for Earthquake Technology-Nepal (NSET) in association with Department of Urban Development and Building Construction and Action Aid Nepal at Dhulikhel Lodge Resort, Dhulikhel on 19- 20 January 2008 with a purpose of developing a common understanding of words/ terminology on disaster risk reduction, which would be useful for the public ,authorities and practitioners. The main objective of the program was to select appropriate Nepali words for the 50 terminologies on disaster reduction developed by ISDR, develop consensus on them and develop a Nepali Disaster Risk Reduction/ Management Vocabulary. 15 prominent litterateurs, linguists, etymologist, of Nepal were together along with the facilitators from NSET to select Nepali words pertaining to disaster. The group selected words

discussed on them and came to a consensus on words appropriate to be used by the public, authorities and practitioners.

Shake Table Demonstration in Dhaka, Bangladesh

NSET experts visited Dhaka, Bangladesh on 23 April 2007 to organize a Shake Table Demonstration in Dhaka, Bangladesh. The demonstration held on 21 May by UNCRD Japan, Bangladesh Disaster Preparedness Centre (BDPC) and NSET.

Hospital disaster preparedness drill

NSET facilitated and supported a disaster preparedness drill organized at the B.P. Koirala Institute of Health Sciences (BPKIHS) in Dharan on 30 October, 2007. The drill was done in coordination with the Dharan Municipality, Action Aid Nepal and BPKIHS. The drill was organized as part of the "Safe Hospitals Campaign" 2007-2008, declared by the UN International Strategy for Disaster Reduction (UN/ISDR).

Interaction with the media

NSET organized an interaction with the media at its office on 4 January 2007. The purpose was to discuss its activities for disaster risk reduction and the DesInventar—a disaster database maintained by NSET.

It organized another interaction with the media on 11 February 2007. This interaction was organized in Banepa and the purpose was to discuss "Earthquake Risk Reduction and Management, Efforts of Banepa Municipality ".

Cross-Cutting Capacity Development (3cd) Program

Under the Cross-Cutting Capacity Development (3cd) Program for Disaster Risk Management Master Plan of Kathmandu Metropolitan City (KMC), a team comprising of representatives from Earthquake Mega Cities Initiatives (EMI) visited Nepal during February 2008. During their visit, various programs were conducted which included meetings with Kathmandu Valley Town Development Committee (KVTDC), KMC and other concerned organizations and two different workshops on Emergency Management and Mainstreaming Disaster Risk Reduction in Land Use Planning: Pilot Application in Kathmandu. NSET is providing services to KMC as the local investigator for the program.

During the period another visit was made by the three member team of Makati city officials and EMI. The purpose of the visit was to study about the land pooling and guided land development sites of Kathmandu Metropolitan City and like wise the implementation of land pooling from the Kathmandu Valley Town Development Committee. During the period field visit was conducted and mutual understanding of the land development system was shared among the related professionals. On April 21 2008, a workshop on City to City Sharing on Land use Planning and Disaster Risk Management was organized at KVTDC meeting hall at Anamnagar, where the land use planning issues as well city level disaster management works done by each municipalities were discussed.

A Strategic Planning Workshop for Kathmandu Metropolitan City (KMC) Risk Sensitive Land Use Planning project was conducted during 6-7 November 2008 at Park Village, Budhanilkantha. Similarly a workshop on Emergency Management Planning System in KMC was organized on 11 November 2008.

Community representative expressing his view in the workshop held under the 3cd program

Community Based Disaster Risk Reduction Initiative (CBRRI)

The Community Based Disaster Risk Reduction Initiative (CBRRI) is implemented by NSET to initiate a pilot program on participatory disaster risk reduction for the rural communities. It is proposed to initiate the program from ward number 4 of Alapot Village Development Committee (VDC) in Kathmandu and slowly expand to cover entire 9 wards of the VDC. The objective of this initiative is to initiate disaster risk reduction planning process, prepare a framework for ward level disaster risk reduction master plan for ward number 4 and implement one of the first lists of action within one year (31 May 2009). NSET will work as a facilitator and the Ward Level Disaster Management Committee (WLDMC) will take the leading role for all the activities of this initiative with maximum participation from the beneficiary community. Alapot VDC will be considered as one of the "Case Stations" of NSET which is one of the Field Campus within the Case Station and Field Campus (CaSiFiCa) network. Japanese method of participatory planning "Youn-Men-Kaigi" System will be tested for its probable applicability in Nepal. The activities of this initiative are divided into five broad categories Preparation, Institutional Development, Capacity Building, Pilot Project and Phasing Out.

Community representing, expressing his intrest to be a part of CBRRI

Under this initiative a One day workshop was organized on 18 March 2008 in Alapot Village Development Committee (VDC) as an initial interaction with the local community. The workshop was conducted with following two major objectives;

- Inform the local leaders and the stake holders about the concept of developing Alapot as a Model VDC in carrying out VDC level Disaster Risk Reduction Activities. The outcome of the process of these activities will be replicated in other VDCs with the required adaptations.
- Assess the interest of the stakeholders and relevancy of the concept and initiate strengthening the partnership with the VDC for future action.
- Introduction of "Youn-Men Kaigi System" in Alapot

The workshop was jointly organized by Bal Bikas Lower Secondary School and Alapot Village Development with the technical assistance from NSET. The entire proceedings of the workshop was actively participated by the stakeholders from different works of life ranging from school students, teachers, local leaders and the influential persons within the VDC.

DiMSIS: A Joint Collaboration of Earthquake Disaster Mitigation Research Center (EDM) and NSET

The Earthquake Disaster Mitigation Research Center (EDM) of the National Research Institute for Earth Science and Disaster Prevention (NIED) a Japanese research NGO has initiated a program with NSET to develop IT-based tools for disaster mitigation. The system ST-GIS which is being tested in Nepalese context about the potential use with the possible solution for earthquake risk reduction measures in local level of governance. Municipalities are the main target of the project to test the applicability of the system. The aim of the present initiative is to support local governments to help them master the system, to improve their daily business, to reduce cost, to ensure that the system works in times of disasters, to enhance the capacity of officials, and to create new services for disaster susceptible cohorts. The replication of the system is also aimed to help the local government

bodies to reduce the disaster risks. The mitigation measures can be taken appropriately only if there exists quality information. The relevancy of the system in Nepalese contest especially in Kathmandu will be highly applicable upon the success of the initiation.

In regard of implementing the DiMSIS in Nepal, the project team from EDM visited Nepal during March 11-21, 2008. This was their third visit and it focused on discussions on- Improved version of DIMSIS, Bar Code Reader and its use in Community Disaster Management particularly in preparedness and response process, Long Wave Wireless System – useful to school earthquake safety program and further planning to develop conceptual framework and future actions. The activities carried out by the team during the visit were; Presentation on the system, Users training on DiMSIS and Meeting with the officials of Kathmandu Metropolitan City (KMC) and Department of Urban Development and Building Construction (DUDBC).

Celebrating 15th Anniversary of NSET

NSET celebrated its fifteenth anniversary on 18 June 2008 at NSET office premises by organizing various programs. The event was attended by NSET's partners, associates, donors, staff, directors and board members along with their family members.

The event started with the welcome address from Mr. Amod Mani Dixit, Executive Director of NSET. Mr. Kalyan Bista, Admin Director introduced the new staff members of NSET. Ms Mariza A. Rogers, Acting Regional Advisor from USAID/ OFDA congratulated NSET for celebrating its 15 th anniversary and wished for further success of the organization in the years to come. During the program, Mr. Shiva Bahadur Pradhnang, President of NSET launched the newly recorded earthquake awareness song written by Mr. Binod Shrestha, Geotechnical Engineer of NSET and sung by Mr. Sugam Pokhrel one of the popular singer of Nepal. He further distributed the Earthquake Go-Bags (earthquake emergency kit) to all the staff members of NSET. The evening was then celebrated with music and other entertainment activities followed by dinner at the end.

A team from Pakistan at NSET

Four delegates from Church World Service-Pakistan/Afghanistan made a visit to Kathmandu, Nepal during Nov 11 – 14, 2008 on invitation from NSET. Disaster Response Program of CWS-P/A is

NSET family on 15th NSET day

implementing a School Safety Project in earthquake affected area of Pakistan and they were here to obtain the school retrofitting experience of NSET to implement their program in Pakistan. Their plan during their visit to Kathmandu was the following;

- Visit the site of on -going/completed retrofitting works
- Meeting the Project team in implementing the retrofitting project
- Meeting with people involved in advocacy around retrofitting
- Meeting with the team involved in fundraising for retrofitting

Technical Assistance to the Mondialogo Award Team

An agreement was made among Mondialogo Award Team and NSET, where NSET is assigned to provide technical support on Model Building Construction and Shaking Table Demonstration; provide 3 days TOT for Mason Training; Provide Guidance on Exercise Session on 6 days Mason training with one Construction Technician and to provide guidance on retrofitting of Full Scale Buildings by PP Band. The activities under this contractual agreement are planned to be started from October 2008 and completed by December 2008.

As according to the agreement made, NSET provided technical assistance for conducting Mason Training, Training of Trainers (TOT) Course on Earthquake Resistant Construction of Buildings organized jointly by University of Oxford, United Kingdom, Institute of Industrial Science, University of Tokyo, Japan, Indian Institute of Technology, Bombay, India, Engineering without Boarder United Kingdom, Khwopa Engineering College Nepal, Nepal Engineering College, National Society for Earthquake Technology, from 4-6 November 2008. In addition a Shake Table Demonstrations was also conducted at Khwopa Engineering College, Bhaktapur with technical assistance from NSET.

Training and workshops

- **International Conference on Earthquake Risk Management (ICERM) in Islamabad, Pakistan.** The confere nce on Earthquake Risk Management (ICERM) was held on 28 – 30 April 2007 in Islamabad. It was jointly organized by Earthquake Reconstruction and Rehabilitation Authority (ERRA) of the Government of Pakistan, United Nations International Strategy for Disaster Reduction (UN/ISDR), United Nations Human Settlements Program (UN Habitat), UNDP Pakistan, United States Agency for International Development / Office of the Foreign Disaster Assistance (USAID / OFDA) and NSET. The NSET team, led by Amod Dixit, was involved in designing and overall management of the conference which sought to share Pakistan's experiences in response, early recovery, and reconstruction and rehabilitation. There were about 200 participants at the conference. Pakistan's Prime Minister Mr. Shaukat Aziz, was the chief guest at the closing ceremony.
- NSET collaborated with the International Centre for Integrated Mountain Development (ICIMOD) and other partners to organize a regional training workshop on "Earthquake Vulnerability and Multi-Hazard Risk Assessment". Other organizing partners were the European Commission Humanitarian Aid

Dignitaries at the dias during ICERM in Pakistan

department (DIPECHO), International Institute for Geo-Information and Earth Sciences (ITC), The Netherlands, Asian Disaster Preparedness Centre (ADPC), Bangkok and the Nepal Centre for Disaster Management (NCDM). The training was held from 5 to 16 March 2007 at ICIMOD. The main objective of the training was to build the capacity of national institutions in utilizing geospatial tools (GIS/RS/GPS) for multi-hazard risk assessment and mapping as well as to raise the awareness of such tools for disaster preparedness and mitigation.

- NSET collaborated with other regional partners in organizing an international video workshop on "Disaster Education and Risk Perception". The workshop was jointly organized by the National Graduate Institute for Policy Studies (GRIPS) and Building Research Institute (BRI) in cooperation with United Nations Centre for Regional Development (UNCRD), Asia Disaster Reduction Centre (ADRC), Institute of Technology Banding (ITB), Indonesia; Indian Institute of Technology Bombay (IITB), India; Preston University, Pakistan and Istanbul Technical University (ITU), Turkey. The video conference was organized on 15 March 2007 and on 24 January 2008 at the World Bank Public Information Centres in the respective countries. The video workshop was divided into two parts: Disaster Education and Risk Perception.
- Similarly, yet another video conference workshop on "Earthquake Risk Perception" was held on March 5, 2008 to share the results of a survey conducted in 2007/2008. The survey is part of a joint research project on "Dissemination of technologies for safer housing" under the "Collaborative Research and Development Project for Disaster Mitigation on Network of Research Institutes in Earthquake Prone Areas in Asia". NSET is one of the participating organizations of the project.

'Training Workshop on Building Code Implementation'

A five-day training workshop on "Building Code Implementation" was organized from 19-23 May 2008 for engineers/planners/architects from municipalities all over the country at Godavari Village Resort, Lalitpur. The workshop was jointly organized by United Nations Centre for Regional Development (UNCRD), Department of Urban Development and Building Construction (DUDBC)/ Ministry of Physical Planning and Works and National Society for Earthquake Technology–Nepal (NSET). The main objective of the training program was to prepare a framework for building code implementation in each participating municipality. Its specific objectives were to;

- Be familiarized with various requirements of building codes, building regulations, building/planning by-laws for ensuring safe building construction and proper city development;
- Be familiarized with building control system (building permit process) to ensure the safe construction of buildings being in practice in few cities of Nepal and other countries and to help review such practices by field visits; and
- Guide/facilitate in developing general broad framework for implementation of building control system (ensuring building code compliance) suitable for large, medium, small

Participants involved in the training workshop on building code implementation

municipalities of Nepal based on the current and potential institutional system and capacity; and suggest action plan.

The training program was participated by the Engineers and junior engineers of 24 municipalities namely Kathmandu, Lalitpur, Bhaktapur, Kirtipur, Madhyapur Thimi, Banepa, Panauti, Biratnagar, Itahari, Ilam, Tansen, Nepalgunj, Birendranagar, Dhangadhi, Triyuga, Kamalamai, Birgunj, Hetauda, Pokhara, Vyas, Butwal, Bharatpur, Dharan and Janakpur

The training workshop was successful not only in drafting an action plan for future implementation process but also in creating a discussion platform for municipality technicians for sharing learning and experiences. The workshop provided a realistic framework based upon size and building code implementation status of municipalities. Large municipalities with resources and some experience in building codes prompted for a capacity building of technicians where as the small municipalities with relatively fewer constructions per year prioritized municipal laws/bye-laws as their main concern.

National Symposium on 'Building Codes and Building Code Implementation Systems' organized jointly with DUDBC, UNCRD, UNDP, ERRRP in Lalitpur

The Training Workshop on Building Code Implementation was followed by a half-day **National symposium on 'Building Codes and Building Code Implementation Systems'** open to public. The symposium was jointly organized by Department of Urban Development and Building Construction (DUDBC), Earthquake Risk Reduction and Recovery Preparedness Program for Nepal/ ERRRP, UNDP, United Nations Centre for Regional Development (UNCRD) and National Society for Earthquake Technology – Nepal (NSET) on May 24, 2008 at the Yak Palace, Narayani Complex, Pulchowk, Lalitpur. The main objective of the symposium was:

- To share outcomes of the workshop with the key stakeholders of building code implementation process
- To get buy-in from the stakeholders and get support for the implementation of outcomes

The symposium was a huge success participated by around 100 participants representing Government bodies, Non government organizations, Private Organizations, NGOs INGOs, Construction companies, Consultancies, Engineering associations, Students, Media persons etc.

SAARC Workshop on Climate Change and Disasters: Emerging Trends and Future Possibilities

To address the alarming issue of global climate change, the SAARC Disaster Management Centre (SDMC), Delhi, in collaboration with Ministry of Home Affairs, government of Nepal and with technical support from the National Society for Earthquake Technology- Nepal (NSET) jointly organized a Workshop on "Climate Change and Disasters: Emerging Trends and Future Strategies" during 21-22 August, 2008 at Kathmandu, Nepal. The objectives of the workshop was to highlight the recent trends of climate change scenarios including scientific & operational issues, on – going efforts on climate change adaptation and disaster risk reduction strategies, regional cooperation for risk reduction, and roadmap on strengthening the national capacity in support of SAARC Action Plan on Climate Change.

Dignitaries releasing the Souvenir during the SAARC workshop on Climate Change

The purpose of the workshop was to deliberate on recent trends of climate changes and ongoing efforts on climate change adaptation and disaster risk reduction strategies, regional cooperation for risk reduction, and roadmap on strengthening the national capacity, ensure linkages between the regional and country level project initiatives through sharing of national and regional project initiatives and progress, introduction of national and regional project stakeholders, sharing of regional knowledge and good practice that can facilitate national level and regional. The workshop provided a timely forum for discussions and sharing of experiences on SAARC level initiatives, progress and the challenges faced.

The workshop brought together over more than 50 participants representing 8 SAARC member countries, senior officials form SAARC secretariat and over 100 stakeholders from government representatives and others from UN, regional and national organizations based in Kathmandu

The workshop was inaugurated in the auspious presence of dignitaries as Mr. Umesh Prasad Mainali, Secretary, Ministry of Home Affairs, H.E. Dr. Sheel Kant Sharma, Secretary General, SAARC. The inaugural session was attended by about 150 representatives: high level officials of government of Nepal, UN system, bilateral agencies, international financial institutions, academia and professional societies. Richness of such participation is reflective of the growing interest of the different sectors, national, regional and international, in the subject areas of Disaster Risk Reduction (DRR) , Climate Change Adaptation (CCA) and the interlink -age between the two.

The Workshop included 4 technical sessions; a) Country presentation b) Thematic Session II: Integrating Disaster Risk Reduction (DRR) with Climate Change Adaptation (CCA): Sectoral Issues; c) Thematic Session III: Issues for Regional Cooperation; and d) Session for the Development of a Road Map for Regional Cooperation.

Annual meeting of the Asian Disaster Reduction and Response Network (ADRRN), 2008

The 6th Annual meeting of the Asian Disaster Reduction and Response Network (ADRRN) 2008 took place at the Godavari Village Resort, Kathmandu from November 3-5. The annual meeting was organized by ADRRN and hosted by National Society for Earthquake Technology (NSET) Nepal. It was jointly sponsored by United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) Regional Office for Asia Pacific and Australian Government (AusAID).

During the annual meeting of ADRRN

The three-day conference was attended by 31 participants from 16 countries. They underwent rigorous brainstorming for two-and-half days to chalk out future strategy of ADRRN to strengthen the network in the next three years. The meeting also aimed to promote coordination, experience sharing and collaboration among ADRRN members. The agenda of the meeting included presentation and extensive discussion on ADRRN joint projects and lesson learnt. For the three days, the participants extensively engaged themselves in group discussions to share each others experience.

The meeting was a platform to deliberate on the strategies and priority actions for fostering and facilitating network and collaboration at the regional and local level. It was also an opportunity to collectively shape the future of the network with a concrete strategic plan for ADRRN.

The annual meeting was also fruitful in drawing specific commitment from the participants on achieving future strategic objectives through implementation of high priority suggestions on six specific themes. Through the innovative and interesting exercise "The Asian Coffee Shop" the participants not only set the future strategies for the network but also identified the priorities for the forthcoming 3rd Asian Ministerial Conference on DRR. Field visit to various earthquake risk reduction sites in Kathmandu on the third and final day added to the first hand experience of local DRR activities to the participants. Deemed as the most successful annual meeting in ADRRN history, it saw active participation from the member representatives and equally supportive in shaping the future strategy for the network.

International Conference on 'Disaster and Development: Bridging the Gap between Theory and Practice'

An International Conference on 'Disaster and Development: Bridging the Gap between Theory and Practice' organized by Nepal Engineering College, Ehime University, and National Society for Earthquake Technology-Nepal in association with Ministry of Home Affairs, Ministry of Local Development, Ministry of Physical Planning and Works and the Shikoku Branch of Japanese Geotechnical Society was held in Hotel Radisson Lazimpat, Kathmandu, Nepal on November 23-24, 2008. The basic objective of the conference was to provide a forum for the researchers, professionals and academicians to come together and share information and knowledge from each other in the latest development in the field of natural hazards and disaster risk reduction around the world. Mr. Amod Mani Dixit, Executive Director of NSET was the Convenor of the workshop. It was expected that such close cooperation between governmental, non-governmental and academic institutions will soon result in the development of implementable policies, plans and programs towards reducing disaster risks in Nepal. And the open intellectual discussions among the paper presenters and the professional audience during the conference produced a wealth of knowledge which will be useful in bridging the gap between theory and practice in the field of disaster risk management in the South Asia Region.

Earthquake Risk Management Training for Housewives

NSET in association with United Nations Center for Rural Development (UNCRD) organized a four-day Earthquake Risk Management Training for Housewives from 11 to 14 June 2008 at the Hotel Paradise, Jyatha Kathmandu. The training followed a curriculum that included earthquake awareness and education as well as skill based deliverables spread over three modules, Module 1 Earthquake Basics; Module 2 Non structural Mitigation Measures; Module 3 Community Level Light Search and Rescue (CLSAR). The objective of module 1 was to make the participants familiar about earthquake basics like cause and effect of earthquake, existing earthquake risk in Kathmandu Valley and mitigation measures and give them a general idea on the construction of earthquake resistant buildings and retrofitting of the existing

Participants of the Earthquake Risk Management Training for Housewives

Housewives participating in the community level Light Search and Rescue exercise

structures. Module 2 was designed to impart optimum theoretical knowledge and practical skills on preliminary earthquake vulnerability assessment of the non structural components of a residential building. It also included basic techniques of the non structural mitigation in a residential building. This module contained two practical sessions, the non structural vulnerability assessment and carrying out the non structural mitigation work to cover some important outcome of the vulnerability assessment done by the participants. And finally Module 3, i.e. the Community Level Light Search and Rescue was designed to give the participants the basics of Community level Light Search and rescue process. This module included half day practical session on CLSAR practical. The training program was participated by altogether 24 house wives from four different areas within Kathmandu Valley. These included the representatives from the Community Learning Center (CLC) Bhaktapur, (Ward Number 2 Bhaktapur Municipality 2), CLC Bungmati, (Bungmati VDC, Lalitpur), CLC Khokana, (Khokana VDC, Lalitpur) and CLC Kathmandu (Ward Number 18, Kathmandu Metropolitan City).

Earthquake Risk Reduction Training Program for Housewives

NSET in association with Building Research Institute, (BRI) Japan and Graduate Research Institute for Policy Studies (GRIPS) Japan conducted Earthquake Risk Reduction Training Program for Housewives at Chetrapati Free Clinic, Chetrapati in November 2008. The training program was targeted for the housewives, potential house owners for new buildings to be constructed in the near future. The training program was attended by 63 housewives of the surrounding area.

Training the Masons on Earthquake Resistant Construction:

- NSET provided technical assistance for conducting a three-day mason training program at Dhulikhel. The training was organized by the Department of Urban Development and Building Construction (DUDBC), Kavrepalanchowk Division and Sakha Toresteel, Sakha Steel Industries on 3-5 June 2007.
- NSET provided technical assistance for training of masons at Itahari Municipality in east Nepal. The training was held from 2 to 6 June 2007. Two engineers from NSET were deputed for carrying out the training which had 35 participants.
- NSET conducted a five-day training of masons from 10 to 14 September at Bungmati, Lalitpur. The training was supported by World Vision International Nepal. There were 24 participants at the training.
- Under the CBDM Project masons of Bharatpur Municipality were trained on earthquake resistant construction from 19 to 23 November 2007.
- A five-day Mason Training program was organized jointly by NSET and Department of Urban Development and Building Construction (DUDBC)/Kavre at Dhulikhel from 10 - 14 March, 2008. Altogether 20 participants did participate in the training program where NSET provided technical support.

A five-day Mason Training program was organized jointly by UNCRD, NSET and Department of

Involved in practical exercises during the mason training program

Urban Development and Building Construction (DUDBC) under the HESI project at Birendra Nagar, Surkhet District from 4 – 8 June, 2008. Altogether 20 participants attended the training program where NSET provided technical support.

- Upon request from United Mission to Nepal Rukum Cluster (UMN Rukum Cluster) NSET conducted "Earthquake Resistant Building Construction Training for Technicians and Masons" at Khalanga, Rukum District from 3 to 7 November 2008 for five consecutive days. The program was conducted jointly by UMN Rukum Cluster and NSET in close coordination with District Development Committee Rukum. Twenty nine persons participated actively in the training program. The program conducted district, Rukum is one of the rural areas in the far-western part of Nepal.

Other training programs, seminars, workshops

- NSET has continued efforts to institutionalize the implementation of the building code in Nepal. It organized a national workshop on the enforcement of building codes on August 2-4, 2007. The workshop was supported by the United Nations Centre for Regional Development (UNCRD) under its Housing Earthquake Safety Initiative (HESI). NSET is a part of the Housing Earthquake Safety Initiative (HESI) program (2007-2009) being implemented in Peru, Nepal, Indonesia and Algeria. The program is a collaborative effort of government and non-government organizations.
- NSET and DUDBC organized a "Building Damage Assessment Training" for engineers at DUDBC from July 2 to 4, 2007.

Box-19: Training masons around the world

Bal Krishna Kasula was born in a middle-class Newar family at Nangkhel VDC, in Bhaktapur in 1973. The father of three children did not attend university nor does he have formal engineering training. Yet, today, Kasula is one of the busiest technicians at NSET: his skill in building earthquake-resistant buildings has taken him around the world to train engineers, masons and builders on safe construction techniques.

Kasula became involved in earthquake-safe construction at a training organized by NSET at a school in his village in 1999. He then became a member of the team at NSET that retrofitted schools in Bhaktapur, Kirtipur, Nagarkot and Kathmandu. So far, Kasula has helped to rebuild more than 20 schools and trained more than 50 Nepali brick layers. He was also involved in training masons in Afghanistan, India, Iran, Indonesia, Pakistan and Tajikistan. He attended the World Conference on Disaster Reduction (WCDR) in Kobe, Japan in January 2005, where he assisted UNCRD and NSET in organising a series of 8 Shake Table Demonstrations featuring a traditional Nepali and Japanese wooden houses, and also helped train a group of university students.

Kasula has since contributed in the design of earthquake resistant houses by combining Japanese and Nepali building techniques. He was also a member of the senior NSET professional team that visited Banda Aceh, Indonesia in July 2006 to provide technical assistance to the World Bank/Indonesia through the Building Research Institute, BRI/ Japan. The NSET team was there to assist in organizing Shake Table demonstrations and train local technicians, including engineers on earthquake resistant construction.

In 2005 Kasula was awarded the Science and Technology Award by the Royal Nepal Academy of Science and Technology. Since 1994 NSET has trained over 1500 masons on safe construction techniques in Nepal.

Source: NSET newsletter ISSUE 3, October 2006

Box-20: Orientation on Earthquake Preparedness

NSET has been conducting orientation programs on earthquake safety for embassies, diplomatic missions, aid agencies, international organizations, international non-government organizations, non-government organizations, hospitals, private organizations, schools and even communities to make them aware and enhance their knowledge on earthquake safety. Such interactions are organized upon request.

- NSET and UNCRD organized a seminar on "Japanese Practice of Earthquake-resistant Building Design and Building Permit Process and its Relevance to Nepal" in Kathmandu on 31 July 2007. The speakers shared the Japanese building design and permit processes with Nepali professionals.
- NSET conducted training on maintenance and operation of deep tube wells under the DPRP/UNICEF project on 7 and 8 October 2007. The training had 26 participants.
- Under the DesInventar program, "Training on Disaster Inventory/Information Management System in Nepal" was held during 26 – 29, February, 2008. The training was jointly organized by Ministry of Home Affairs, Ministry of Local Development (Government of Nepal), and UNDP – Nepal, with technical support from NSET. There were 18 participants in the training representing from Ministry of Home Affairs, Ministry of Local Development and participants from other districts outside Kathmandu Valley (Syangja, Chitwan, Makawanpur, Sarlahi and Sindhuli). The training was focused on DesInventar Methodology applicable in Nepalese context including basic concepts of Natural Disasters, Disaster Information etc
- NSET professionals conducted an orientation training program on Earthquake Preparedness and Light Search and Rescue on March 5 2008 for staff of International Nepal Fellowship/Worldwide (INF/W) in Lalitpur upon request from the INF/W. The main objectives of the training program were: i) to raise general earthquake awareness by informing them about earthquake risk of Nepal, earthquake risk mitigation measures, preparedness for earthquakes and do's & don'ts before, during and after earthquakes; ii) to provide general information on basic concept of search and rescue, its types and the process involved; and iii) impart practical skill on some basic techniques required for LSAR. A total of 29 staff of INF/W from different part of the country participated in the training program. LSAR focuses on the basic search and rescue skills that can be used by individuals in communities and institutions for immediate rescue of victims in their families and organizations in case of a disaster situation. A similar training was organized for the staff of NSET on March 4, 2008 at NSET office premises.
- NSET provided technical assistance for conducting School Teachers Training of Trainers (TOT) on School Earthquake Preparedness organized jointly with Lalitpur Municipality and supported by UNICEF/EU held from 9 to 11 July 2008

Activity Briefs (2007-08):

NSET participated in a day-long "Share Fair" organized by USAID on 5 June 2007. The event was organized to celebrate 50+ years of USAID in Nepal.

NSET in association with UNICEF and Lalitpur Sub metropolitan City (LSMC) jointly organized a "Lessons Learned Workshop on Disaster Preparedness and Response Plan Framework (DPRP) for Safe Drinking Water in Lalitpur Sub-Metropolitan City" in Lalitpur. It was the final sharing workshop under the project on October 2007.

Mr. Surya Narayan Shrestha, Deputy Executive Director, NSET participated and presented paper in the Inter-Agency Disaster Risk Reduction and

Emergency Preparedness Planning (DRR/EPP) Workshop organized by DPNet, Government of Nepal and Save the Children Alliance in Kathmandu on 22 November, 2007.

NSET professionals attended the Fifth Nepal Geological Congress on Geology, Environment and Natural Hazards Mitigation: Key to National Development organized by the Nepal Geological Society in Kathmandu from 26 – 27 November 2007.

Mr. Amod M. Dixit, Executive Director, NSET was requested to be the keynote speaker in the program held on 3 December 2007 for the launching of DIPECHO Project "Surakshit Samudaya" towards building safer communities in five districts of Nepal through disaster management initiatives.

Mr. Amod M. Dixit, Executive Director, NSET attended a meeting with the Australian Ambassador to Nepal, Mr. Graeme Lade along with his Contingency Planning Action Team at his residence along with some other NGO's and Organizations involved in Disaster Preparedness on 5 December 2007.

Mr. Surya Narayan Shrestha, Deputy Executive Director, NSET attended the partners meeting of Comprehensive Disaster Management Program (CDMP) Bangladesh organized by Asian Disaster Preparedness Centre (ADPC) and UNDP/ Bangladesh at Hotel Asia Pacific, Dhaka, Bangladesh on 12 January 2008.

Mr. Amod M. Dixit, Executive Director of NSET attended meeting for National Platform for Disaster Risk Reduction at Ministry of Home Affairs on 14 January 2008.

Mr. Binod Shrestha, Geotechnical Engineer of NSET made presentation on Earthquake Risk Management in Nepal in the Workshop on EDM/ PRRP Capacity Building at Gaidakot, Nawalparasi on 17 January 2008 organized by Action Aid Nepal and supported by NSET on 17 January 2008.

NSET professional attended the workshop on Contingency Planning to prepare Cluster-wise Contingency Plan organized by Office for the Coordination of Humanitarian Affairs (OCHA) at Hotel Himalaya, Lalitpur during February 25-26, 2008

Executive Management Committee Meeting of NSET was held at NSET Office Meeting Hall on 7 March 2008.

Ms. Lakshmi Bhombore, National Coordinator Program Support Unit and Mr. Bittu Mallik, Accounts Manager from Sustainable Environment and Ecological Development Society (SEEDS) of India visited National Society for Earthquake Technology (NSET) under the NSET-SEEDS Exchange program to share knowledge and observe/learn the finance and administration system at NSET from 17-19 March 2008.

NSET attended the Steering Committee Meeting (National Platform for Disaster Management- Code of Conduct) held at Ministry of Home Affairs on March 27, 2008.

NSET participated in the first consultative meeting on Emergency Shelter organized at the Department of Urban Development and Building Construction (DUDBC) meeting hall on April 7, 2008.

On request from UNCRD Japan, NSET professionals participated in the series of one-day workshop on "What if an Earthquake Strikes" organized for the Community Learning Centre (CLC) members and the community members of Bhaktapur, Khokana, Bungmati and KMC ward 18 during April 22- 25, 2008 respectively. In the workshop presentation on Earthquake Risk Management (ERM) and the role of community on ERM was made by NSET.

Mr. Bijay K Upadhyay, Earthquake Technology Training Specialist at NSET, attended the seminar on Development of Consulting Industry in Nepal organized by Asian Development Bank (ADB) and SCAEF at Hotel Himalaya, Lalitpur during 1-2 May 2008.

Mr. Ganesh Jimee, Emergency Preparedness and Response Manager, NSET attended the 5th National Workshop on Pre-Monsoon on Disaster Preparedness organized by DPNet at Nepal Red Cross Society (NRCS) meeting hall on 2 May 2008.

Mr. Gopi K. Basyal, Urban Planner at NSET participated in the meeting regarding Report on Global Assessment of Risk (GAR), held at UNDP, Pulchowk, on behalf of NSET on 10 May 2008.

NSET professionals participated in the one day Workshop "Emergency Shelter Cluster Contingency Planning '' organized by DUDBC at the Malla Hotel, Lainchour on 12 May 2008.

Mr. Ganesh Jimee, Emergency Preparedness and Response Manager at NSET participated in the NSET/PEER Hospital Preparedness for Emergencies (HOPE) Course organized by Institute of Medicine (IOM), Ministry of Health (MOH) and NSET at the Park Village Resort during 12-14 May 2008, as an Instructor.

Mr. Binod Shrestha Geotechnical Engineer at NSET participated in Workshop on HFA organized by LUMANTI - School Based Disaster Risk Mitigation Project at Lalitpur, Bishal Bazaar on 1 June 2008 and further participated in the 18th General Training Course on Water Induced Disaster Mitigation organized by DWIDP on 4 June 2008 where he made presentation on Earthquake risk reduction and preparedness.

Executive Management Committee Meeting of NSET was held at the NSET Office Meeting Hall on June 18 2008.

Upon invitation from the Consular of US Embassy, Mr. Amod Dixit, Executive Director, NSET attended the reception held at the embassy on 18 June 2008.

Mr. Suman Pradhan, Civil Engineer at NSET attended the Seismic Seminar organized by Earthquake Safety Section of LSMC and JICA on 4 July 2008.

Mr. Ram Adhikari, Civil Engineer at NSET attended a seminar on 'Rainwater Harvesting in Kathmandu; Benefits, Costs, Obstacles and Opportunities- An Economic perspective organized by LUMANTI on 4 July 2008.

Mr. Amod M. Dixit ,Executive Director, NSET participated in the event Launch of Rethinking Disasters in Nepal organized by Oxfam GB Nepal at Hotel Himalaya, Lalitpur held on 8 July 2008.

Mr. Ram C. Kandel, Director SESP at NSET, attended the Workshop on progress of HFA priorities in Nepal organized by DPNet, UNDP and Action Aid at Grand Hotel on 11 July 2008

Annual General Meeting of NSET Executive Management Committee was held on July 13, 2008 at NSET Office Meeting Hall.

Mr. Gopi K. Basyal, Urban Planner at NSET attended the one day Workshop on "Establishment of Information Centre on Disaster" jointly organized by Itahari Municipality and UPKA Nepal with support from Action Aid Nepal at Itahari Municipality on 11July 2008. Mr. Basyal further participated in the National Food Security Baseline Mapping program for (GIS Users) organized by World Food Program (WFP) at WFP office, Patan on 31 July 2008.

NSET professionals participated in the Progress Sharing Meeting of Ongoing Research Disaster - Poverty Interface (GAR report) organized by UNDP at UNDP conference hall on 29 August 2008.

Mr. Amod M. Mani. Dixit, Executive Director, NSET participated in the Strategy Session: Disaster Preparedness and Risk Reduction held at UN House, Pulchowk on 9 September 2008.

Chapter 5

REGULAR ONGOING PROGRAMS OF NSET

School Earthquake Safety Program

Begun in 1999, School Earthquake Safety Program (SESP) of NSET is a long-term sustained initiative that will continue to be developed as additional resources are generated.

SESP actually began with as one of the priority initiatives under the Kathmandu Valley Earthquake Risk Management Project (1997-2001). The program evolved from a simple school retrofit to a comprehensive program of earthquake safety involving the entire community. The program now is one of the successful ongoing programs of NSET in promoting community participation in all components of program activities and to raise earthquake awareness significantly.

Public awareness

NSET believes that raising earthquake awareness is a major component for bridging the knowledge gap. Awareness helps to eradicate myths and fallacies and communities can be convinced of the impending seismic risk and how to reduce harm. NSET has developed innovative ideas to make people aware. The programs aiming to raise awareness are:

Earthquake Safety Day

Nepal observes the Earthquake Safety Day on Magh 2 of Nepali month (either 15 or 16 of January) to commemorate the Great Nepal-Bihar Earthquake of 1934. Many public information activities are organized on ESD.

Radio/TV Programs

NSET has established partnerships with a number of FM radio stations to spread awareness about the risks associated with earthquakes. The programs target homeowners and convince them on the possibility and affordability of making their homes earthquake-resistant. NSET provides expert knowledge to the programs by deliberating on aspects of earthquake risk and its mitigation.

NSET's radio programming began on Radio Sagarmatha, a community FM Radio Station in Kathmandu. It supports another program on the Do's and Don'ts during earthquakes daily on Capital FM, another Kathmandu station. Outside the Kathmandu Valley, NSET supports a weekly program on Annapurna FM in Pokhara. The central message on all radio programs is 'Be Prepared'.

1) Radio Sagarmatha (FM 102.4) at 7.30 PM, every Tuesday
2) Radio Annapurna (FM 91.8) at 7.30 AM, every Wednesday
3) Capital FM (FM 92.4) at 8.00 AM, every Morning

Shake Table Demonstration Program

NSET's Shake Table Demonstration Program helps take research directly to vulnerable communities, while also helps adapt the research technology with the local situation. The Shake Table demonstrations help show and convince people in a simple and cost-effective way how their residences can be secured to reduce damage during earthquakes.

Orientation lectures

NSET organizes orientation lectures on earthquake safety upon request. The content usually covers basic information about earthquakes and the situation in Nepal, what to do before, during and after earthquakes, etc. Occasionally, the lectures also include earthquake drills.

Consultations for home owners

NSET organizes free consultations for home owners and potential house owners in Kathmandu Valley. This weekly consultation program focuses on how to construct buildings that are earthquake-resistant, and discusses the main vulnerabilities in the house plans and how to avoid those.

Mobile Earthquake Clinics

"Mobile Earthquake Clinic" was started by NSET to provide on-site consultation in aspects

of earthquake- resistant building construction. It is an innovative initiative of NSET where a team of earthquake engineer / structural engineer, technician and masons visit different locations / building construction sites in and around Kathmandu valley and provide advice on safe construction methods. 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 hundreds of buildings within Kathmandu Valley and has successfully served as an onsite implementation of Building Code. Remarkable improvements in building construction has been observed since then as- Stirrups shape, size and spacing, size of structural members like column and improved detailing in connections (beam column joints), protection of infill walls etc. Most of house owners got to know about the earthquake risk in Kathmandu Valley and they were convinced on the benefits of seismic resistant construction and its economy. Thus through NSET's Mobile Earthquake Clinic, knowledge of safer building construction has been disseminated in a very effective manner.

Earthquake Vulnerability Tours

Vulnerability Tour is one of the several efforts of NSET towards enhancing level of awareness and also for educating people on the need of investing in earthquake vulnerability reduction initiatives in Nepal. It is a guided tour in a defined route or a defined location to observe different vulnerability factors. The Earthquake Vulnerability Tour is an innovative awareness tool initiated by NSET. The tour aims to point out how vulnerable the city's buildings and critical facilities such as the schools and the fire stations are to earthquakes. This tour will help to know the ground reality of our cities which may help different stakeholders to work together to reduce the level of earthquake risk in Kathmandu Valley. The tour is conducted with an objective to convince common people to the policy/decision makers and the international community on urgency of urban earthquake vulnerability reduction initiatives and to help develop perception of existing seismic vulnerability of building structures, life line structures and their combination.

The participants of the tour are encouraged to take part in the discussion on existing vulnerabilities along the route and their potential remedies. A range of hazards, primary as well as secondary is considered and discussed for the locality. Likewise, all the phases of disaster, from the onset of the event to the problems of rescue and response, rehabilitation, reconstruction and the necessity of introducing mitigation in the reconstruction, are talked about during the tour at appropriate moments. The discussion is mostly informal. The tour in fact allows and encourages the participant to identify the vulnerabilities in a neighborhood, to assess the extent of the problem, and to explore possible measures that needs to be promoted and implemented.

The tour has thus turned out to be an effective disaster risk communication tool. It provides the sentimental environment of probable earthquake scenario, which in turn drew more and more buy-in from all sectors in the success of the program. Further the Tour Guidebook was also developed. NSET has organized various such tours for the national and international participants. The entire exercise appeared to make very intense impact on the participants. But still there is a need to develop Volunteers who can develop such tours in their respective communities. Further there should be more informal discussion to get more success and the participants should be encouraged to identify the vulnerabilities in their neighborhood.

Impact of awareness activities

There are several evidences that show the positive impacts of the awareness programs. Some of outcomes are listed below:

- The government and the other organizations have recognized NSET's efforts shown by their desire to work with NSET.
- There has been an increase in the number of requests for orientation lectures from communities and organizations including VDCs, municipalities, professional groups, business community, international and UN agencies, academic institutions, and NGOs/INGOs.
- There has been an increase in the number of earthquake-related articles in the print and broadcast media. Many of the producers of construction materials (steel, bricks, cement) have begun to refer to the earthquake hazard while marketing their products. This helps spread awareness of earthquakes, even though good products alone don't make buildings safe. Safe

buildings require the right combination of good materials, design and workmanship.

- Implementation of the national building code in construction in municipality. Lalitpur Sub-Metropolitan City (LSMC) has incorporated Nepal National Building Code into its building permit process. LSMC is one municipality with which NSET has been working closely.
- The health sector disaster preparedness and emergency response plan considers an earthquake of MMI IX as the worst-case scenario to base the response plan.
- There has been an increase in the number of requests for technical assistance for the construction/retrofitting of public and private schools.

Community Based Disaster Risk Management Program

Several communities of Kathmandu Valley have started community based disaster risk management programs in their localities. NSET provides technical assistance to such groups. Some wards of Kathmandu city have begun the CBDM efforts by forming Ward-level Disaster Management Committees made up of volunteers who are then trained for their roles.

Training programs on earthquake-resistant construction

NSET has developed training courses aimed at different stakeholder groups. It has ready to use modules for training masons, contractors, technicians, junior engineers, engineers, school

Attending the orientation lecture

Disaster Preparedness drill at the hospital

During the Vulnerability Tour

Glimpses of the training program

teachers and policy/decision makers. These training programs targeted for different audiences have helped propagate the knowledge and create champions of earthquake technology. Courses for professionals consist of theoretical classes, case studies and experience while those for masons emphasizes in practical experiences such as bar-bending and reinforcement placement , proper brick laying, construction stitches and bands etc. Some training programs are discussed below:

Engineers/ Architect, Junior Engineer training

Objectives

- To familiarize practicing civil engineers and architects with the basic concepts of earthquake-resistant design and construction of residential buildings
- To familiarize them with the Nepal National Building Code and make them aware on need to implement the code
- To familiarize them with the concepts of repair and retrofitting of damaged buildings.

Target Group
Civil engineers Architects, Junior Engineers.

Engineers'/ Architects' training:

This is a four-day course for engineers and architects. Intake: 30 participants.

Junior Engineers' training

This is a three-day course. Intake: 30 participants.

Mason training program

Objectives

The main goal is to train practicing masons on basic knowledge of earthquake resistant building construction technology and equip them with required skills.

The objectives are:

- Explain the importance and effectiveness of earthquake resistant elements in buildings.
- Incorporate earthquake resistant elements in new construction.
- Outline available methodologies to incorporate earthquake resistant elements in existing buildings.
- Discuss relevant Building Codes to ensure earthquake safe construction

The training courses follow a hierarchical procedure starting from problem identification and end with solving them. Several tests are conducted to support the knowledge in relation to effect of placement of reinforcement rod in beam/slab, quality of work governed by material and workmanship like excess water effect, curing effect, etc.

Glimpses of the training program

Seismic Vulnerability Assessment of Building

This is an ongoing program of NSET under which residential and office buildings of various national and international organizations located in Kathmandu valley and out-side valley are assessed for their seismic vulnerability. There is an increasing and high level of demand for providing expert services on assessing seismic vulnerability and implementing vulnerability reduction measures from various national and international organizations and even from the individuals. While NSET's priority is not to provide services on earthquake-resistant design to individuals or individual institutions which are jobs better done ideally by private firms, we have been providing such services to the international institutions/ agencies resident in Kathmandu/Nepal considering the need to raise their earthquake awareness as anybody living in Kathmandu/Nepal faces the earthquake risk. As most of these agencies are also donor agencies, their activity is expected to influence their respective strategy on development assistance to Nepal to incorporate disaster risk reduction agenda.

Till date, NSET has carried out the assessment of more than 100 residential and office buildings of various national and international institutions.

Box-21 : Community Earthquake Learning Centre (CELC)

NSET has taken up the task of building a Community Earthquake Learning Centre (CELC) that would provide people a space to learn about earthquakes and ways to minimize harm from such disasters. The centre also seeks to provide educational and training facilities for Nepalese as well as regional participants.

The site of the learning centre is located in Ward No. 4 Ka, Sainbu Aawas Ayojana, Lalitpur District. The Learning Centre will provide facilities for raising awareness of earthquake risk reduction and preparedness and also serve as office for NSET.

The centre will have following resources:

Earthquake Museum and Community Earthquake Learning Centre

Community Disaster Mitigation Library & Media Centre

Children Earthquake Learning Centre

Mason Training Workshop

Emergency Information Centre (EIC) cum meeting room

Dormitory for scientists and young researchers

Office space for NSET, parking space for 14 vehicles

The CELC building is also being built to be a model for:

- Earthquake resistant construction,
- Rainwater harvesting,
- Optimum heating and cooling, and
- Solar and wind energy for lighting and water heating

Special Franking of the Commemorative Envelopes dedicated to Earthquake Safety Day

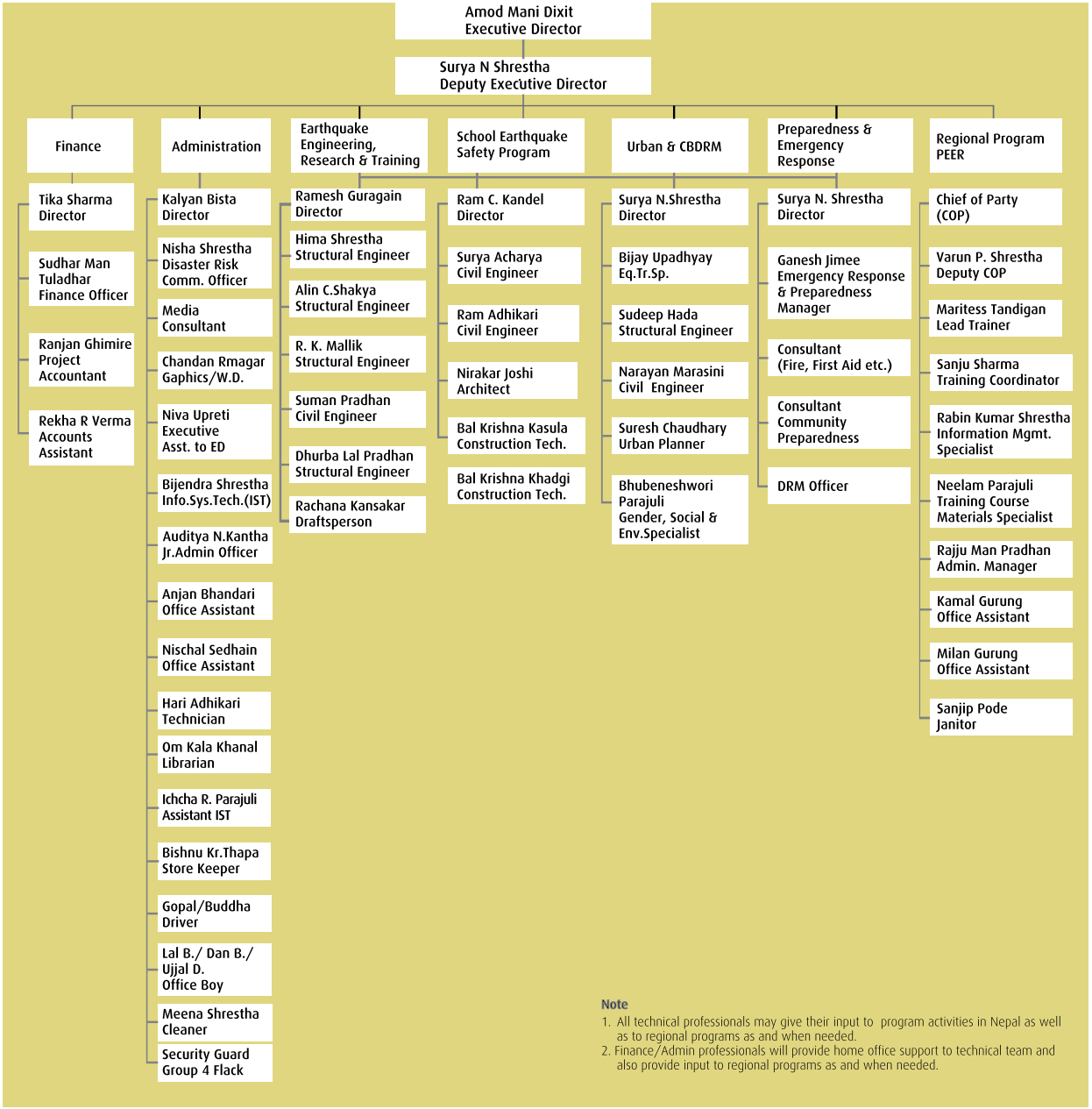
Chapter 5

ORGANIZATIONAL DEVELOPMENT

Evolution of NSET as an organization

When NSET started its first project, the Kathmandu Valley Earthquake Risk Management Project (KVERMP) in 1997, it had a total staff of five and barely enough equipment in its offices. At the end of 2008, NSET has nearly 60 staff members, including a number of well-qualified, international class professionals. The following charts show NSET's current organization:

Figure 6: Organizational chart



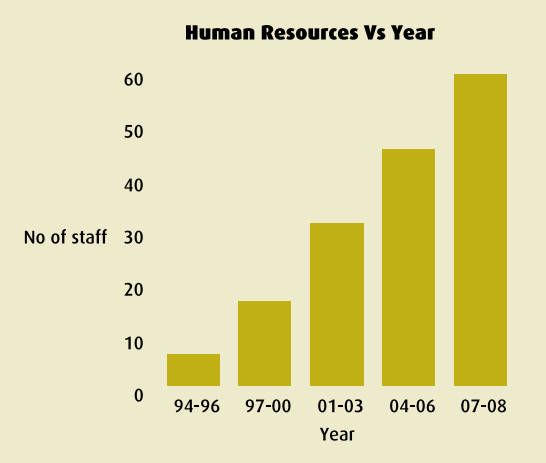


Figure 7: Growth of NSET's Capacity

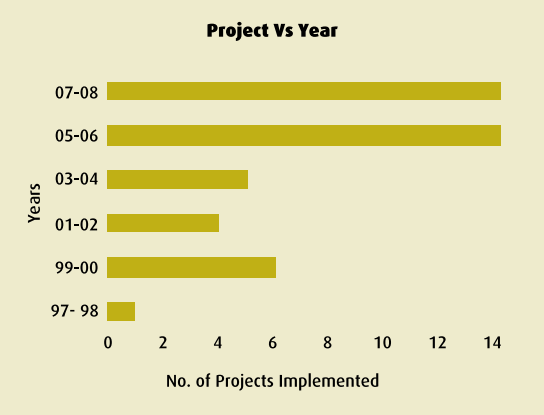


Figure 8: Project Vs Year

After the establishment of NSET in 1994, it implemented the first project only in 1997: The Kathmandu Valley Earthquake Management Project (KVERMP). The methodologies developed during KVERMP were replicated later on in Municipal Earthquake Risk Management Program that NSET subsequently implemented in various municipalities. NSET is sharing its knowledge currently by being a part of similar programs on earthquake risk assessment, capacity building and action planning for earthquake risk management in Dhaka, Sylhet and Chiitagong of Bangladesh and Manshera, Muzaffarabad and Quetta of Pakistan. The first regional program 'Program for Enhancement of Emergency Response (PEER)' has been implemented since 2003 in six countries of South-Asia with technical support from IRG/USA, John Hopkins University/USA and Safety Solution Inc. /USA and under the auspices of OFDA of USAID.

NSET had started off with just two –three projects in hand in the earlier years and the coverage area was also limited whereas in the recent years the number of projects has increased considerably, thus extending its boundary further. A list of significant projects/programs implemented so far by NSET appears in Annex 9.

NSET has now been established as a credible non-governmental institution capable of implementing specialized earthquake vulnerability reduction and preparedness capabilities for government, private, and international/regional institutions. NSET continues to receive requests for assistance in implementing projects for earthquake risk reduction and earthquake preparedness from a wide variety of institutions: government ministries, departments, local governments, and communities both in the national and the international level. The depth as well as extent of services delivered by NSET has expanded.

Diversification of Activities and Current Thinking

While the focus on earthquake by risk management continues, NSET is diversifying its activities to include risk management for other natural hazards such as landslide, flood and implications of climate change and global warming etc by developing and implementing multihazard approaches in

its activities. Likewise, NSET is also paying due attention to other cross-cutting issues such as gender consideration, right-based approaches, inclusiveness, environmental considerations in its program design and implementation.

NSET believes in the use of science and technology for enhancing safety from natural hazards. While knowledge and technology exists internationally and available for use in Nepal and the region, the task is to adapt the existing knowledge and technologies to the local physical, socio-economic and cultural-demographic and contexts. The adaptation process demands development of methodologies for which practical researches are indispensable. NSET is engaged and will be engaged with national and international research stations and academic centers in such implementation-oriented researches. That explains NSET's close relationship with academia.

Likewise, we strongly believe that disaster risk reduction efforts should be aligned with other development initiatives such as achieving MDGs, Poverty reduction, risk-sensitive land use planning and are giving our efforts in understanding the inter-linkages and adapting our programs to contribute to the longer goal of overall developing nations.

In-house Capacity Enhancement

Capacity building of staff is an integral component of organizational development. NSET is committed to build the capacity and enhance the knowledge of its staff members through various trainings and human resource development programs so that the staffs could be encouraged to deliver innovative and quality works.

During the period of 2007-08, 18 staff members have completed training of various types both within and outside the country. A list of such training program appears in Box 22.

Financial Sustainability

In this context, NSET has been trying to develop itself into a financially self-sustaining institution, and considerable success has been achieved over the years. This is reflected in continued increase and growth in the volume of the work implemented by NSET and services provided to communities in reducing the identified earthquake vulnerabilities. Financial report of the year 2007-08 appears in Annex 1.

However we still need financial support, still have to raise funds, and still have to provide fee-based services. Developing local capacities, sharing of knowledge and experiences, helping develop local champions are the ruling criteria for the fee-based services, that we deliver in cooperation with international NGOs, development agencies the UN systems and the related programs conducted by international financial institutions such as the World Bank.

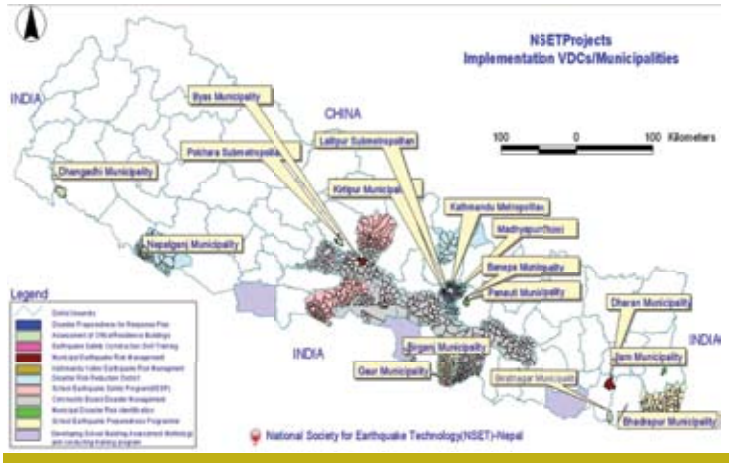


Figure 9: NSET Project/Program Coverage (National)

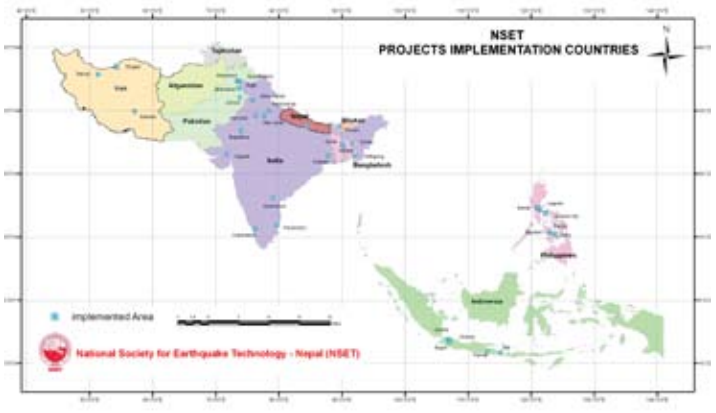


Figure 10: Project/Program Coverage (Regional)

Box-22 : IN-HOUSE CAPACITY ENHANCEMENT

NSET / PEER Training Courses

NSET professionals, Mr. Ram Chandra Kandel, Director, School Earthquake Safety Program and Mr. Ganesh Jimee, Emergency Preparedness and Response Manager at NSET, participated in the;

- Medical First Responders (MFR) Training Course (3-15 January 2008);
- Collapsed Structure Search and Rescue (CSSR) Training Course (May 29 - June 6, 2008); and
- Medical First Responder Instructors Workshop (MFRIW), (16-20 June 2008) organized by Nepal Police Academy and NSET/PEER at the Nepal Police Academy, Maharajgunj, Kathmandu.
- NSET professionals (Mr. Suman Pradhan, Mr. Alin Chandra Shakya, Mr. Dhruba L. Pradhan, Mr. Nirakar Joshi, engineers at NSET) participated in the PEER /NSET Training for Instructors Course (TFI) held at Nepal Police Academy from June 8 2008.

Other Trainings:

- Upon request from Disaster Prevention Research Institute (DPRI), Kyoto University, Mr. Bijay Krishna Upadhyaya, Earthquake Technology Training Specialist of NSET visited Japan for a period of three months July 5 to October 4, 2007 to work with DPRI, Kyoto University as a Visiting Researcher. The major objectives of his visit were: a) share with them his and NSET's experiences and success practices in Nepal, b) jointly engage in Case Station-Field Campus (CASiFiCA) research activities, learn from their scientific methods and tools to promote community-based participatory approaches for disaster reduction in Japan, c) visit and study some of local challenges made by the research partners in Nagoya, and d) learn from the experience of what the NGO Rescue Stockyard in Nagoya has been doing and aimed at.
- Two of the NSET professionals, Nisha Shrestha, and Chandan Dhoj Ranamagar, visited Sustainable Environment and Ecological Development Society (SEEDS) India office in New Delhi under the NSET-SEEDS Exchange program to get exposed to and to share experiences on the process of generation and production of quality publications, media materials and website development from 1-14 November 2007.
- NSET professional Sujan Rai attended six day training on 'GIS for Beginners' organized by Nepal Geological Society, International Centre for Integrated Mountain Development (ICIMOD) and Institute of Engineering (IOE) held at Institute of Engineering (IOE), Pulchowk from 12-17 November 2007.
- Mr. Bijay Upadhyaya, Earthquake Technology Training Specialist at NSET attended the training program on Disaster Response and Recovery (DRR) organized by Government of Malaysia in association with Mercy Malaysia held in the Legend Hotel, Kuala Lumpur from 18 - 26 June 2008
- Mr. Narayan Marasini, Civil Engineer at NSET, attended the Community Based Disaster Risk Management Training organized by MERCY Malaysia at Kuala Lumpur, Malaysia from 11-17 Aug 2008.
- NSET professionals Mr. Ranjan Ghimire and Ms Rekha Verma of the Finance Department, attended the one day Training on Fraud Awareness and Prevention organized by USAID/OFDA at the WWF building on August 15, 2008.
- Mr. Ram Adhikari, Director, SESP at NSET participated in the Disaster Planning Course organized by Defence Institute for Medical Operation and USAID/OFDA for the professional engineers at the Army Headquarters (25-29 Aug 2008).
- Mr. Surya Prasad Acharya, Civil Engineer at NSET attended the five-day training on Trauma Management organized by Nepal Army and USAID at the Army Hospital (15-19 Oct 2008).
- Mr. Gopi Krishna Basyal Geographer/Urban Planner at NSET is doing his MSc in Geo-Hazards at the ITC Netherlands
- Seven of NSET professionals are undertaking Distance Learning Course on Disaster Management
- Ms Bhubaneswari Parajuli participated in the five - day residential training on "Mainstreaming Gender into DRR" at Hotel Dhulikhel Mountain Resort during December 8-12, 2008 and a six- day training of SPHERE Training of Trainers (TOT) during December 21-26, 2008, both organized by DPNet.

ANNEX 1: Financial Report 2007-08

Income and Expenditure Statement

for the period from 17th July 2007 to 15th July 2008 (Shrawan 1, 2064 to Ashad 31, 2065)

Particulars	NSET Rs	NERMP Rs	PEER Rs	SESP/AAN Rs	Current Period Total Rs	Previous Period Rs
Income						
Capital Grant	-	-	-	-	-	4,404,350.00
Professional Service Charge	21,314,191.55	-	-	-	21,314,191.55	18,210,418.84
Earthquake Safety Day	759,188.24	-	-	-	759,188.24	1,172,753.67
USAID/OFDA Grant	-	11,935,189.45	113,965,707.32	-	125,900,896.78	125,412,453.14
Action Aid Nepal	-	-	-	610,283.00	610,283.00	-
PEER Overhead	1,835,411.53	-	-	-	1,835,411.53	994,717.14
PEER G&A	13,498,059.68	-	-	-	13,498,059.68	3,531,174.52
PEER Sub Contract Handling Fee	428,637.11	-	-	-	428,637.11	343,243.52
PEER PFAP handling fee	476,081.42	-	-	-	476,081.42	
Contribution from/for Publication	27,036.00	-	-	-	27,036.00	79,901.00
Membership Fee	5,500.00	-	-	-	5,500.00	-
Interest on Bank Balance	166,948.02	24,233.88	24,823.74	-		110,911.57
Income from Other Sources	1,492,499.90	-	-	-	1,492,499.90	2,264,297.67
Total Income	**40,003,553.45**	**11,959,423.33**	**113,990,531.06**	**610,283.00**	**166,347,785.21**	**156,524,221.07**
Expenses						
Model & NSET Building/Shed	15,950,877.67	-	-	-	15,950,877.67	54,794.57
SESP Expenses - Reconstruction and Wages	99,384.00	-	-	201,846.50	99,384.00	109,833.09
Public Awareness	691,491.13	388,521.26	-	-	1,080,012.39	411,052.46
Earthquake Safety Day	976,456.37	6,228.13	-	-	982,684.50	863,973.71
Workshop/Training/Semiar	411,842.09	-	25,532,843.66	-	25,944,685.75	51,095,248.68
Travel Expenses	3,290,337.55	-	302,709.06	-	3,593,046.61	9,563,201.24
Administrative Expenses	21,282,629.95	11,870,619.05	84,020,352.54	-	117,173,601.54	82,894,736.39
Exchange Gain/Loss	252,116.64	(1,154.75)	(106,971.13)	-	143,990.76	1,129,753.88
Total Expenditure	**42,955,135.40**	**12,264,213.69**	**109,748,934.13**	**201,846.50**	**164,968,283.22**	**146,122,593.02**
Excess of Income Over Expenditure	(2,951,581.95)	(304,790.36)	4,241,596.94	408,436.50	1,393,661.12	10,401,627.06
Opening Balance	16,251,532.67	(1,448,896.86)	4,067,689.66	-	18,870,325.47	31,146.60
Exchange Fluctuation		(270,949.38)	1,239,006.69	-	968,057.31	5,350,556.95
Balance of funds as on Ashad 31, 2065	**13,299,950.72**	**(2,024,636.61)**	**9,548,293.29**	**408,436.50**	**21,232,043.90**	**15,783,330.61**

Significant accounting policies & notes to accounts forms an integral part of this Income & Expenditure Statement

As per our report of even date

Sudhar Man Tuladhar
(Accounts Officer)

Amod Mani Dixit
(General Secretary)

Shiva Bahadur Pradhanang
(President)

Shashi Satyal
(Partner)
T R Upadhya & Co.
Chartered Accountants

Date: 19 December 2008
Place: Kathmandu

Balance Sheet

as at Ashad 31, 2065

Particulars	Schedule	As at Ashad 31, 2065 Rs	As at Ashad 32, 2064 Rs
Assets			
Fixed Assets	I	7,986,947.26	9,081,839.16
Receivables	II	15,482,330.04	22,457,396.95
Cash & Cash Equivalents	III	17,216,363.81	13,495,557.84
Total Assets		**40,685,641.11**	**45,034,793.95**
Liabilities			
Vehicle Loan		1,577,027.30	2,034,010.09
Current Liabilities	IV	17,876,569.91	27,217,453.26
Surplus as per Income & Expenditure Statement		21,232,043.90	15,783,330.60
Total Liabilities		**40,685,641.11**	**45,034,793.95**

Significant accounting policies & notes to accounts forms an integral part of this Income & Expenditure Statement

As per our report of even date

Sudhar Man Tuladhar
(Accounts Officer)

Amod Mani Dixit
(General Secretary)

Shiva Bahadur Pradhanang
(President)

Shashi Satyal
(Partner)
T R Upadhya & Co.
Chartered Accountants

Date: 19 December 2008
Place: Kathmandu

ANNEX 2: NSET Management Committee (July 2005 - 2010)

Shiva B. Pradhanang
President

Shreeram Singh Basnet
Member

Amod Mani Dixit
General Secretary

Varun Prasad Shrestha
Member

Yogeshwor K. Parajuli
Treasurer

Mahesh Nakarmi
Member

Mukunda Pradhan
Member

Tika Sharma
Member

ANNEX 3: NSET staff list

Name	Designation
Mr. Amod Mani Dixit	Executive Director
Mr. Surya Narayan Shrestha	Deputy Executive Director (Director for Urban and CBDRM Division and Emergency Response and Preparedness Division)
Mr. Tika Sharma	Director, Finance
Mr. Kalyan Bista	Director, Administration
Mr. Ram Chandra Kandel	Director, School Earthquake Safety Program
Mr. Ramesh Guragain	Director, Earthquake Engineering Research and Training Division
Ms. Bhubaneshwori Parajuli	Social, Environmental and Gender Specialist
Mr. Ganesh Kumar Jimee	Emergency Response and Preparedness Manager
Mr. Surya Prasad Acharya	Senior Civil Engineer/Program Manager SESP
Mr. Bijay K. Upadhyay	Earthquake Technology Training Specialist
Ms. Hima Shrestha	Structural Engineer
Mr. Narayan Marasini	Civil Engineer
Mr. Gopi Krishna Basyal	Geographer/Urban Planner
Mr. Ram Prasad Adhikari	Civil Engineer
Mr. Suman Pradhan	Civil Engineer
Mr. Alin Chandra Shakya	Structural Engineer
Mr. Dhurba Lal Pradhan	Structural Engineer
Mr. Suresh Chaudhary	Geographer/Urban Planner
Mr. Sudeep Hada	Structural Engineer
Mr. Radha K. Mallik	Structural Engineer
Mr. Ranjan Dhungel	Civil Engineer
Ms. Nisha Shrestha	Disaster Risk Communication Officer
Mr. Nirakar Joshi	Architect
Mr. Sudhar Man Tuladhar	Accounts Officer
Mr. Hari Adhikari	Technician
Mr. Chandan Dhoj Ranamagar	Graphics/Web Designer
Ms. Neeva Upreti	Executive Secretary (ED's Office)
Mr. Adutiya Narayan Kantha	Junior Administrative Officer

Ms. Rachana Kansakar	Draftsperson
Mr. Anjan Bhandari	Office Assistant
Mr. Nischal Sedhain	Office Assistant
Ms. Om Kala Khanal	Librarian
Mr. Bijendra Shrestha	Information System Technician
Mr. Bal Krishna Kasula	Construction Technician
Mr. Bal Krishna Khadgi	Construction Technician
Mr. Bishnu Thapa	Store Keeper
Mr. Ichcha Ram Parajuli	Assistant Information System Technician
Mr. Gopal Chaulagain	Driver
Mr. Buddha Shrestha	Driver
Mr. Lal Bahadur Pradhan	Office Boy
Mr. Dan Bahadur Koirala	Office Boy
Mr. Ujjal Dhakal	Office Boy
Ms. Meena Shrestha	Cleaner

Program for Enhancement of Emergency Response (PEER) Team:

Mr. Amod Mani Dixit	Chief of Party
Mr. Varun Prasad Shrestha	Deputy Chief of Party
Ms. Maritess Tandigan	Lead Trainer
Mr. Rajju Man Pradhan	Administrative Manager
Mr. Sanju Sharma	Training Coordinator
Ms. Neelam Parajuli	Training Course Materials Specialist
Mr. Rabin Kumar Shrestha	Information Management Specialist
Mr. Ranjan Ghimire	Project Accountant
Ms. Rekha Rani Verma	Accounts Assistant
Mr. Kamal Gurung	Office Assistant
Mr. Milan Gurung	Office Assistant
Mr. Sanjip Pode	Janitor

Senior Volunteer

Mr. Yoshihiko Koori	Senior JICA Volunteer (April 2007 - March 2009)

ANNEX 4: NSETs partners and supporters (1993-2008)

National

- Armed Police Force
- B.P. Koirala Institute of Health Sciences
- Department of Mines and Geology
- Department of Urban Development and Building Construction
- Disaster Management Committee of Wards 17, 29 and 34, Kathmandu
- Disaster Preparedness Network (DPNet)
- Diploma Engineers' Association, Nepal
- Institute of Engineering, Tribhuvan University
- Institute of Medicine, Tribhuvan University
- Kathmandu University
- Ministry of Education and Sports
- Ministry of Health and Population
- Ministry of Home Affairs
- Ministry of Local Development
- Ministry of Environment, Science and Technology
- Ministry of Physical Planning and Works
- Ministry of Women, Children and Social Welfare
- Municipalities of Kathmandu Valley and other districts
- National Forum for Earthquake Safety
- Nepal Army
- Nepal Forum for Environmental Journalists
- Nepal Bureau of Standards and Metrology
- Nepal Engineering College
- Nepal Engineers Association
- Nepal Geological Society
- Nepal Red Cross Society
- Nepal Police
- National Police Academy
- Rotary Clubs
- Social Welfare Council
- Society of Consulting Architectural and Engineering Firms
- Society of Nepalese Architects
- PARADIGM-Nepal

International

- Action Aid International Nepal
- All India Institute of Hygiene & Public Health (AIIH&PH), India
- Ambullan 118 of Indonesia
- American Red Cross
- Amity Public Safety Academy of Philippines
- Asian Disaster Preparedness Center
- Asian Disaster Reduction Center
- Asian Disaster Reduction and Response Network
- Asian Seismological Commission
- Badan Koordinasi National of Indonesia
- Badan Search and Rescue National of Indonesia
- Bangladesh Disaster Preparedness Centre
- Boarder Security Force of India
- Building Research Institute of Japan
- Central Reserve Police Force , India
- Christian Aid-UK
- Commissionerate of Health & Medical Services, Gujarat, India
- Disaster Management Bureau of Bangladesh
- DPRI/Kyoto University
- Earthquake and Megacities Initiatives (EMI)
- Emergency Rescue Unit Foundation of Philippines
- Emergency Medical Relief (EMR)/ Directorate of Health Services, New Delhi, India
- Earthquake Reconstruction and Rehabilitation Authority (ERRA), Pakistan
- Fire National Training Institute of Philippines
- Fire Service and Civil Defense Directorate of Bangladesh
- Focus Humanitarian Assistance, Pakistan
- GeoHazards International
- Give2Asia
- Graduate Research Institute for Policy Studies (GRIPS) of Japan
- Indian Tibetan Boarder Police (ITBP), India
- Indonesian Red Cross
- International Centre Integrated Mountain Development
- International Association of Earthquake Engineering

- International Resources Group
- Jakarta Fire Services, Indonesia
- Japanese International Cooperation Agency
- Jawaharlal Institute of Post Graduates Medical Education & Research (JIPMER), India
- Johns Hopkins University - Center for International Emergency, Disaster, and Refugee Studies
- Lutheran World Federation
- MERCY Malaysia
- Ministry of Food and Disaster Management, Bangladesh
- Ministry of Health and Family Welfare, Bangladesh
- Ministry of Health, Indonesia
- Ministry of Home Affairs, India
- National Disaster Management Authority of Pakistan
- National Disaster Coordinating Council of the Philippines
- National Industrial Security Academy of India
- Nat'l Institute of Preventive and Social Medicine of Bangladesh
- National Research Institute for Earth Science and Disaster Prevention of Japan
- New Zealand Society for Earthquake Engineering
- Norwegian Refugee Council
- Office of Foreign Disaster Assistance of United States Agency for International Development (OFDA/ USAID).
- Oxfam GB Nepal
- Philippines General Hospital
- Reynolds Geo-Sciences Limited, UK
- Safety Solutions Incorporated, USA
- SAARC Disaster Management Center, India
- Sustainable Environment and Ecological Development Society (SEEDS/India)
- The International Institute for Geo-Information Science and Earth Observation (ITC)
- United Mission to Nepal
- The World Bank
- United Nations Center for Regional Development - Disaster Management Planning Hyogo Office
- United Nations Development Programme
- UN-ISDR
- United Nations Educational, Scientific and Cultural Organization
- UN-HABITAT
- World Health Organization
- World Seismic Safety Initiatives

ANNEX 5: List of organizations that have signed Memorandum of Understanding (MOU) with NSET for Cooperation in Earthquake Risk Management and Emergency Response Training

S.N.	Name of Institution	Specific Purpose
1	UNDP, Nepal	To cooperate in the implementation of Kathmandu Valley Earthquake Risk Management Project.
2	United Mission to Nepal (UMN)	To cooperate in the implementation of Kathmandu Valley Earthquake Risk Management Project.
3	Room to Read	To assist communities to construct earthquake resistant public schools
4	Bibhuti Man Singh, Architect	Architecture design/drawings of NSET's proposed Community Learning Center Building
5	Nepal Forum For Environmental Journalists (NEFEJ)	To work on collaborative approaches for environmental protection, urban management, awareness raising through dissemination of information, training, workshop, seminar and community radio broadcasting.
6	Lalitpur Sub-Metropolitan City, ICIMOD, ITC/Netherlands	To develop the methodology for the implementation of seismic risk assessment for Lalitpur area within Kathmandu valley of Midland Mountain range of Himalaya and to support LSMC in the development of GIS and its application.
7	Kathmandu University	To pool information, expertise and human resources in the fields of disaster risk reduction and emergency response capacity enhancement
8	Department of Urban Development and Building Construction (DUDBC)	To work on collaborative approaches for raising awareness on earthquake resistant building construction practices in accordance to National Building Code, developing human resources, making efforts to implement building code at local level, organizing training, workshop and seminar for the same.
9	Diploma Engineers Association Nepal (DEAN)	To reduce earthquake risk through awareness raising program as well as organizing training, workshops/ seminars, research and development.
10	Nepal Red Cross Society (NRCS)	To work together in the field of disaster reduction and earthquake risk management, awareness raising through dissemination of information, training, workshop, seminar, and various other collaborative approaches.

12	Central Department of Geology, Tribhuvan University	To pool information, expertise and human resources in the fields of disaster risk reduction and emergency response capacity enhancement
13	Kathmandu Metropolitan City (KMC)	To pool information, expertise and human resources in the fields of disaster risk reduction and emergency response capacity enhancement.
14	Nepal Engineering College (NEC)	To work together to develop curricula for M.Sc level disaster management course and to build collaborative approaches for earthquake and other disaster management activities.
15	DPRI/Kyoto University	Establishment of Case Station and Field Campus
16	Bangladesh Disaster Preparedness Center (BDPC)	Enhancing cooperation and collaboration in disaster risk management areas.
17	Focus Humanitarian Assistance, Pakistan	Enhancing cooperation and collaboration in SESP program in Pakistan
18	Norwegian Refuge Council (NRC), Nepal Bar Association (NBA), Social Welfare Council (SWC)	NRC will work in partnership with NSET and NBA for the Information, Counseling and Legal Assistance (ICLA) and Shelter Program components for IDPs.
19	Ministry of Home Affairs, Ministry of Local Development, Ministry of Physical Planning and Works, Lalitpur Sub-Metropolitan City, Nepal Water Supply Corporation, Nepal Red Cross Society, District Disaster Relief Committee and UNICEF/Nepal	To facilitate development of a disaster response framework and emergency drinking water facilities in the event of a major earthquake in Kathmandu Valley.
20	Action Aid, Center for Policy Research and Consultancy, Education Network and Disaster Preparedness Network of Nepal	To reduce peoples' vulnerabilities to disasters by contributing towards the implementation of the Hyogo Framework the project "Disaster Risk Reduction through School".
21.	National Research Institute for Earth Science and Disaster Prevention (NIED)	To enhance the institution's contribution capability for disaster reduction to benefit each other by sharing common information on disaster reduction technology and knowledge in order to cooperate in the development of Disaster Reduction Hyperbase.

MOU For the Implementation of Program for School Earthquake Safety Program (SESP)

1	Bhuwaneshwory Lower Secondary School , Nangkhel, Bhaktapur	To retrofit the existing school building and to build the earthquake resistant new building.
2	Gadgade Primary School, Nagarkot,Bhaktapur	To retrofit the existing school building
3	Upayogi Primary School, Sirutar,Bhaktapur	To retrofit the existing school building
4	Vaisnabi Secondary School ,Kritipur	To construct new earthquake resistant school building
5	Bal Vikash Secondary School,Alapot, Kathmandu	To retrofit the existing school building
6	Kabhresthali Lower Secondary School, Kavresthali,Kathmandu	To construct new earthquake resistant school building
7	Himalaya Primary School,Thimi, Bhaktapur	To construct new earthquake resistant school building
8	TinkannyaPrimary School,Katrak Dhading	To construct new earthquake resistant school building
9	Amarkhu Lower Secondary School, Bhumisthan ,Dhading	To construct new earthquake resistant school building
10	Nateshwori Primary School, Chhaling,Bhaktapur	To construct new earthquake resistant school building
11	Vidyodaya Primary School, Jhochen Kathmandu, KMC-23	To construct new earthquake resistant school building
12	Saraswoti Secondary School, Thencho,Lalitpur	To construct new earthquake resistant school building
13	Shree Krishna Secondary School, Dhapakhel,lalitpur	To construct new earthquake resistant school building
14	Saraswoti Secondary School, Thakalmath,Bhaktapur	To construct new earthquake resistant school building
15	Chaitnya Multiple Campus,Banepa	To construct new earthquake resistant school building
16	Shiva Primary School,Viyas,Tanahun	To construct new earthquake resistant school building
17	Sangam Primary School,Viyas,Tanahun	To construct new earthquake resistant school building
18	Bal Premi Secondary School,Thimi, Bhaktapur	To construct new earthquake resistant school building
19	Golmadevi Primary School, Sindupalchowk	To construct new earthquake resistant school building
20	Janajyoti Secondary School, Bhimad Tanahun	To construct new earthquake resistant school building
21	Janasewa Primary School,Viyas Tanahun	To construct new earthquake resistant school building

22	Suryodaya Bal Bikash Primary School, Imadol, Lalitpur	To construct new earthquake resistant school building
23	Adarsha Saul School,Bhaisepati, Lalitpur	To construct new earthquake resistant school building
24	Shree Jana Udaya Nimna Madhyamik Vidyalaya, Bhaisepati, Lalitpur	To retrofit the existing school building
25	Mahendra Shanti High School, Balkot, Bhaktapur	To retrofit the existing school building
26	Mahendra Adarsha High School, Imadol, Lalitpur	To retrofit the existing school building
27	Bansha Gopal Higher Secondary School, Hetauda-6, Makwanpur	To retrofit the existing school building
28	Churiyamai Secondary School, Churiyamai, Hetauda	To retrofit the existing school building
29	Sakala Devi Primary School, Dibyapuri, Nawalparasi	To retrofit the existing school building

MOU For the Implementation of Program for Enhancement of Emergency Response (PEER)

1	Institute of Medicine, Tribhuvan University	To nationalize and institutionalize HOPE course in Nepal
2	Nepal Police, Ministry of Home Affairs	To implement the PEER program in the best interest of Nepal, and create an environment of mutual cooperation towards successful implementation of MFR, CSSR and TFI courses.
3	Ministry of Health & Family Welfare, Ministry of Food and Disaster Management, National Institute of Preventive & Social Medicine, Bangladesh	To nationalize and institutionalize HOPE course in Bangladesh.
4	Disaster Management Bureau (MDMR), Bangladesh	To implement the PEER program in the best interest of Bangladesh, and create an environment of mutual cooperation towards successful implementation of MFR, CSSR and TFI courses in Bangladesh.
5	National Disaster Coordinating Council, Philippines	To implement the PEER program in the best interest of Philippines, and create an environment of mutual cooperation towards successful implementation of MFR, CSSR and TFI courses in the Philippines.
6	National Disaster Management Authority (NDMA), Pakistan	To implement the PEER program in the best interest of Pakistan, and create an environment of mutual cooperation towards successful implementation of MFR, CSSR and TFI courses in Pakistan

ANNEX 6: List of NSET publications

S.N.	Name Of Publication
	Books and Guidelines
1	A Manual for Designers and Builders
2	The Kathmandu Valley Earthquake Risk Management Action Plan
3	Earthquake Scenario of Kathmandu Valley (English)
4	Earthquake Scenario of Kathmandu Valley (Nepali)
5	Non-Structural Vulnerability Assessment of Hospitals in Nepal
6	Earthquake Preparedness Hand Book
7	Bhaicha (Illustrated story on Earthquakes)
8	Guidelines for Seismic Vulnerability Assessment of Hospitals
9	Guidelines for incorporation Earthquake Safety Measures in Repair and Maintenance of Buildings with Historical/ Archeological Importance
10	Abstract Book (ASC 2002)
11	Proceedings of Asian Seismological Commission (ASC 2002)
12	Earthquake Resistant Construction of Buildings Curriculum for Mason Training (Guidelines for Training Instructors)
13	National Building Code 203 (In Nepali)
14	What to do during an Earthquake (In Nepali)
15	Earthquakes (30 Frequently Asked Questions and Answers by NSET) –In Nepali
16	Parale Kunyu ko Aago (Illustrated story on Earthquake / Tsunami for Adult) – In Nepali
17	Parale Kunyu ko Aago (Illustrated story on Earthquake / Tsunami for Children) – In Nepali
18	Retrofitting of Common Frame Structural (Pillar System) Houses
19	"What are the tricks for constructing earthquake-resistant buildings?"
20	"Hazuraama Ko Katha" -Earthquake Story for Children (Nepali)
	Posters and Fliers
1	Risk Land
2	NSET Timeline (Brochure)
3	Calendar - Annual
4	Earthquake-induced Cracks in building (size 20" X 30")
5	EQ. Safety thru community-based initiative (size 17" X 22")
6	Modified Mercalli Intensity Scale (Size 20" X 30")
7	Poster: Earthquake Risk Reduction of Non Structural Items
8	Citizens Responsibilities During Mass Casualty Management
9	ESD- Poster - Annual
10	NSET News Letter - Quarterly
11	Guideline for Training Instructors
12	Fliers (Pillar, Stone, Brick Masonry, Earthquake Safety and Retrofitting)

ANNEX 7: List of SESP implemented Schools

S. No.	Name of School	Address	Year of Original Construction	Retrofitted / Reconstruction/ New Construction	Year of Retrofitting/ Reconstruction/ New Construction	Project Status	No of Students
1	Bhuwaneshwory Lower Secondary School	Nangkhel VDC, Ward No: , Bhaktapur	2017 B.S.	Retrofitting/ Reconstruction	1999-2002	Completed	126
2	Gadgade Primary School	Nagarkot VDC, ward no.- 8, Bhaktapur	2045 B.S.	Retrofitting	1988-89	Completed	175
3	Upayogi Primary School	Sirutar VDC, ward no.- 1, Bhaktapur		Retrofitting	1988-89	Completed	
4	Vaisnabi Secondary School	Kritipur Municipality, ward no. Kathmandu	2056 B.S.	Reconstruction	2000	Completed	273
5	Bal Vikash Secondary School	Alapot VDC, ward no.: 4 , Kathmandu	2058 B.S.	Retrofitting	2000	Completed	400
6	Kabhresthali Lower Secondary School	Kabhresthali VDC, ward no.-4, Kathmandu	2039 B.S.	Reconstruction	2001/02	Completed	280
7	Himalaya Primary School	Madhyapur Municipality, ward no.-3, Nekosera, Bhaktapur	2037 B.S.	New construction	2002	Completed	74
8	Tinkannya Primary School	Benighat VDC, ward no.-2 Katrak,Dhading	2027 B.S.	Reconstruction	2002	Completed	80
9	Amarkhu Lower Secondary School	Bhumisthan VDC-3, Dhading		New construction	2002	Completed	354
10	Nateshwori Primary School	Chhaling VDC, ward no.-, Bhaktapur	2037 B.S.	New construction	2002/03	Completed	135
11	Vidyodaya Primary Bhaktapur	KMC- 23, Jhochhen	2023 B.S.	Reconstruction	2002/03	Completed	218
12	Saraswoti Secondary School	Thecho, Lalitpur	2046 B.S.	Reconstruction	2003	Completed	291
13	Shree Krishna Secondary School	Dhapakhel, Lalitpur	2058 B.S.	New construction	2002/03	Completed	431
14	Saraswoti Secondary School	Sudal-6, Thakalmath Bhaktapur	2017 B.S.	Reconstruction	2003- 2004	Completed	463
15	Chaitanya Multiple Campus	Banepa		New construction	2003	Completed	
16	Shiva Primary School	Vyas-5, Tanahun		New construction	2003-2005	Completed	
17	Sangam Primary School	Vyas-7, Tanahun		Reconstruction	2003	Completed	

18	Golmadevi Primary School	Kadambas, Sindhupalchowk		New construction	2003	Completed	
19	Janajyoti Higher Secondary School	Bhimad, Tanahun		New construction	2004/2005	Completed	
20	Balpremi Secondary School	Thimi, Bhaktapur	2036 B.S.	Reconstruction	2004/05	Completed	341
21	Suryodaya Balbikash Primary School	Ikudol-9, Lalitpur	2051 B.S.	Reconstruction	2005	Completed	132
22	Adarsha Saula H. S. School	Sainbu, Lalitpur	2044 B.S.	Reconstruction	2006/ 2007	Completed	582
23	Shree Jan Uday Nimna Madhayamik Vidhyalaya	Sainbhu-4, Bhainsepati, Lalitpur	2037 B.S.	GF retrofitting/ FF New Construction	2006-2007	Completed	227
24	Mahendra Shanti Secondary School	Balkot, Bhaktapur	2015 B.S.	Reconstruction	2007	Two storey Completed	304
25	Mahendra Adarsha Secondary School	Imadol-7, Lalitpur	2017 B.S.	Reconstruction	2007/ 2008	Under Construction	651
26	Churiya Mai Secondary School	Sikharpani, Churiya Mai VDC-9, Hetauda	2017 B.S.	New construction	2008	Under Construction	713
27	Bansha Gopal Higher Secondary School	Chaugadha, Hetauda-6	2017 B.S.	New construction	2008	Under Construction	991
28	Sakala Devi Primary School	Divyapuri-8, Kadampur, Nawalparasi	2017 B.S.	New construction	2008	Under Construction	273
29	Buddha Jyoti Bal Udhyan L.S. School	Buudha Jyoti Marga, Balaju, Kathmandu	2053 B.S.	Retrofitting/ Re construction	2008	Under Construction	310
30	Shree Laxipur H.S. School	Triuga-5, Gaighat, Udaypur	2022 B.S	Retrofitting	2008	Under Construction	861
31	Shree Panchayat Secondar School	Dharan-10, Sunsari	2020 B.S	Retrofitting	2008	Under Construction	576
32	Shree Balkumari Secondary School	Sunakoti, Lalitpur	2007 B.S	New construction	2008	Under Construction	522

ANNEX 8: NSET participation at International workshops and conferences 2007/2008

Month	Conference/ Workshops	Venue	NSET Representation
January	Expert meeting for ABCD/HESI in Tokyo from 16-18 Jan, 2007 organized by UNCRD	Japan	Amod Dixit
January	'International Conference on School Safety' (17 - 21 Jan 2007) organized by SEEDS India	Ahmedabad, India	Ramesh Guragain
February	Country Planning Meeting /PEER (12-13 Feb,2007)	Islamabad, Pakistan	Amod Dixit
February	DRH Consultative Meeting (19 - 20 Feb, 2007)	Delhi, India	Amod Dixit
March	Regional Planning Meeting / PEER	Jakarta, Indonesia	Amod Dixit
March	International DRH Contents Meeting / 1st Annual DRH Workshop	Japan	Surya N.Shrestha
April	WHO consultation Workshop on Coordinated work for disaster risk reduction and the preparedness of health facilities in urban settings organized by WHO-Kobe Centre, 16 April, 2007	Japan	Ramesh Guragain
May	Seminar on the theme of "Community Based Disaster Risk Management" organized by Japan Bank for International Cooperation JBIC (7-8 May,2007)	Kobe,Japan	Amod Dixit
June	" Global Platform on Disaster Risk Reduction " organized by ISDR from 5-7 June 2007	Geneva, Switzerland	Amod Dixit
June	Asian Conference on DRR organized by Government of Kazakhstan, Government of Japan in association with UNISDR, UNDP and ADRC Japan (25-27June 2007)	Astana, Republic of Kazakhstan	Ram C. Kandel
June	Consultation meeting/workshop on Pan-Himalayan Study on Indigenous Technology of Earthquake-Resistant Construction of Historic Buildings (PAHSIB) on 25th of June 2007	Delhi, India	Ramesh Guragain
July	"Regional Workshop on Building Risk Knowledge: Experience in Risk Assessment from the Region and "Enhancing Applications of Disaster Loss Database" organized by UNDP/Bangkok, June 28 – 30, July 2-4, 2007	Bangkok, Thailand	Ganesh Jimee

October	Asian Science and Technology Forum Tsukuba Seminar on "International Workshop on Information Platform for Disaster Reduction (IPDR Workshop)" 1-6 October, 2007	Tsukuba, Japan	Amod Dixit
October	"Asia-Pacific Regional Workshop on School Education and Disaster Risk Reduction"	Bangkok	Amod Dixit
October	"National Seminar on Seismic Microzonation" at EDI	Ahmedabad, India	Amod Dixit
October	Regional Workshop on Accountability in Humanitarian Practice	Kuala Lumpur, Malaysia	Amod Dixit
November	Second Asian Ministerial Conference on Disaster Risk Reduction	New Delhi, India	Amod Dixit
December	'Technical Refreshers Course on DesInventar ' 4-5 Dec, 2007 and Regional Workshop on Extensive Risk Analysis 6-7 Dec 2007 organized by Regional Centre Bangkok/UNDP	Bangkok	Gopi Krishna Basyal
January	SAARC workshop on application of Science and Technology organized by DMC SAARC	New Delhi, India	Ram Chandra Kandel
January	International Conference on Construction on "Managing Earthquake Risk" organized by Construction Industry Development Council and supported by National Disaster Management Authority	New Delhi, India	Amod Dixit
January	Meeting on "Regional Launch of Global Campaign on Safe Hospitals" organized by UNISDR	Bangkok	Ramesh Guragain
May	International Conference on School Safety, May 2008	Islamabad, Pakistan	Surya Prasad Acharya
May	Steering Committee of the Asia NGO Consultative Meeting on DRR' organized by UNISDR and Oxfam Hong Kong on 27-28 may 2008	Bangkok	Amod Mani Dixit
May	"Disaster Reduction Hyperbase (DRH- Asia) 3rd Facilitation Meeting at EDM Meeting hall, EDM, Kobe (29-31 May, 2008)	Kobe, Japan	Amod Mani Dixit

June	Seventh International Workshop on Seismic Analysis in South Asia Region. (2-5 June 2008)	Thimpu, Bhutan	Amod Mani Dixit
June	National Conference on Mass Instability and Earthquake Risk Management in Mountainous Regions: Challenge, Lessons Learnt and Future Strategy organized by Disaster Mitigation and Management Centre, Dehradun (27 - 28 June 2008)	Bangkok	Surya Prasad Acharya
July	South Asia Regional Consultation Meeting on owner driven reconstruction, Gujarat jointly organized by Gujarat State Disaster Management Authority (GSDMA) and other regional, Indian organization (16-18 July, 2008)	Gujarat, India	Surya Narayan Shrestha
July	JICA/ ADRC workshop on Disaster Risk Reduction for ADRRN members (29-31 July, 2008)	Kualalumpur, Malaysia	Niva Upreti
August	ADRRN Exco member- member retreat schedule (8-9 Aug, 2008)	Kuala Lumpur, Malaysia	Amod Mani Dixit
September	USAID Project Implementation Meeting	Delhi, India	Amod Mani Dixit
October	14th World Conference on Earthquake Engineering	Beijing, China	Amod M. Dixit, Surya N. Shrestha, Ramesh Guragain, Ram C. Kandel, Ganesh K. Jimee, Surya P. Acharya
October	GFDRR Partnership Development Workshop (29-31 Oct, 2008)	Delhi, India	Surya Narayan Shrestha
November	Seminar on Disaster Volunteer Activities organised by Osaka University, Division of Volunteer Studies (13-18 Nov, 2008)	Nagoya City, Japan	Narayan Marasini

ANNEX 9: PROJECTS/PROGRAMS IMPLEMENTED BY NSET

S.No	Contracts/Grants/Cooperative Agreements	Duration	Location	Name of Client
1	Kathmandu Valley Earthquake Risk Management Project (KVERMP)	1997-2000	Kathmandu	OFDA / USAID, ADPC
3	Environmental Mapping Project	1999-2002	Thimi, Kirtipur , Dharan, Banepa	Regional Urban Development Office (RUDO) / South Asia, USAID
4	Kathmandu Valley Earthquake Risk Management Action Plan Implementation Project	2000-2005	Kathmandu	OFDA / USAID
5	Nepal - Gujarat Mason Exchange and Training program: A community based sub- regional initiative	2001-	Kathmandu, Gujarat	SEEDS - India
6	Seismic vulnerability Assessment of Hospitals in Nepal	2003-2004	Throughout Nepal Ministry of Health, His Majesty Government of Nepal	World Health Organization (WHO),
7	Seismic vulnerability Assessment of Water Supply Pipe-networks of Kathmandu Valley	2002-2003	Kathmandu Valley	UNICEF
8	Project for Pre - Positioning of Emergency Rescue Stores (PPERS)	2003-	Kathmandu Valley	Civil Affairs Group of British Army
9	Municipal Earthquake Risk Management Project	2002-2003	Banepa,Vyas, Dharan and Pokhara	AUDMP of ADPC / OFDA
10	Disaster Inventory / Information Management System in Nepal	2003-2006		UNDP - Nepal
11	Assessment of Existing Buildings	2000- ongoing,	Kathmandu Valley Biratnagar, Dhangadi, Nepalgunj, Birgunj, Pokhara	
12	Feasibility study on Community based solid waste management for Dharan municipality	2002-2003	Dharan	Regional Urban Environment Policy and Management Program of Regional Urban Development Office (RUDO) for South Asia, USAID
13	Kathmandu Valley Earthquake Preparedness Initiative	2004-2005	Kathmandu Valley Red Cross Society	American Red Cross Society, Nepal

14	Nepal Earthquake Risk Management Program (NERMP)	2005-Ongoing	Kathmandu Valley and other Districts of Nepal	Office of Foreign Disaster Assistance(OFDA) of USAID
15	School Earthquake Safety Program (SESP)	1999	Kathmandu Valley, and various districts of Nepal	Various Organizations
16	Program for Enhancement of Emergency Response (PEER)	2003-2008 (Ongoing)	Bangladesh, India, Indonesia, Nepal, Pakistan and Philippines	Office of Foreign Disaster Assistance(OFDA) of USAID
17	Disaster Risk Reduction Through School Project	2007-2009	Kathmandu Valley, Makwanpur, Rasuwa and Banke Districts	Action Aid Nepal
18	Developing Existing School Building Assessment Methodology and Conducting Training Program	2005	Kapilvastu,Parsa and Saptari Districts)	UNICEF/Nepal
19	Thimpu Valley Earthquake Risk Management Project: Seismic Vulnerability Assessment and Retrofitting of Office Buildings	2007-2008	Thimpu Valley, Bhutan	Standards & Quality Control Authority, Ministry of Works and Human Settlement, Royal Government of Bhutan
20	Up-streaming Community Based Approaches for Promoting Safer Building Construction in Iran	2006-2007	Kerman, Gorgan of Iran	UNDP/Tehran
21	Program for Strengthening Capacities for Disaster Risk Management in Iran	2006-2007 2006	Tehran - Iran Tanahun, Syanjha,	Asian Disaster Preparedness Center (ADPC) UNDP/Nepal
22	Community Based Disaster Management Project (CBDMP)		Chitwan, Makwanpur, Sarlahi and Sindhuli Districts	
23	Disaster Preparedness and Response Plan for Safe Drinking Water in the Kathmandu Valley	2006-2007	Lalitpur Sub-metropolitan City, Nepal	UNICEF/Nepal
24	Capacity Building and Knowledge Management: Institutionalization of Earthquake Preparedness in School of Earthquake Affected Areas of Pakistan	2006-2007	Gilgit, Pakistan	UN/ISDR
25	Technical Support on Earthquake Resistant Housing Reconstruction, Pakistan (TSERR)	2006-2007	Bagh, Muzzaffarabad and other earthquake affected areas	Office of Foreign Disaster Assistance (OFDA) of USAID.

26	Earthquake Safety Construction Skill Training for Masons and Construction Technicians	2007	Bhardrapur, Gaur, Bhaktapur, Maddhapur Thimi, Kirtipur Municipality and Kathmandu Metropolitan - Nepal	Lutheran World Federation (LWF)
27	School Earthquake Preparedness Program in Jhapa, Rautahat and Kathmandu Valley	2006-2007	Jhapa, Rautahat and Kathmandu Valley	Lutheran World Federation (LWF), Nepal
28	Collaborative Research and Development on Network of Research Institutes in Earthquake Prone Countries	2007-2008	Kathmandu Metropolitan City	National Graduate Institute for Policy Studies (GRIPS), Japan
29	Community Based Disaster Management Program in Kathmandu Valley	2007	Kathmandu, Lalitpur	OXFAM GB, Nepal
30	Development of National Strategy for Disaster Risk Management in Nepal (NSDRM)	2006-2007	Kathmandu	UNDP/Nepal
31	Capacity Building for Reconstruction of Earthquake-Affected Areas of Pakistan	2005-2006	Bag and Muzafarrabad - Pakistan	UNDP/Pakistan
32	Municipal Disaster Risk Reduction Program in Nepal (MDRIP)	2008	Illam and Panauti	UN-Office for Project Services (UNPOS), Geneva
33	Risk Mapping Program and Shelter Response Planning	2008	Kathmandu - Nepal and Maputo - Mozambique	UN-HABITAT Headquarters C/o UNDP/BCPR, Geneva
34	Comprehensive Disaster Management Program (CDMP)	2008-2009	Sylhet, Chittagong, Dhaka - Bangladesh	CDMP Govt. of Bangladesh Main Consultant Asian Disaster Preparedness Center (ADPC)
35	Research on Earthquake Safety of Stone Masonry Buildings	2007-2008	Nepal	Building Research Institute (BRI)/ Japan
36	Awareness Raising and Capacity Building for Earthquake Risk Reduction	2007-2008	All 75 districts of Nepal	DUDBC/ Nepal

37	Shaking Table Demonstration	1999	Afganistán, India, Indonesia, Iran, Japan, Nepal, Pakistan, Tajikistan, Bangladesh	Shelter for Life (SFL – Afghanistan, UNCRD, BRI Japan, UNDP,JICA Pakistan, World Bank Indonesia , Mercy Malaysia etc
38	Seismic Vulnerability Assessment of Office and Residences of Various Organizations/Institutions located in Kathmandu Valley and other parts of Nepal	2000	Kathmandu Valley, Biratnagar, Dhangadi, Nepalgunj, Birgunj, Pokhara	American Embassy, British Embassy, Save the Children Alliance, ICRC, WHO Nepal Nepal RedCross Society–Blood Banks; Department of Health Services, Teku ,
39	Earthquake Vulnerability Reduction and Preparedness Program (EVRP), Pakistan	2007-2009	Muzaffarabad and Mansehra Municipalities of Pakistan	UNDP Pakistan , National Disaster Management Authority (NDMA)
40	Review proposal on "Technical Service for Review and Guidance of Rural Housing Reconstruction Program in Pakistan"		Pakistan	UN-HABITAT
41	Disaster Risk Management Master-Planning for the Kathmandu Metropolitan City (KMC) – 3 cd	2006	Kathmandu	Earthquakes & Megacities Initiative (EMI), Pacific Disaster Center
42	Earthquake Resistant Construction Training for Masons		Bungamati, Lalitpur	World Vision International
43	Evaluation of the "Post Flood Shelter Restoration Project, Barmer"	2006	Rajasthan, India	Christian Aid –UK; SEEDS/India
44	Housing Earthquake Safety Initiative (HESI)	2007-On-going	Nepal	UNCRD
45	Training Programs on Earthquake–resistant Construction for Masons and other Stakeholders of Building Industry		Nepal and the Region	
46	Public Awareness Programs		Nepal	
47	Global Assessment of Poverty and Disaster Risk (GADR)		Nepal	UNDP
48	Developing A Strategy for Improving the Seismic Safety of Schools in Nepal	August 2008-June 2010	Nawalparasi and Lamjung districts of Nepal	GFDRR/The World Bank
49	Assessment on the Economics of Disaster Risk Reduction (EDRR)	Dec 08-Feb 09	Nepal	GFDRR/The World Bank

EARTHQUAKE SAFETY TIPS

Jhatpat Jhola-"GO-BAG"

Stock up on emegencysupplies beforehand: portable battery operated radio (and extra batteries). flashlights (extra bulbs and battries), first aid kit, bottled water, water purifying tablet,non-perishable food and medical supplies, blankets, cooking, passports, insurance papers, bank documents, etc.) and important telephone numbers, copies of your house plan (useful in case of search and rescue action), Money, duplicate set of keys, whistle, etc.

During an earthqauake (if you are indoors)

Drop to the ground; take cover by getting under study table or other piece of furniture; and hold on untill the shaking stops. If there is not table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building. Stay away from glass windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture.

Before an earthquake

- Develop a Family Earthquake Preparedness Plan and prepare an Earthquake "GO BAG" (Emergency Survival Kit) so that you can cope with earthquake geing on your own for up to three days.
- Prepare communication plan to contact or meet your family members in case of an earthquake:
  - Identify reuniting place within permises of your house, in the neighborhood and outside the neighborhood
  - Identify contact points within your city, outside the city and outside your country.
  - Identify safe and unsafe places within our home, school or workplace.

Safe spots:

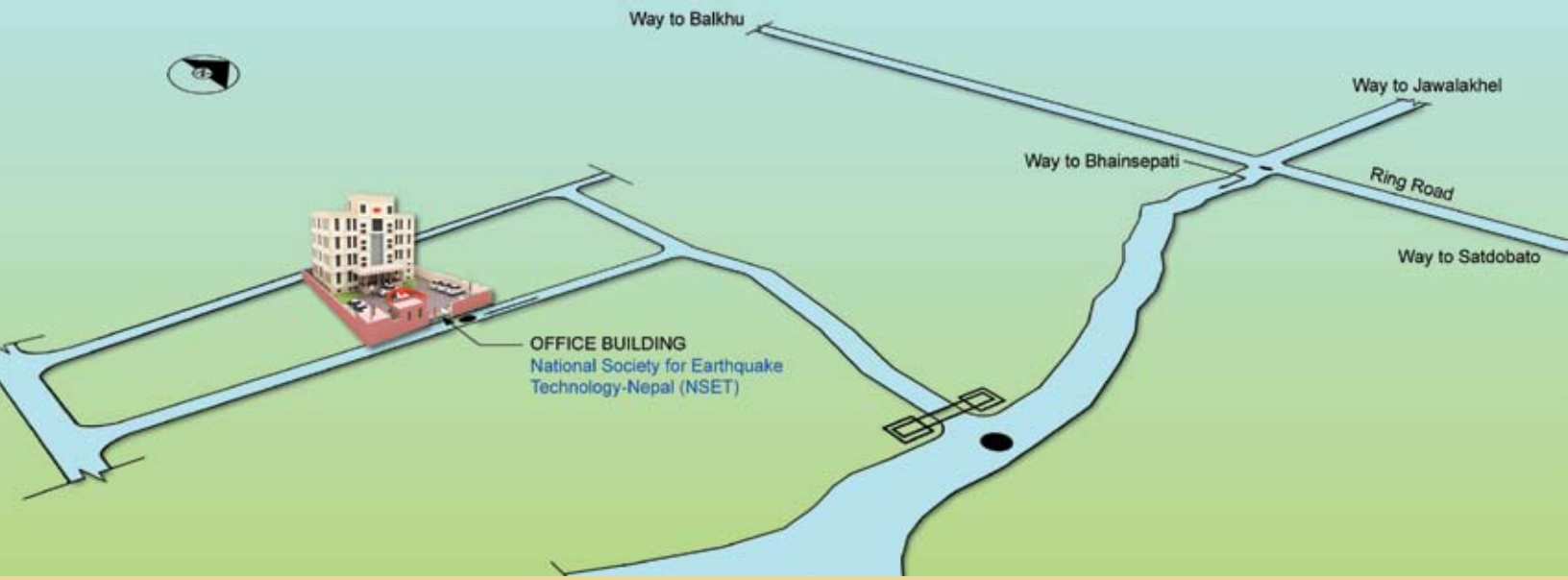
- Under a strong table; remember to hold on to the legs
- Next to an interior wall
- Somewhere close to you, no more than few steps, or two meters away, to avoid injury from falling objects.

Unsafe Spots:

- Near windows with large glass panes
- Staircases
- Next to hanging objects, unfastened furniture

Secure heavy items or furniture to the floor or wall.

LOCATION MAP OF NSET



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