

Disaster Resilient Communities in Nepal by 2050

NSET

NSET was established in 1993 by a group of professionals dedicated to reduce earthquake risk of Nepal. It was registered with the Government of Nepal in 1994 as a non-governmental organization. It is a multi-disciplinary professional society of professionals belonging to various physical and social sciences related with aspects of earthquake risk management. NSET has developed 10-Year Strategic Plan (2021 to 2030) with an idea to ensure greater visibility in its strategic destination and the path to attain its envisioned destination through accomplishment of its mission.

VISION Disaster Resilient Communities in Nepal by 2050

MISSION

To contribute in enhancement of disaster resilience of the communities through development and implementation of appropriate technologies, inclusive and collaborative approaches in order to minimize and manage disaster risks.

CORE IDEAOLOGIES & VALUES Our ideologies form the base of our existence, values, behaviors, decisions and actions. Our core values might be a competitive advantage, but that's not why we have them. We have them because they define for us, what we stand for, and we would hold them even if they became a competitive disadvantage in certain situations.

Our core ideologies and values, which form a system of timeless guiding principles and tenets are:

- 1. Community; our Raison d'être (Reason of existence)
- 2. Recognition and Respect for indigenous knowledge, approaches, technologies, systems and practices
- 3. Accountable, Responsible, Sustainable and Disciplined Actions
- 4. Outcome and Impact based mobilization, exploration and learning
- 5. Equitable, Inclusive, Collaborative working culture and approach
- 6. Apolitical Existence
- 7. Respect for the law of the land
- 8. Learn, Grow and Strive for Excellence as a team

STRATEGIC INTENT

Our Strategic Intent is what we intend to become and to achieve at some point in the future without giving due regard to the restrictions posed to us by the current resources and capabilities. It refers to our all-inclusive and forwardthinking image of our goals.

NSET's strategic intent:

- 1. to be the most effective professional society- a center of excellence for knowledge and resources related to DRM
- 2. to be the most sought after, respected and credible source of knowledge, resources and technologies related to DRM
- 3. When it comes to DRM, ours should be the name which comes at the topof-the-mind



STRATEGIC OBJECTIVES

Our Strategic Objectives are our priority areas of achievement to be accomplished within 2030. During 2021-2030, NSET will focus on the following strategic objectives which are connected to our strategic priorities:

SO1: Develop and implement integrated and inclusive interventions related to Multi-Hazard Disaster and Climate Risk Management through development and enhancement of understanding, capabilities and resources of communities in Nepal and region.

SO2: Assist in Institutionalization and Integration of validated understanding, approaches and technologies related to Disaster and Climate Risk Management into the laws, regulations, policies, initiatives and mechanisms in order to strengthen Disaster Risk Governance in Nepal.

SO3: Devise and integrate innovative, cost-effective and appropriate methods and measures in order to increase involvement and investment of public and private sector in Disaster and Climate Risk Management.

SO4: Develop and promote effective and inclusive collaboration in order to enhance and scaleup innovation and R&D in the area of Disaster Risk Management.

SO5: Be a dynamic, sustainable and learning organization through enhancement of capabilities, networks and collaborations.

ORGANIZATIONAL DEVELOPMENT

NSET that started operating with a few professionals has now completed 29 years in action. Over the years, NSET has contributed to support efforts on Earthquake Risk Management and Disaster Risk Reduction at the local and national level, and also at the regional and global levels.

NSET Staff – as it grows

NSET completes 29 years of action

NSET's 29-year long journey has been a landmark in terms of quality & effectiveness of its services to help communities and nations in building their resilience. NSET has now grown significantly with many qualified professionals and with adequate physical facilities.

With a total of 4 staff back in 1997, we raised to 234 professionals and supporting staff in May 2018, and now total 96 staff who dedicatedly serve in various programs & projects across the country and beyond.













Also, there is a diversity in age-groups too with big majority of youths.



Capacity of Emergency Response



BEMR:	Basic Emergency Medical Response
CSAR:	Community Search and Rescue
MFR:	Medical First Responder
EU:	End User
CSSR:	Collapsed Structure Search and Rescue
TFI:	Training for Instructors
IW:	Instructors' Workshop
MIW:	Master Instructors' Workshop

NSET Finances: Financial Volume of NSET Activities

The financial volume of NSET has been increasing with the growth in the number of staff and programs. The annual turnover of around 80 thousand USD that was back in 1997 and has reached 2.5 Million USD in 2021/2022, and last year in 2020/2021 the amount is of 2.4 Million USD. This shows the trends of the financial volume of NSET activities.



Source of Fund then and Now

There is a gradual increase in NSET funds generated through its services in the form of vulnerability assessment of existing buildings, orientation emergency programs and

preparedness planning and drills. NSET has been prioritizing to diversify the sources of fund. It has also expanded its funding sources and now there are several key sources of funds including USAID project funding other bilateral agencies, and funds generated by selling technical services.



NSET ORGANOGRAM



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NSET ACCOMPLISHMENTS





BRIEF PROJECT PROFILE

Table of Content			
S.N.	Particulars	Donor	Project Duration
ONGOI	NG PROJECTS		
1.	Tayar Nepal: Resilient Settlement-Capacity Building on Building Code	DAI Global, LLC	April 2023 – Dec 2023
2.	TAYAR NEPAL: SUPPORT BIRENDRANAAR MUNICIPALITY TO PERFORM FEASIBILITY STUDY ON LAND POOLING	DAI Global, LLC	March 2023- July 2023
3.	Care Nepal: Doti Earthquake Response	Care Nepal	March 2023 to October 2023
4.	Sajag-Nepal: Preparedness and planning for the mountain hazard and risk chain in Nepal	NERC/Durham University	Jan 2021- Dec 2023
5.	Making Displacement Safer: Locally led DRR Solutions for Displaced Populations in Urban Areas	GNDR	Mar 2021- June 2023
6.	Strengthening Education Clusters at Federal, Provincial and Local Governments (Supporting the response to the COVID-19 crisis in the education sector)	UNICEF	April 2022- April 2023
7.	National Housing and Settlements Resilience Platform (NHSRP)	CRS Nepal	Sep 2022 to September 2023
8.	UKRI GCRF: Urban Disaster Risk Hub (Tomorrow's Cities)	UK- GCRF/DFID	Feb 2019 – March 2024
9.	SAFER BUILD: Construction of a pilot, low-cost, high- seismic	UK-GCRF	1 Sep 2021 to 31 Aug 2023
10.	Seismic Construction of a Demonstration Earthquake- resistant School Building in Amargadhi	GeoHazards International (GHI)	2022-2023
11.	Response Fire-Rautahat	Care Nepal	April 2023- June 2023
12.	Integrated Disaster Risk Reduction and Environment in Darjeeling Hills (IDRRE)	Deutscher Caritasverband (DCV) Caritas Germany	1 June 2023-31 March 2024
13.	ENHANCING SCHOOL SAFETY AT "UTTARAGAYA PUBLIC ENGLISH SECONDARY SCHOOL-NUWAKOT	EL COMEDOR GIORDANA LIVA	3 April 2023 to 3 Oct 2023
COMPLETED PROJECTS			
14.	Implementation of Disaster Risk Management Localization training at 702 Local levels of Nepal	IOM/USAID	April 2022- Jan 2023
15.	Housing Recovery and Reconstruction Platform (HRRP4)	CRS Nepal	Aug 2019- August 2022
16.	Views from Frontline	GNDR	Oct 2018- August 2022

17	Nepal Earthquake Professionals training and Nepal	US Geological	Sep 2019 to
17.	earthquake hazard reduction	survey (USGS)	Sep 2022
10	Tayar Nepal(Support Ministry of Federal Affairs and	DAI Global.	3 Dec 2021-
18.	General Administration (MoFAGA) to develop national	LLC	31 May
	tramework on Risk Sensitive Land Use Plan(RSLUP)		2022
	and Building Construction (DLDBC) for development of	DAI Global	10 Dec
19.	National Building Code (NBC) Training Manual and		2021-31
			Aug 2022
			Oct 2019 –
20.	Technical Support for Resilience Community (TESREC)	USAID/OFDA	September
			2022
21	Pisk Informed Landslide Management In Nenal's Hill Area	People In Need	July 2020 –
21.		(PIN)	April 2022
		Lawrence	
	Workshop for Improved seismic event location using the	Livermore	7-11 Nu
22.	Regional Seismic Travel Time (RSTT) Method	National	November
		Laboratory	2022
	Tavar Nepal (Scaling Up Seismic Retrofitting of Residential		
23.	Buildings Through The Local Government Regulatory	DAI Global,	Jun 2020 –
	System)	LLC	Dec 2021
24	Hospital Preparedness for Emergencies (HOPE) Course in		23 Dec -31
24.	Nepal	UNDF	Dec 2021
	CITYNET National Workshop on the SDG Navigator and		August 2021
25.	the localization of Urban Sustainable Development Goal	CityNet	– Nov 2021
	Cases		huby 2021
26.	Lamjung Earthquake Response Program	CRS	July 2021- Sep 2021
		Crown	Feb 2021
27.	Nepal Safer Schools Project (NSSP)	Agents/DFID	Aug 2021
	Housing Reconstruction Technical Assistance Program		Oct 2015 -
28.	"HRTAP" (Baliyo Ghar)	USAID/Nepai	Sep, 2021
20	Program for Enhancement of Emergency Response		Oct, 2014 -
23.	(PEER) Stage IV		Sep, 2021
30	Provide technical support to National Reconstruction	UNDP	Feb 2021 -
	Authority in development of the knowledge products	0.10.	May 2021
31.	Modeling Exposure Through Earth Observation Routines	DFID/GCRF	Feb 2018 –
	(METEOR)	Carllenate	Feb 2021
22	Seismic Vulnerability Assessment of Amargadhi School	GeoHazards	July 2020-
32.	Buildings	International	Jan 2021
		(GHI)	March 2017
33.	Housing Recovery and Reconstruction Platform (HRRP3)	CRS Nepal	Iviarch 2017-
	Study to Support Detail Planning of the Project for Building		July 2019
34.	Management Enabling Urban Resilience	JICA	2019 - 2020
25	Study on Urban Davelonment in Kethmandu Vellay		2010
აე.		JICA	2019
36.	3D Demonstrations for Land slide Risk Reduction	GCRF-Durham	Dec 2019
37.	Empowering Women through Disaster Risk Reduction		2018 - 2019
	1		

38.	Building Code Training for Mason worker and Building Bylaws and Building Code Orientation for Municipal Elected Officials	Sajhedari Bikash PACT	Nov 2017 - Feb 2019
39.	Technical Support for Building Code Implementation in Nepal	USAID/OFDA	2017-2020
40.	Earthquake-triggered landsliding in Nepal during and post Monsoon, 2017-2019	Durham University	2017 - 2019
41.	Seismic Safety and Resilience of Schools in Nepal (SAFER)	DFID and Bristol University	2017 - 2020
42.	Building Code Implementation Program in Municipalities of Nepal (BCIPN)	USAID/OFDA	Sep 2012 – Sep 2017
43.	Disaster Education to Nepal Earthquake	Sakura-Net	2016 - 2018
44.	Enhancing Children Safety and Community Resilience through Integration of Comprehensive School Safety (CSS) Framework	UNICEF/Nepal	Jun 2016 - Dec 2017
45.	Building Back Safer Schools for All Nepal Earthquake Response 2015	Plan International	2015 - 2016
46.	Training and Campaign for Earthquake Non-Structural Mitigation	Shapla Neer	2015-2016
47.	Promoting Public Private Partnership for Earthquake Risk Management (3PERM)	USAID/OFDA	Oct 2011- Mar 2016
48.	Technical Support for Earthquake Safer Housing Reconstruction (TSESHR)	USAID/OFDA	Jul – Oct 2015
49.	Support to Develop Risk Sensitive Land Use Plan (RSLUP) and Building Bye-Laws of Kathmandu Valley	UNDP Genesis/ESS	Nov 2014- Dec 2015
50.	Enhancing Children Safety and community Resilience through integration of Disaster Risk Reduction and Climate Change Adaption (DRR & CCA) in Education Sector	UNICEF/Nepal	May 2014 - Dec 2015
51.	Nepal Earthquake Risk Management Program Stage II (NERMP-2)	USAID/OFDA	2011-2015
52.	Enhancing the health sector crisis preparedness in the event of high intensity earthquake in Kathmandu Valley, Nepal	Save the Children	2013-2014
53.	Urban WASH Preparedness and Community Based Disaster Risk Reduction (The design of WASH facility at TU/NARC IDP Site)	OXFAM /GB	2013-2014
54.	Seismic Vulnerability Assessment of buildings of World Food Program sub-office facilities in Nepal	WFP	2013
55.	Seismic Vulnerability Assessment of six buildings at Nepal Red Cross Society Premises	Nepal Red Cross Society	2013
56.	Disaster Preparedness for Safer Schools in Nepal-2 (DPSS -2)	ARC	2011-2014
57.	Disaster Preparedness for Safer Schools in Bangladesh (DPSS Bangladesh)	ARC	2012-2014
58.	Capacity Development for School Sector Program Implementation	ADB/Nepal	2012-2014
59.	Program for Enhancement of Emergency Response (PEER) Stage3	USAID/OFDA	2009-2014
60.	Enhancing emergency health and rehabilitation response readiness capacity of health system in the event of a high intensity earthquake in Kathmandu Valley-DIPECHO-VI	OXFAM GB	2011-2012

61.	Technical Services for Strengthening Risk Sensitive Land	UNDP	2011-2013
62.	Resilience and Disaster Risk Reduction (DRR) Capacity Building program for the Earthquake Recovery and Disaster Risk Reduction project in eastern Nepal	DFID/ERDRR	2012-2013
63.	Developing Video Toolkit for Earthquake Safe Building Practices in Nepal	UNDP	2012
64.	Institutional Capacity Building of DoE/RED/DEOs/RCs on Earthquake Preparedness Program in Schools under the School Earthquake Safety Program (SESP)	UNICEF	2012
65.	Enhancing emergency health and rehabilitation response readiness capacity of health system in the event of a high intensity earthquake in Kathmandu Valley	Merlin	2011-2013
66.	Technical Support to Department of Education on Disaster Risk Management in Education	ADB	2011-2012
67.	Disaster Risk Management – Education Sector	ADB	2011
68.	Technical Services for strengthening implementation of NBC in Nepal	UNDP	2011
69.	Community Based Disaster Risk Management in Nepal (CBDRM-N)	LWR	2010-2011
70.	Preparation of Mason Training Guideline and Mason Training Manual on Earthquake Resistant Construction of Buildings	ADPC	2005
71.	Preparation of Training Manual on Earthquake Resistant Design of Buildings/ Nepal National Building Code and its implementation strategy		
72.	Disaster Preparedness for Safer Schools in Nepal (DPSS) First Phase	ARC	2009-2010
73.	Comparative Risk Assessment in Humla district	DIPECHO/Miss ion East	2009
74.	Developing A Strategy for Improving the Seismic Safety of Schools in Nepal	The World Bank	2008-2011
75.	Preparing Background Paper on Ex-Ante and Ex-Post Investment estimates in DRR at country level / Nepal	GFDRR/Wold Bank, UNISDR	2008-2009
76.	Comprehensive Risk Mapping in Triyuga, Udaypur	Action Aid Nepal	2008-2009
77.	Risk Mapping and Shelter Response Planning Program in Kathmandu and Maputo	UN Habitat	2008
78.	Earthquake Vulnerability Reduction and Preparedness Program (EVRP) in Muzaffarabad and Mansera Municipalities - Pakistan	UNDP	2008
79.	Comprehensive Disaster Management Program – Bangladesh (CDMP)	UNDP, DFID, EC	
80.	Disaster Risk Reduction through School Project (DRRSP)	ActionAid,	2007-2009
81.	Research on Earthquake Safety of Stone Masonry Buildings	BRI- Japan	2007-2008
82.	Municipal Disaster Risk Reduction Program in Nepal (MDRIP)	GRIP/UNDP	2008
83.	Global Assessment Report on the Study on Disaster- Poverty linkage	UNDP	2008

84.	Thimpu Valley Earthquake Risk Management Project: Seismic Vulnerability Assessment and Retrofitting of Office Buildings	Standards & Quality Control Authority, Bhutan	2007-2008
85.	Nepal Earthquake Risk Management Program (NERMP)	USAID/OFDA	2005-2008
86.	Awareness Raising and Capacity Building for Earthquake Risk Reduction	DUBC	2007-2008
87.	Collaborative Research and Development on Network of Research Institutes in Earthquake prone countries	GRIPS, Japan	2007-2008
88.	Program for Enhancement of Emergency Response (PEER) Stage2	USAID/OFDA	2003-2008
89.	CBDRM in KV	OXFAM GB	2007
90.	Earthquake Safety Construction Skill Training for Masons and Construction Technicians	LWF/DIPECHO -CPDRR	2007
91.	Seismic Vulnerability Assessment of UN House, Bhutan	UNDP Bhutan	2007
92.	Seismic Vulnerability Assessment and Retrofitting for British Embassy Buildings in Kathmandu Valley	British Embassy	2006-2011
93.	Up-streaming Community Based Approaches for promoting Safer Building Construction in Lorestan, Iran	UNDP	2006-2007
94.	Program for Strengthening Capacities for Disaster Risk Management in Iran	UNDP/GOI	2006-2007
95.	Disaster Preparedness and Response Plan for Safe Drinking Water in the Kathmandu Valley, Lalitpur (DPRP)	UNICEF Nepal	2006-2007
96.	Community Based Disaster Risk Management Project (CBDMP)	UNDP	2006-2007
97.	National Strategy for Disaster Risk Management in Nepal (NSDRM)	UNDP	2007
98.	Seismic Vulnerability Assessment of Saudi Pak Tower in Islamabad, Pakistan	UNDP/Pakistan	2006
99.	Capacity Building and Knowledge Management: Institutionalization of Earthquake Preparedness in School of Earthquake Affected Areas of Pakistan	UN/ISDR	2006-2007
100.	Technical Support on Earthquake Resistant Housing Reconstruction, Pakistan (TSERR).	USAID/OFDA	2006-2007
101.	Case Station and Field Campus (CASIFICA)	Kyoto University	2006
102.	Community Based Disaster Risk Management in Nepal (CBDRM-N)	UNDP	2006-2007
103.	School Earthquake Preparedness in Jhapa, Rautahat and Kathmandu valley	LWF	2006-2007
104.	Capacity Building for Reconstruction of Earthquake- Affected Areas of Pakistan	UNDP/Pakistan	2005-2006
105.	"Risk Sensitive Land Use Plan of Kathmandu Metropolitan City, Mainstreaming Disaster Risk Reduction in Megacities, a Pilot Application in Metro Manila and Kathmandu	FFO- German Committee for Disaster Risk Reduction (DKKV)	2006-2010
106.	Developing existing school building assessment methodology and conducting training program	UNICEF Nepal	2005
107.	Kathmandu Valley Earthquake Preparedness Initiative (KVEPI)	ARC	2004-2005

108.	Seismic Vulnerability Assessment and Retrofitting Options for British Embassy Buildings in Tehran	Reynolds Geo- Sciences Ltd., UK	2004-2005
109.	Disaster Inventory / Information Management System (DIMS) in Nepal	UNDP	2003
110.	Seismic Vulnerability Assessment of Drinking Water Supply Network of Kathmandu Valley	UNICEF Nepal	2002-2003
111.	Program for Enhancement of Emergency Response (PEER) Phase 1	USAID/OFDA	1998-2003
112.	Seismic Vulnerability Assessment of Major Hospitals of Nepal	WHO	2003-2004
113.	Environmental Mapping Project	RUDO-South Asia/ USAID	1998-2002
114.	Earthquake Disaster Risk Reduction in Kathmandu	UNESCO CCT	
115.	Pre-Positioning of Emergency Rescue Stores (PPERS)	Civil Affairs Group, British Army	
116.	Nepal Gujarat Mason Exchange and Training Program		2001
117.	Solid Waste Management in Dharan Municipality	USAID	
118.	Study on Earthquake Disaster Mitigation in Kathmandu Valley	JICA	
119.	Kathmandu Valley Earthquake Risk Management Action Plan Implementation Program (KVAPIP)	USAID/OFDA	2001-2004
120.	Municipal Earthquake Risk Management Project (MERMP)	AUDMP/ADPC	Jan 2003- Oct 2003
121.	Kathmandu Valley Earthquake Risk Management Project (KVERMP)	USAID/OFDA	1997-2000
REGULAR PROGRAMS			
1. 7	Earthquake Safety Day (ESD)		
2. 6	School Earthquake Safety Program (SESP)		
3. 5	Shake Table Demonstration		
4. 4	Seismic Vulnerability Assessment		
5. 3	Public Awareness Program		
6. 2	Community based Disaster Risk Reduction		
7.1	Training Programs		

List of NSET Publications

List of NSET Partners

A) ONGOING PROGRAMS

TAYAR NEPAL: RESILIENT SETTLEMENT-CAPACITY BUILDING ON BUILDING CODE

This is the grant under USAID's Improved Disaster Risk Management Project- Tayar Nepal issued by DAI Global, LLC under which National Society for Earthquake Technology – Nepal (April 2023 to December 2023) works with an objective of below:

- 1. To organize orientation program to potential house owners to enhance awareness on safer building construction and retrofitting
- 2. To enhance capacity of masons on building code implementation and municipal engineers/technicians on building code, building construction working procedure, vulnerability assessment and retrofitting.
- 3. To develop synergy among community, local governments and key stakeholders on the retrofitting process.

TAYAR NEPAL: SUPPORT BIRENDRANAAR MUNICIPALITY TO PERFORM FEASIBILITY STUDY ON LAND POOLING

This is the grant under USAID's Improved Disaster Risk Management Project- Tayar Nepal issued by DAI Global, LLC under which National Society for Earthquake Technology – Nepal (March 2023 to July 2023) works with an objective of below:

- 1. Conduct detailed study on land pooling in Birendranagar Municipality Through review existing legal provisions and practices on land pooling, options for land pooling and finalize the land pooling area with municipality
- 2. Conduct detailed feasibility study of the selected land pooling area and prepare detailed project report of selected land pooling scheme.

CARE NEPAL: DOTI EARTHQUAKE RESPONSE

DOTI Earthquake Response Program (March 2023 to Oct 2023) is funded by CARE Nepal with a goal to resume basic services by rebuilding damage houses and infrastructures due to Doti and Bajura Earthquake hit at the western Nepal in Nov 2022 and Feb 2023 by providing socio-technical support to house-owner and local government. The following are the specific objectives to achieve the goal within this project period:

- To develop the technical designs for transitional and permanent houses based on available local materials and technologies.
- To enhance the knowledge of house-owner on safer building construction and reconstruction policy through community orientation.
- To enhance the capacity of construction technician on safer building construction, retrofitting and reconstruction policy.
- To provide door-to-door technical assistance to house-owners for safe building construction and housing grant processing.
- To assist local government and district administration office on building compliance and inspection mechanism for grant processing.

Project Area:The project is planned to assist reconstruction at Purbichauki rural municipality, Doti district. The rural municipality is near to the earthquake epicenter with buildings damages and human casualty due to earthquake.

SAJAG-NEPAL: PREPAREDNESS AND PLANNING FOR THE MOUNTAIN HAZARD AND RISK Chain in Nepal

Sajag -Nepal is a collaborative research project (Jan 2021-Dec 2023) which is designed to make a significant difference to the ways in which residents, government, and the international community take decisions to manage Multi-Hazards and Systemic Risks. The team consists of Nepali and international researchers and practitioners from a range of disciplines, including geoscience, social science, and the humanities.

Sajag-Nepal involves:

Universities of Durham, Northumbria, Oxford, Bristol (UK), National Society for Earthquake Technology-Nepal (NSET), BBC Media Action - Nepal, Stiftelsen Flowminder, IFRC Nepal, Social Science Baha Nepal, Tribhuvan University (Nepal), and Universities of British Columbia (Canada) Auckland and Canterbury (New Zealand).

The project includes four work packages which will:

(1) Think critically about the Social, Political, Economic, and Environmental Context within which disasters occur in Nepal;

(2) Establish a new approach to National-Scale Strategic-Planning for Complex Multi-Hazard events, including earthquakes, monsoons, and landslides.

(3) Develop interdisciplinary science to Anticipate, plan for, and Communicate the Range of Hazards that occur during the annual monsoon; and

(4) Find the best ways to utilize Local Knowledge and Interdisciplinary Science to inform how to prepare for and respond to multi-hazard disasters.

MAKING DISPLACEMENT SAFER PROGRAM

"Making Displacement Safer: Locally-led DRR Solutions for Displaced Populations in Urban Areas" program is supported by GNDR during the period of March 2021-June 2023. The project aims to contribute to the substantial reduction of disaster risk and losses in lives, livelihoods and assets, for displaced populations in urban areas. It will do this by facilitating the discovery and scale-out of innovative locally led DRR solutions for displaced populations. The project aims to achieve an increased understanding of the unique disaster risk challenges for displaced populations in urban areas; an increased number of innovative approaches for reducing the vulnerability of displaced populations in urban areas: and, finally, ensure approaches and stakeholder roles for reducing vulnerability of displaced populations in urban areas are institutionalized in national and international systems.

Intended Outcomes

One: An increased understanding of the unique disaster risk challenges for displaced populations in urban areas

Two: An increased number of innovative approaches for reducing the vulnerability of displaced populations in urban areas

Three: The approaches and stakeholder roles for reducing vulnerabilities of displaced populations in urban areas are institutionalized in national and international systems

STRENGTHENING EDUCATION CLUSTERS AT FEDERAL, PROVINCIAL AND LOCAL GOVERNMENTS (SUPPORTING THE RESPONSE TO THE COVID-19 CRISIS IN THE EDUCATION SECTOR)

The project is funded by UNICEF for the period of April 2022 to April 2023 implementing in 4 province of Nepal namely Province 1, Madesh Province, Gandaki Province and Bagmati Province. The program expected result is to continuity of learning facilities, children's and educational centers affected by COVID-19 pandemic with the following specific results:

- Affected Provincial and Local Governments developed the education response plan of selected 300 schools of 80 palikas
- Affected children supported with education materials for continuation of learning (homebased or center based) in emergencies
- Established functional WASH facilities in coordination with the education cluster members and education stakeholders and local government.
- Teachers and SMC members capacitated on management and use of education emergency materials.

This program is planning to strengthen cluster coordination and response mechanism to support local governments and schools for COIVID 19 response to recovery and other interventions for preparedness and resilience of for learning continuity, ensuring an adequate capacity for management and coordination during the response/early recovery of education services from the COVID-19 period in LGs.

NATIONAL HOUSING AND SETTLEMENTS RESILIENCE PLATFORM (NHSRP)

The National Housing and Settlements Resilience Platform (NHSRP) was established to support the National Reconstruction Authority (NRA), Building, Grant Management and Local Infrastructure (GMALI), Central Level Programme Implementation Units (CLPIUs), District Level Programme Implementation Units (DLPIUs) other relevant government authorities, and Partner Organizations (POs) with coordination of the post-earthquake housing reconstruction. NHSRP 3 is primarily funded by CRS Nepal. The NHSRP program period is 1st September 2022 to 30th September 2023.

UKRI GCRF: URBAN DISASTER RISK HUB

UKRI GCRF: Urban Disaster Risk Hub, the University of Edinburgh, UK supported project is being implemented by NSET during Feb 2019 – March 2023. The project has mainly 2 objectives:

- To reduce the risk of multiple, interacting hazards on the populations that will inhabit the rapidly expanding urban development of the Kathmandu City and
- To facilitate the incorporation of multiple risks scenarios into new planning guidelines in the proposed satellite cities of Kathmandu.

The project conducted following activities:

• Stock taking of hazard, exposure and risk data for the implementation of main GCRF-URD project and contribute to the milestone for the Hub

- Identifying key stakeholders and establishing/strengthening relationship with stakeholders at different level
- Development of framework for methodology for hazard analysis, exposure data collection fragility functions update and risk analysis
- Coordinating and working with the tubule team in installation of smart-solo seismometer in the land around Khokana in the first instance and across the Kathmandu valley.

SAFER BUILD: CONSTRUCTION OF A PILOT, LOW-COST, HIGH-SEISMIC

The project (Sep 2021 to Aug 2023) aims to construct a two classroom, one storey (designed in advance to be extendable to two storeys), reinforced concrete school in the Municipality of Kageshwori Manohara. The buildings will be supported on the novel, seismically isolated, foundation system that resulted from our GCRF SAFER project. The school will be constructed in Ward no. 9 serving the needs for primary education. The region is deliberately selected to be at the vicinity of Kathmandu (about 40min drive) to facilitate easy access of the project members for supervision and management purposes.

SEISMIC CONSTRUCTION OF A DEMONSTRATION EARTHQUAKE-RESISTANT SCHOOL Building in Amargadhi 2022-2023

GeoHazards International (GHI) in partnership with National Society for Earthquake Technology-Nepal (NSET) is constructing an earthquake resistant model school building as a demonstration project in Amargadhi Municipality, Dadeldhura District, Sudurpaschim Province of Nepal. The program is being funded by multiple donors to GHI. The project will focus on improving earthquake safety in Amargadhi by training local masons to build an earthquake-resistant two-room RC-framed building in Amargadhi. The project will also support the school in developing a school disaster management plan.

RESPONSE FIRE-RAUTAHAT

Response Fire-Rautahat program is supported by Care Nepal for the period of April-June 2023. The main objective of this program is to provide technical and financial support to the household of Rautahat District for constructing houses damaged by fire.

INTEGRATED DISASTER RISK REDUCTION AND ENVIRONMENT IN DARJEELING HILLS (IDRRE)

Integrated Disaster Risk Reduction and Environment in Darjeeling Hills (IDRRE) project supported by Deutscher Caritasverband (DCV), Caritas Germany for the period of 1 June 2023 to 31 March 2024. The project has identified earthquakes as a major hazard and has planned risk assessments and other preparedness measures, some of which are technical, thus requiring the support of sectoral technical experts. In this regards, Cartias Germany has supported NSET for providing support to Anugyalaya and Caritas India for earthquake preparedness including a risk assessment of the Darjeeling bazaar. NSET supporting project team in conduction of seismic hazard study, provide ToT to engineers of the two districts and capacity need assessment.

ENHANCING SCHOOL SAFETY AT "UTTARAGAYA PUBLIC ENGLISH SECONDARY SCHOOL-NUWAKOT"

ENHANCING SCHOOL SAFETY AT "UTTARAGAYA PUBLIC ENGLISH SECONDARY SCHOOL-NUWAKOT" project supported by EL COMEDOR GIORDANA LIVA for the period of 3 April 2023- 3 October 2023 . The major objective of this project is to enhance earthquake safety of Uttargaya Public English Secondary School (UPESS). NSET will conduct the detail assessment of all school building blocks constructed and prepare assessment report for enhancing structural safety, provide the construction supervision of Block"D" building and support UPESS for disaster preparedness and to conduct earthquake DRILL at School.

B) COMPLETED PROGRAMS

IMPLEMENTATION OF DISASTER RISK MANAGEMENT LOCALIZATION TRAINING AT 702 LOCAL LEVELS OF NEPAL

The project was funded by IOM/USAID for the period of April 2022 to Jan 2023 and executed through a consortium of three national and international organizations namely National Society for Earthquake Technology-Nepal (NSET), The Lutheran World Federation (LWF) and Practical Action Consulting Pvt. Ltd. (PAC). At the national level, the consortium is managed by NSET and responsible for contractual agreement, consortium management, coordination, and reporting to IOM and MoFAGA. Proposed activities including province and local level coordination and training will be managed by consortium members and local implementing partners. The main objective was to provide disaster risk management localization training at 702 Local levels of Nepal covering 7 province of Nepal.

HOUSING RECOVERY AND RECONSTRUCTION PLATFORM (HRRP4)

Under Technical Coordination for Housing Recovery and Reconstruction Platform (HRRP) Nepal, Phase 4 (Aug 2019 to August 2022), NSET intends to provide Technical Coordination support and leadership to HRRP4 for earthquake affected districts. The technical coordination will support POs and Government line agencies, National Reconstruction Authority (NRA), Central and District Level Project Implementation Unit CLPIU/DLPIU Building and Grant Management and Local Infrastructure (GMALI) to effectively implement the Earthquake Housing Reconstruction Program (EHRP). NSET, with the HRRP management, has prepared a plan to provide technical staff at central, hub and district level in line with then approved HRRP4 organogram to lead the technical coordination part of HRRP 4. The National technical coordination team will facilitate collaboration between partners, stakeholders and government to standardize technologies, standards, guidelines, and curricula at Central Level through developing/adapting/reviewing for all technologies, which can then be recommended for approval, Continuous advocacy and support at central level will be carried out for this. The technologies and related guidelines are for both new construction as well as retrofitting, including corrections of non-compliant buildings.

The purpose of technical coordination is to facilitate collaboration around socio-technical issues relating to the housing recovery.

VIEWS FROM THE FRONTLINE

Views from the Frontline is supported by Global Network for Disaster Reduction (GNDR) implemented by NSET in 15 communities of 5 provinces in Nepal during Oct 2018-August 2022.

The project aims:

- Monitoring the impact of Disaster Risk Reduction Initiatives from civil society prospect.
- Support 15 communities with small scale mitigation activities up to US \$ 1,000 each. Nepal Earthquake Professionals training and Nepal earthquake hazard reduction

NEPAL EARTHQUAKE PROFESSIONALS TRAINING AND NEPAL EARTHQUAKE HAZARD REDUCTION

This program is supported by US Geological Survey for the period of Sep 2019 to Sep 2022.

This project aims to produce strategic plans for a sustainable risk reduction program in Nepal. For this different interaction workshops have been planned, technical training for the capacity enhancement of NSET and government professionals in United states and operationalization of Nepal Seismic Hazard Assessment of Kathmandu and Environment (N-SHAKE) Network.

TAYAR NEPAL: SUPPORT MINISTRY OF FEDERAL AFFAIRS AND GENERAL ADMINISTRATION (MOFAGA) TO DEVELOP NATIONAL FRAMEWORK ON RISK SENSITIVE LAND USE PLAN

This is the grant under USAID's Improved Disaster Risk Management Project- Tayar Nepal issued by DAI Global, LLC under which National Society for Earthquake Technology – Nepal (Dec 2021 to May 2022) works with an objective to support MoFAGA in developing a National Framework on "Risk-Sensitive Land Use Plan" for local governments that helps to facilitate preparation and implementation of Risk Sensitive Land Use Plan at local travel. The framework will also serve as a practical reference for urban planner, local specialists, practitioners, academicians and researchers to use the document as per their need.

TAYAR NEPAL: SUPPORT DEPARTMENT OF URBAN DEVELOPMENT AND BUILDING CONSTRUCTION (DUDBC) FOR DEVELOPMENT OF NATIONAL BUIDLING CODE (NBC) TRAINING MANUAL AND TRAINING

This is the grant under USAID's Improved Disaster Risk Management Project- Tayar Nepal issued by DAI Global, LLC under which National Society for Earthquake Technology – Nepal (Dec 2021 to August 2022) works with an objective mentioned below:

- Develop the training manual and curriculum on National Building Code that covers Architectural Design, Structure Design, Sanitary and Plumbing Design, Electrical Design and Geo-technical requirements
- Conduct NBC training to municipal engineers and technicians of 8 core and 8 twin municipalities
- Build the capacity of municipal engineers/technicians so that they can design buildings, check and verify the design drawing, analyze structural reports, monitor construction works as per NBC requirements.

TECHNICAL SUPPORT FOR RESILIENCE COMMUNITY (TESREC)

The USAID/OFDA supported program "Technical Support for Resilience Community (TESREC)" is being implemented by NSET during Oct 2019-Sep 2022. The TESREC program, with the name "My Village is Resilient (मेरो सुरक्षित गाउँ)" seeks to build upon the efforts and achievements of building code support programs and intend to develop model of community resilience approach for rural municipalities viewing its huge scope of replicability and scaling up the successes, to learn and utilize the experiences, and to utilize the methodologies for rural areas. For that, this program intends to focus on grass-root communities in rural areas of Nepal.

The overarching goal of "My Village is Resilient (मेरो सुरक्षित गाउँ)" program is to "Make Rural Communities of Nepal Disaster Resilient". The main objective is to "Support in establishing model for resilient rural community through safer building practices and preparedness". There are major two components; first component is about establishing framework and systems for ensuring safer building construction in rural municipalities; and second component is about developing Model Disaster-Resilient Community - "My Village is Resilient".

The program has thematic areas Building and Infrastructures Regulation, Multi-Hazard Risk Assessment and Planning and Preparedness and Response Planning with Cross-cutting themes.

Following are key activities under the program:

- a. This program supports in developing the framework of Building Code implementation initially for at least seven (7) Rural Municipalities that can be later replicated to other rural municipalities in the entire country.
- b. This program will develop organized and systematic Building Permit System and building code implementation mechanism appropriate for rural context of Nepal. The program supports at least 7 Rural Municipalities to establish Building Permit System (BPS) in these municipalities.
- c. The program provides technical assistance to one Rural Municipality for developing their Risk Sensitive Land Use Plan (RSLUP).
- d. Based on the experience and lessons of building code implementation and RSLUP, NSET plans to develop draft of Building and Land Use Regulation. This regulation is to contribute to proper building and land management for the sustainable development, and will be applicable to other rural municipalities as well.
- e. This program intends to provide technical assistance for demonstration of retrofitting of three (3) buildings in program Rural Municipalities.
- f. This program has provision of embedded technical assistance to the rural municipalities to ensure the systems of risk reduction and resilience building are well established. There will be 1 Civil Engineer working in each of the target rural municipalities who will support and facilitate for establishing Building Permit System and Building Code Implementation.
- g. This program supports in multi-hazard risk assessment and planning in selected three (3) communities out of the seven (7) program Rural Municipalities.
- h. A comprehensive multi-hazard risk assessment is to be conducted in three (3) rural communities. The risk assessment will consider the existing situations and capacities for different phases of disaster cycle: preparedness, mitigation, response, and reconstruction. The outcomes of the risk assessment provide a holistic picture of the risk situation in the municipality and will be used to develop risk reduction and management plans and policies.
- i. The Comprehensive DRM plan is to be developed based on the existing Local Disaster and Climate Resilience Planning (LDCRP) Guidelines developed and mandated by the Ministry of Federal Affairs and General Administration (MOFAGA). Further, the annual development plan of Rural Municipality will be reviewed, and risk mitigation measures will be included. Major development plans and programs will be analyzed and ranked based on their potential disaster risks; and specific risk mitigation measures will be proposed for priority and high-risk development activities such as roads, water supply systems, electric supply etc.

RISK INFORMED LANDSLIDE MANAGEMENT IN NEPAL'S HILL AREA

Risk Informed Landslide Management in Nepal's Hill Area is a program supported by People in Need (PIN) and implemented by NSET during July 2020 to April 2022. The project aims to improve resilience of hill communities in four rural municipalities (Bhotekoshi, Barabise, Tamakoshi and Big) in Sindhupalchowk and Dolakha districts through strengthening risk-informed landslide management at the local level.

The project conducted followings activities:

- Curriculum development for community-level participatory workshops to increase the knowledge of landslide hazards and associated risks

- Coordination meetings with community, elected ward-level representatives and LDMC to strengthen risk-informed planning at the ward and community levels.
- Identification of strategic locations and set up field offices on all 4
- Municipal Level two-day Workshops on Landslide Risk Reduction planning at each municipality
- One-day workshop on Landslide Risk Reduction at all wards of the municipalities
- Orientation programs on Community Level Landslide Risk Reduction at 80% of the existing wards of formal vdc and municipality
- Distribution of calendars with relevant messages and figures on landslide risk reduction and preparedness to at least 50 % of the households in the municipalities.
- Publish and circulate advocacy and awareness booklet to at least 10 % of the household families, all key stakeholders such as NGOs working in the project area and to relevant divisions/departments of the local, provincial and national government

Distribution of DRR Mainstreaming Guideline for local governments containing instructions, advisory checklists, guidelines and points to consider for disaster resilience while planning for physical development like public infrastructure, buildings etc. This guideline will also be used as an advocacy material for provincial and federal governments too.

WORKSHOP FOR IMPROVED SEISMIC EVENT LOCATION USING THE REGIONAL SEISMIC TRAVEL TIME (RSTT) METHOD

The Regional Seismic Travel Time (RSTT) model and method was originally developed in the late 2000s by the U.S. national laboratories for the U.S. National Data Center (USNDC). The US provided RSTT to the Comprehensive Nuclear-Test-Ban Treaty Organization Provisional Technical Secretariat (CTBTO-PTS) in 2012 to improve data processing at the International Data Center (IDC). Since then, RSTT has undergone rigorous testing and it is now incorporated into the IDC operational system. As part of the CTBTO-PTS capacity building program, RSTT is featured in international workshops with the goal of familiarizing CTBT signatory states with technology that is used at the IDC. Workshops also help scientists in signatory states utilize RSTT for their own CTBT verification efforts, which works towards the goal of consistent data analysis in the international community.

Lawrence Livermore National Laboratory (LLNS) and the CTBTO-PTS are sponsoring an in-person RSTT workshop to engage scientists from CTBT signatory states in the Middle East and South Asia Region.

The National Society for Earthquake Technology-Nepal (NSET) in collaboration with Department of Mines and Geology (DMG) of the Government of Nepal has conducted "Workshop for Improved seismic event location using the Regional Seismic Travel Time (RSTT) Method", which was held held from 7 to 11 November 2022 in The Soaltee Kathmandu Hotel, Tahachal Marg, Kathmandu, Nepal.

TAYAR NEPAL: SCALING UP SEISMIC RETROFITTING OF RESIDENTIAL BUILDINGS THROUGH THE LOCAL GOVERNMENT REGULATORY SYSTEM

This was the grant under USAID's Improved Disaster Risk Management Project- Tayar Nepal issued by DAI Global, LLC under which National Society for Earthquake Technology – Nepal (NSET) works to develop and pilot institutional mechanisms to promote and implement seismic retrofitting of residential buildings. The grant has key focuses on awareness-raising and

capacity building among the house-owners, municipal personnel, local engineers, and masons; develop a regulatory system in the municipality to promote and implement retrofitting; and collaborations between the municipality and key stakeholders on the retrofitting process.

The project conducted followings activities:

- Identify the key issues for promoting the retrofitting of the residential buildings
- Enhance awareness and capacity of key stakeholder on retrofitting
- Collaborate with local government for institutionalizing of retrofitting process
- Develop synergy between local government and key stakeholder on the retrofitting process

CITYNET HOSPITAL PREPAREDNESS FOR EMERGENCIES (HOPE) COURSE IN NEPAL

Under Hospital Preparedness for Emergencies (HOPE) Course with funding support of UNDP and under the guidance of , NSET has provided training to the Government and DRRM stakeholders. Training conducted on 24th-28th December 2021.

CITYNET NATIONAL WORKSHOP ON THE SDG NAVIGATOR AND THE LOCALIZATION OF URBAN SUSTAINABLE DEVELOPMENT GOAL CASES

CITYNET National Workshop on the SDG Navigator and the localization of Urban Sustainable Development Goal Cases program supported by CityNet implemented by NSET for the period of August 2021 to November 2021.

The program undertake the following tasks and deliverables:

- Translation of the either the SDG Navigator, the Toolkit on localization of Urban Practices, or both, in Nepali
- A Blended (Hybrid) workshop on localizing the SDGs with invited experts/speakers and domestic CityNet members

LUMJUNG EARTHQUAKE RESPONSE PROGRAM

Lumjung Earthquake Response program was supported by Catholic Relief Services Catholic Relief Services - United States Conference of Catholic Bishops ("CRS") during the period of July 2021 to September 2021. The main objective of program is to provide coordination and technical support, direct transitional support (shelter, WASH, and food security) to highly vulnerable households affected by the earthquake, and socio-technical support to earthquake-affected communities.

Key activities under the program:

• Distribution of NFIs for transitional shelter, accompanied by training on proper use of NFIs.

- Distribution of WASH/COVID-19 safety kits.
- Distribution of food basket to vulnerable households.
- Provision of socio-technical assistance through help desks.
- Communication of key messages on transitional shelter techniques, earthquake resilient reconstruction, and safe construction techniques in the context of the COVID-19 pandemic.

NEPAL SAFER SCHOOLS PROJECT (NSSP)

The Nepal Safer Schools Project (NSSP) was a DfID funded project seeking to increase the safety of approximately 250 vulnerable schools in Nepal and build the resilience of pupils, staff and the wider community to disasters. It is a consortium of Crown Agents, Save the Children and Arup international and NSET is implementing the one of the programme. The project is one part of DFID's wider 'Strengthening Disaster Resilience in Nepal" programme seeking to build the resilience of vulnerable people and reduce the impact of natural hazards in Nepal. The NSSP is aligned with the Government of Nepal's School Sector Development Plan (2016-2021) which includes a focus on School Safety and Disaster Risk Reduction, by upgrading physical infrastructure to be more resilient and ensuring the curriculum and teacher training integrates disaster resilience.

The objective of the NSSP is to support the implementation of the Government of Nepal's Vision for Increasing Resilience in Schools in Nepal. It will achieve this in two broad ways.

- Support the implementation of the Comprehensive School Safety framework (Safer Learning Facilities, Disaster Management and Resilient Education) in four districts in the Far- and Mid-West; and
- Support national-level capacity in the Department of Education to further develop policy and guidance to deliver safer schools.

The NSSP has three main results areas in line with the comprehensive school safety framework:

- Output 1: Safer learning facilities, particularly through seismically-resilient retrofitting and rebuilding;
- Output 2: School-level disaster management and resilient education and
- Output 3: National-Level technical assistance on safer learning facilities

Among the three outputs of NSSP, NSET is responsible for accomplishment of Outpu1: Safer learning facilities, particularly through seismically resilient retrofitting and rebuilding. Beside the major retrofitting and rebuilding work, to support Schools in COVID 19 situations, as a part of NSSP works, NSET has also worked in construction of WASH structures such as CGDF (Child, Gender, Disable Friendly) Toilets and hand Wash Stations in 52 schools of 4 selected districts.

Following are the major scope of work carried out by NSET during the inception and implementation of NSSP:

- Assist in developing quality assurance manual
- Assist in developing school selection criteria
- Assist in data collection and analysis of school
- Provide major service for the following activities:
- Screening Survey: 398 schools
- Rapid Vulnerability Assessment: 51 schools, 215 blocks, 554 classrooms
- Detail Assessment:28 schools, 123 block, 351 classrooms

- Retrofit Design: 28 schools, 118 blocks, 334 classrooms
- New Building Design: 5 classrooms
- Wash Design/Construction: 52 schools
- RVA training of municipal engineers: 1 event/32 participants
- Province level retrofit design training: 2 event/30 participants
- Completion of Retrofit Construction: 91 classroom, 20 blocks
- Rebuild: 2 classrooms
- Community orientation in safer construction: 21 events/533 participants
- Formation of operation and maintenance committee and orientation to the committee: 47 events/754 participants
- SMC training: 3 event/15 schools/95 participants
- Mason Training: 14 event/355 participants

HOUSING RECONSTRUCTION TECHNICAL ASSISTANCE PROJECT ()

The April 25, 2015 earthquake wreaked havoc in the central Nepal and damaged approximately 1 million homes. Those houses were mostly traditional stone-mud and brick-mud structured, non-engineered, constructed instead by home owners and with little consideration of seismic risks or building codes. The immense structural damage to housing after the earthquake highlighted many areas of vulnerability. These include construction workers' and homeowners' lack of awareness and training in earthquake-safe construction, especially in rural areas. Additionally, the absence of a national curricula, standards, guidelines and manuals for training individuals involved in housing construction and inadequate compliance with building codes contributed to the scale of the damage.

Realizing this need, with short-term goal to ensuring earthquake safer construction of all houses being reconstructed after the quake and longer-term goal to establish a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal, NSET is implementing "Baliyo Ghar " program with the funding support from USAID Nepal since 1st October 2015. The program is set to be completed in September 2021. Baliyo Ghar Program is providing technical blanket assistance at Kageshwori Manohara Municipality of Kathmandu, 13 VDCs and a municipality in Dolakha, 9 VDCs of Nuwakot and 11 VDCs and a municipality in Dhading. The total expected capital cost of the program is 10.3 million US dollar.

The key activity of Baliyo Ghar is to provide blanket technical assistance to the earthquake-affected population in rebuilding their homes with earthquake-resistant technology. Construction workers (masons, carpenters, bar-benders, contractors), Social mobilizers, Technical professionals (engineers, sub-engineers, architects, structural engineers, Common people (house-owners, consumer groups and other groups of people such as Mother's groups) and policy/decision makers (officials at rural and urban municipalities, political leaders, officials at ministries and departments) are the target beneficiaries of the program. Mason trainings to the existing masons and trainings to the technical professionals, orientation to wider group such as house-owner, community people, community organization/groups, youths and government authorities are some of the activities being carried out under the program. Likewise, On the Job training is being carried out to develop new masons by building a house of poor and marginalized family with duration of 50 days.

The major activities of the Baliyo Ghar program are:

• Providing technical assistance to government on policy formulation and development of guidelines such as; helping government on building and implementing building code, preparing training manuals and curricula etc.,

- Carrying out capacity building activities including, community orientations, mason trainings, On the Job Training, Engineers' trainings, social mobilizer trainings for quake resistance housing construction,
- Awareness raising activities which includes; mobile clinic service to every household, media campaign (Radio/TV program), and social media campaign etc.

To provide training and technical assistance for construction professionals and homeowners promote and help build earthquake-resistant homes in the program districts, Baliyo Ghar has established training centers and technical support teams by establishing Reconstruction Technology Centers (RTCs) at different levels: a national RTC (NRTC in Kathmandu), three district RTCs (DRTC), three local level RTCs (LRTC), and many Mobile Teams (MT) to ensure earthquake-resistant reconstruction.

DRTCs are implementing two kinds of activities: First, they support develop instructors in government organizations and other partner organization in districts through TOTs and provide necessary technical support and guidance to partner organization to standardize the training and technical support system. Second, DRTCs are also supporting Baliyo Ghar districts team on effective implementation of the Baliyo Ghar program. LRTCs are supporting to organize mason trainings and Mobile Teams mobilized in local level. And also facilitating the grant distribution process and other reconstruction activities in coordination with local bodies of government.

This program is closely aligned with the GON Housing Assistance Program and supports the establishment of district- and local-level reconstruction resource centers and demonstration models and homes. Mobile teams are providing technical assistance to homeowners in harder-to-reach areas, and trained professionals are providing national-level training and technical assistance to government engineers and other professionals supporting housing reconstruction. At the initial stage of formation of National Reconstruction Authority (NRA), a training was conducted for more than 2500 Technical Professionals recruited by NRA and DUDBC before mobilizing them to the field. Baliyo Ghar program assisted NRA to distribute the Housing Reconstruction Grant to eligible quake affected households. Baliyo Ghar prepared separate Curricula for Mason Trainings, each for Rural Masons and Urban Masons. Baliyo Ghar assisted in development of Fund Disbursement Guidelines, developing Information Booklets, Posters and Pamphlets related to the grant distribution. Baliyo Ghar program prepared Standard Operating Procedure (SOP) for inspection, manual for inspection, Technical Posters incorporated 10 Tips for Earthquake Resistant Building Construction etc.

After three years of devastating earthquake, Baliyo Ghar program is accelerating its activities like: Mason Training for existing masons, Training of Trainers (TOT), Social Mobilizer's Training, On the Job Training, Community Orientations and Mobile Clinic to ensure safer reconstruction and promote earthquake safety and preparedness.

PROGRAM FOR ENHANCEMENT OF EMERGENCY RESPONSE STAGE IV (PEER-4)

PEER is a regional training program being implemented by NSET for improving the emergency response systems and capacities of the beneficiary countries in South Asia. PEER Stage 4 started from October 2014 to September 2021. It was implemented in Bangladesh, India, Nepal and Pakistan. It is addressing the need to further strengthen emergency response capacities of people and governments of these countries.

PEER aims to enhance local and regional disaster preparedness and response capacities of vulnerable countries in South Asia. The overall goal of PEER is to reduce mortality in mass casualty events and increase survival rates of disaster victims in the program beneficiary countries.

Initiated in Asia in 1998 by the USAID/Office of U.S. Foreign Disaster Assistance (OFDA), the 1st, 2nd and 3rd phases of PEER program have been successfully implemented. PEER Stage IV is a logical continuation of PEER, PEER Stage II and III. The program aims to enhance local and regional disaster preparedness and response capacities of vulnerable countries through the institutionalization of sustainable disaster preparedness training programs and advanced emergency response systems.

The objective of PEER Stage 4 is to enhance emergency response capacity of South Asian Countries by providing training on Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR), Community Action for Disaster Response (CADRE), Hospital Preparedness for Emergencies (HOPE) and Swift Water Rescue (SWR) course and by promoting networking and collaboration among relevant individuals and institutions in the region. The target groups of PEER are community-level emergency response volunteers, national and regional level emergency response professionals. The total fund allocated for this program is 4.5 million.

The major activities of the program being implemented under the PEER are CADRE, CSSR, HOPE, MFR, SWR, TFI and IWs. CADRE training course teaches anyone how to prepare for disasters in their communities. CSSR course aims to provide individuals with collapsed structure search-and-rescue tasks the knowledge and skills necessary to safely and appropriately search for, stabilize, and extricate victims trapped in collapsed structures. HOPE is a training course for hospital staff, medical and non-medical health care personnel to prepare health care facilities to respond effectively to emergencies involving large numbers of casualties. MFR course provides individuals with first response tasks the knowledge and skills necessary to assess, treat, and transport sick or injured patients following an emergency or disaster. SWR is a newly introduced course under PEER Stage 4. NSET is set to develop the course with the involvement of experts from different regional organizations. Instructor development courses aim to train individuals to perform the tasks necessary to be effective instructors of PEER training courses. Training for Instructors (TFI) is prerequisite for being a PEER course instructor. NSET works primarily with national disaster management organizations, local governments, identified partner training organizations, such as the fire, police army, Red Cross/Red Crescent societies, governmentaffiliated/nongovernment/ private and volunteer response organizations.

NSET is collaborating with national governments (nodal agency) of PEER countries for strategic direction and guidance in PEER implementation, including developing qualified instructors for PEER courses. Developing highly qualified PEER instructors is important to produce skilled responders who are ready to be deployed during emergencies or disasters. Partner training institutes are being designated by nodal agencies to implement and institutionalize these courses. Below are NSET's key program partners in each of the PEER countries.

NSET is also working in partnership with two other institutions during PEER Stage 4, namely, SEEDS on the implementation of CADRE course for the civil sector in India; and with Initiative Outdoor for development, adaptation and piloting of a training course on Swift Water Rescue (SWR). NSET is also coordinating with other organizations being supported by USAID/OFDA, namely, American Red Cross, for CADRE in Nepal; and with Asian Disaster Preparedness Center (ADPC) for the implementation of HOPE course in Bangladesh, India, Nepal, Pakistan, Afghanistan, and Sri Lanka.

Since the start of PEER Stage 4 in October 2014, NSET has completed 41 various program events in the four PEER beneficiary countries till May 2017. Through these PEER events, NSET managed to officially launch the fourth stage of PEER in the four (4) countries and also develop MFR and CSSR graduates in Nepal, Pakistan and India. As of May 2017, there are a total of 1326 MFR graduates, 1055 CSSR graduates, 832 TFI graduates, 578 MFRIW graduates (MFR Instructors), 474 CSSRIW graduates (CSSR instructors), 172 Master Instructors (MFR-CSSR Course

Coordinators and Monitors/ MIW), 41 MFR Refresher Course graduates; 43 CSSR Refresher Course graduates; 2578 HOPE graduates, 511 H-TFI graduates (HOPE instructors), 1,479 CADRE graduates, and 488 CADRE-TFI graduates (CADRE instructors), in the PEER region.

The various activities performed under the program are;

- PEER's effectiveness was demonstrated during the response to the April 25, 2015 earthquake and its aftershocks in Nepal. PEER graduates were mobilized by their respective organizations and played key roles in the response operations.
- PEER-trained personnel serving in the Nepal Army, the Nepal Police, and the Nepal Armed Police Force Search and Rescue (SAR) teams.
- Provided Community Action for Disaster Response (CADRE) training course to individuals to be better prepared to respond to disasters in their communities.
- Medical First Responders (MFR) course provided to individuals with the first response knowledge and skills necessary to assess, treat, and transport sick or injured patients following an emergency or disaster.
- Hospital Preparedness for Emergencies (HOPE) training course provided for hospital staff and medical and non-medical health care personnel to prepare health care facilities that can respond effectively to emergencies involving large patient load.

PROVIDE TECHNICAL SUPPORT TO NATIONAL RECONSTRUCTION AUTHORITY IN DEVELOPMENT OF THE KNOWLEDGE PRODUCTS

Under the program "Provide technical support to National Reconstruction Authority in development of the knowledge products" supported by UNDP (Feb 2021 to May 2021), NSET has provided technical support to NRA for development of knowledge products, which is mainly the Part A of NRA Compendium Report. There are two main scope of the project: i) to develop Compendium Part A which is the synthesis report of five different thematic reports under part B, and ii) to develop "Ten management lessons on earthquake recovery".

MODELLING EXPOSURE THROUGH EARTH OBSERVATION ROUTINES (METEOR)

Modelling Exposure Through Earth Observation Routines (METEOR) is a project supported by British Geological Survey and being implemented in Tanzania and Nepal during Feb 2018-Feb 2021. The teams from British Geological Survey (BGS), Image Cat, The Global Earthquake Model (GEM) Foundation, The Disaster Management Department, Tanzania, The Humanitarian OpenStreetMap Team (HOT), Oxford Policy Management Limited (OPM), Fathom and NSET are associated in this research endeavor.

The escalating impacts of natural hazards are caused mostly by increasing exposure of populations and assets. A major challenge when making Disaster Risk Management (DRM) decisions is poor understanding of the distribution and character of exposure in ODA countries. Exposure needs to be mapped, monitored and modelled by Governments, NGOs, affected communities and businesses, seeking to bolster resilience and growth. Robust, quantitative methods are required to justify resilience decisions and risk mitigation. Projects have aimed to map exposure using Earth Observation (EO) using a range of approaches, though the application of these in DRM has been greatly limited by the fact that many have been poorly calibrated, for

instance by being based solely upon readily available data or were designed only for a particular setting.

METEOR takes a step-change in the application of EO exposure data by developing and delivering rigorous and open routines (protocols) and standards to allow quantitative assessment of exposure, with explicit uncertainties. These protocols and standards will be developed for broad application to ODA countries and will be tested and validated in two contexts (Nepal and Tanzania) to assure they are fit-for-purpose. The process of building capacity and co-delivering new consistent data will promote welfare and economic development in these countries and demonstrate the applicability of the techniques elsewhere.

METEOR will deliver country-wide openly available exposure data for the 48 least developed ODA countries. Better-informed DRM decisions that meet the demands of international drivers (e.g. SDGs, Sendai Framework) will be underpinned by our national-scale data.

Following are some key activities under the project:

- Delivery and use of open-source national-scale exposure datasets for multi-hazard analysis by Nepalese, Tanzanian and global stakeholders.
- Develop protocols and frameworks for the robust development of exposure data.
- Uptake of sustainable business model for exposure application in DRM by stakeholders.
- Exposure data integrated into national DRM policy and planning (where possible in a three-year project).
- Capacity building for end users to utilize and understand hazard-exposure data.
- Demonstrate the value of exposure data and risk products, working with end users.
- Creation of a network of stakeholders better placed to act as leaders of DRM in their geographic regions.
- Establish methods of characterizing the lineage and uncertainty of exposure data so end users can evaluate fitness of purpose;
- Use these methods to co-develop and provide (in an open platform) "level 2" exposure and hazard data for 2 pilot countries (Nepal and Tanzania);
- Openly distribute the methods, protocols and resulting data to the end user community (i.e. globally) in order to provide a template for exposure modelling in the developing and developed world.

SEISMIC VULNERABILITY ASSESSMENT OF AMARGADHI SCHOOLS BUILDINGS

GHI in partnership with NSET is conducting a seismic vulnerability assessment of school building in Sudhurpaschim (Far- Western)Province which is being funded by International Association for Bridge and Structural Engineering (IABSE) Foundation. The main focus of this program is to conduct a training to local engineers to assess the seismic vulnerability and inventory data for sharing with local authorities.

The project has planned following activities:

- Conduct a seismic vulnerability assessment of school buildings
- Advise on vulnerability assessment checklists and tool selection for consistency with other assessment efforts in nearby areas.
- Advise GHI's Amargadhi based engineers on selection of school buildings for the onthe-job training effort
- Train GHI's Amargadhi based engineer and local engineers on the use of the selected vulnerability assessment of school checklist, in the field in Amargadhi, by assessing several typical school buildings.

TECHNICAL COORDINATION FOR HOUSING RECOVERY AND RECONSTRUCTION PLATFORM–PHASE 3 (HRRP3)

HRRP is a platform for coordination, strategic planning and technical guidance to agencies involved in recovery and reconstruction and to support the Government of Nepal in coordinating the national reconstruction program.

HRRP supports government authorities (NRA, MOUD/DUDBC, MOFALD) in coordination, strategic planning, facilitating cooperation with the national and international organizations, the private sector, overseas labor migrants, and public associations involved in recovery and reconstruction under the guidance of GON and co-led by IOM and UNHABITAT, as of the beginning of January 2016. In order to facilitate the ongoing reconstruction efforts in the earthquake affected districts, Nepal Reconstruction Authority (NRA) approved the HRRP phase-3 on 7th March 2017 and it is set to run until the end of February 2019. CRS Nepal is leading the platform for phase-3; and DFID, SDC, Habitat for Humanity, Plan International, ACTED, Caritas Nepal and NSET have been providing financial and in kind contributions to the platform.

The Technical coordination provides supports to POs and Government line agencies, NRA, CLPIU/DLPIU for both MOUD and MOFALD. NSET, with the HRRP management, has provided technical staff at central and district level in line with the approved HRRP organogram. The fundamental approach of technical coordination is working at three level (National, Hub and district) in line with the HRRP-3 main approach. The National technical coordination team comprising three personnel (One National Technical Coordinator and two national technical coordination officer) is facilitating the standardization of technologies, standards, guidelines, and curricula at center level through developing/ adapting/ reviewing for all technologies, which recommended for approval. The technologies and related guidelines are for both new construction as well as retrofitting, including corrections of non-complaint buildings.

At hub level, one technical coordinator embedded in a District Management Team (DMT) and supporting the delivery of coordination services under the HRRP in districts. The DMT, Technical Coordinator is working with district management team to ensure a common understanding of technical assistance for the housing reconstruction. The DMT technical coordinator is working with the district technical coordinator to identify and respond to gaps or duplications in coverage, and to address quality issues. He also ensures strong links between the HRRP district team and District NRA office and DLPIUs. Currently, Eight District Technical Coordinator (DTC), one in each district (Ramechhap, Kathmandu, Sindhuli, Dhading, Okhaldhunga, Dolakha, Makawanpur and Sindhupalchowk), are working for HRRP under this contract. They are supporting to disseminate the technologies developed at center level to district level to ensure clear and common understanding amongst all stakeholders, particularly POs staff involved in technical assistance at VDC level and the MOUD/CLPIU engineers based in the VDCs and responsible for inspection.

This is continuously doing through the district orientations, trainings, district technical coordination meetings and field visits by technical professionals through the District Technical Coordinators with continuous support from National technical team and The District Management Team (DMT). Similarly, Technical coordination is supporting all stakeholders to have a uniform understanding on the comprehensive package of technical assistance at center as well as district level.

STUDY TO SUPPORT DETAIL PLANNING OF THE PROJECT FOR BUILDING MANAGEMENT ENABLING URBAN RESILIENCE

Study to Support Detail Planning of the Project for Building Management Enabling Urban Resilience is supported by Japan International Cooperation Agency Nepal Office (JICA) and implemented by NSET during Nov 2019 - Jan 2020.

The project has following objectives:

- To study and analyse governing policy provisions and understand the causes behind weak enforcement of Nepal Building Code (NBC), Building Bye-Laws, and policies/acts/guidelines related to NBC and Bye-laws.
- To assess building regulation system of 20 municipalities of Kathmandu Valley
- To analyses the building construction practices and find out the factors behind compliance/ non-compliance.
- To analyze the key stakeholders' responsibility and viewpoints regarding enforcement of NBC and Bye-Laws.
- To summarize the good practices, constraints and possible interventions area based on the above analysis for implementing NBC and Building Bye-Laws in private buildings within Kathmandu Valley

A team of Building Regulation Assessment Expert, Structural Engineer, Urban Planner, Building Assessment Team and Data Analyst has studied the building regulation acts and polices of Nepal government; assess the building regulation implementation mechanism of 20 municipalities; assess the 100 constructing buildings and drawings at field; interaction with 25 major organization from central, province and local government and also with professional on building construction i.e Engineers, Masons, Contractors and House-owners. With this information summarize the good practices, constraints and possible interventions area based on the above analysis for implementing NBC and Building Bye-Laws in private buildings within Kathmandu Valley.

STUDY ON URBAN DEVELOPMENT IN KATHMANDU VALLEY

NSET implemented the project with the support from Japan International Cooperation Agency Nepal Office (JICA) during Jan-Mar 2019. The project had following objectives:

- To study the bye-laws and building code compliance of constructed buildings and drawings submitted for permit process.
- To identify priority areas of interventions to enhance the byelaws and building code compliance

A team of Building Code Implementation Expert, Structural Engineer, Urban Planner, Building Assessment Team and Data Analyst had studied the 600 constructed building from 2008 to 2018 and 60 drawings submitted for building permit process during 2008 to 2018 of eight municipalities of Kathmandu Valley. A questionnaires were developed to assess these drawings and buildings base on Nepal Building Code and Bye-Laws. Then construction practices and compliance rate of buildings and drawing according to Nepal Building Code and Bye-Laws at different period and area were analysed. Also to identify priority areas of interventions to enhance the byelaws and building code compliance; interview with different stakeholder with was conducted.

3D DEMONSTRATIONS FOR LANDSLIDE RISK REDUCTION

3D Demonstrations on Landslide Risk Reduction project is supported by University of Durham and implemented by NSET in 2019-2020. 3D Landslide Demonstrator is conceptualized as an awareness tool to educate the community members about common types of landslides generally observed by the community members. These types include rotational slide, sliding due to pore

pressure and debris flow. It is expected to make the community understand that all types of landslides cannot be mitigated, some may be reduced or retarded and only a little of them can be mitigated through various demonstrations. These demonstrations will also provide some techniques of landslide monitoring at the community level, identify and implement simple small-scale mitigation measures at the community level. This information will be very much essential and useful to the local area planners for basic infrastructure and settlements. It is also expected to be useful to students in the school, college and universities in understanding the practical aspects of landslide mechanism and soil stability parameters. The 3D Landslide Demonstrator was first tested in NSET premises which was observed by NSET professionals. Then it was taken to the Chaku in Sindhupalchowk for field testing in a couple of places.

The program had following objectives:

- Develop a landslide demonstrator for rotational and rain induced landslide modelling
- Conduct series of demonstration as a piloting phase.
- Recommend potential improvement and actions for the future based on the learnings.

EMPOWERING WOMEN THROUGH DISASTER RISK REDUCTION

Research on possibility of empowering women through Disaster Risk Reduction is supported by IHRR Durham University and implemented by NSET during Apr-Dec2019.

The project had following activities:

- DRR initiatives to empowering women in Bhainse the rural community in Bagmati Municipality
- DRR initiatives to empowering women in Khokana the core urban community in Lalitpur Metropolitan City.

Under the project, following activities were held:

- Unite the women's group in the project communities to form a disaster management groups
- Enable them to prepare a social Hazard/Risk map, identify the potential hazards and risk reduction measures.
- Plan and implement small scale landslide mitigation and storm drainage diversion culvert in Bhainse of Bagmati Rural Municipality.
- Plan, install and commission community firefighting system in Khokana ward num 21 if Lalitpur Metropolitan City.

SAJHEDARI BIKAS BUILDING CODE TRAINING FOR MASON WORKER AND BUILDING BYLAWS AND BUILDING CODE ORIENTATION FOR MUNICIPAL ELECTED OFFICIALS

The Sajhedari Bikaas (SB) is USAID-funded project aimed at empowering communities to direct their own development. Under Sajjhedari, a project "Building Code Training for Mason worker and Building Bylaws and Building Code Orientation for Municipal Elected Officials" was implemented by NSET in Six Municipalities of Nepal during Nov 2017 – Feb 2018.

Following activities held under the assignment:

• Design the curriculum outline for the mason and orientation for municipality's officials in consultation with MoFALD/Municipality Division.

- Detail design of both the training and orientation will be finalized in consultation with MoFALD, municipality with SB. The curriculum for both orientation and training should be in accordance with the approved MoFALD and Department of Urban Development and Building Construction-(DUDBC) approved building code training manual;
- Conduct a seven-day training on building code for mason workers of six municipalities consisting of at least 25 to 35 people in each event;
- Conduct building code training for mason workers in line with building code and bylaws for six municipalities and submit each training completion report after completion of event;

TECHNICAL SUPPORT FOR BUILDING CODE IMPLEMENTATION IN NEPAL (TSBCIN)

Nepal formulated the National Building Code (NBC) in 1994 and was made it mandatory for all municipalities and urbanizing settlements in the country in 1998 through Nepal Building Act, 1998. Despite this, it remained unimplemented until 2003 until Lalitpur Sub-Metropolitan City took the initiatives for Building Code implementation (BCI) followed by Dharan Sub-Metropolitan City in 2007. Based on the experiences of NSET working with then Lalitpur, Dharan and few more municipalities, NSET implemented the Building Code Implementation Program in Municipalities in Nepal (BCIPN) during 2012-2016. BCIPN was largely successful in developing and piloting methodologies for building code compliance in 30 municipalities and urbanizing settlements of Nepal. There are now 293 municipalities (including Metro, Sub-metro and municipalities) in Nepal and there is desperate need to scale up, consolidate, replicate and institutionalize the BCI process in all remaining municipalities.

To continue the success and institutionalization of the process, NSET is implementing the program Technical Support for Building Code Implementation in Nepal (TSBCIN) with funding support from the United States Agency for International Development / Office of U.S. Foreign Disaster Assistance (USAID/OFDA) in 30 Municipalities during 2017-2020.

The overall goal of TSBCIN is to build the disaster resilient community in Nepal through technical support for building code implementation. It aims to support Building Code Implementation (BCI) through awareness, capacity building, institutionalization, and networking.

The objective of the TSBCIN is to support Building Code Implementation through awareness, capacity building, institutionalization, and networking. This program focuses on; a) improving building permit system, building code implementation mechanism, and risk based planning and implementation system, b) enhancing capacities of masons, contractors, engineers, municipal professionals on safer construction and c) raising awareness of communities for safer construction practices. This program is being implemented in 30 municipalities covering 7 provinces of Nepal.

Major Activities

The TSBCIN activities are categorized under five broad topics. Earthquake Awareness Promotion and Sensitization to various stakeholders about BCI is one of the activities of TSBCIN. As part of this, awareness and sensitization programs for house owners, municipal staff, political/social leaders and other stakeholders through safety campaigns, mobile clinics, local radio campaign etc are the specific functions. Likewise, Capacity Enhancement Programs are another category of TSBCIN activities. This category includes activities like training on safer construction practices for masons, contractors, engineers, municipal engineers, municipal staff, officials and elected representatives. The third category of activities is Program for Improving Institutional System which includes activities like consultation meetings and thematic workshops, development of local disaster risk management plans, earthquake loss estimation, risk-sensitive land use plan and mobile application. Similarly, Collaboration/Cooperation/Networking is another category of activities which includes tasks such as meetings, sharing workshops, joint research works, collaboration with local private organization, exchange portal, international sharing visits/conferences. The last set of activities is Monitoring and Evaluation (M&E).

EARTHQUAKE-TRIGGERED LANDSLIDING IN NEPAL DURING AND POST MONSOON

Earthquake-triggered landsliding in Nepal during and post Monsoon, 2017-2019. Monitoring and risk assessment. The overall goal of this project is to determine how hillslopes damaged during the 2015 Nepal EQS progressively deform in response to stress perturbations resulting from precipitation and continuing seismicity. The study site is located at the Upper Bhote Koshi (UBK), in Sindupalchowk District. Our initial assessments from imagery indicate that EQ-triggered landslide is characterized by small-scale but widespread rock-fall, and large-scale rock slope failures from ridgelines and reactivation of existing deeper-seated landslides. So, in order to understand the mechanism of failure from last 1.5 years, regular monitoring of these 10 locations is underway NSET is running landslide monitoring application in 10 locations of Listikot VDC with the support from powerful web-based access of HOBO Data Loggers and automatic slope monitoring instruments are now streaming live data. But the implementation of such kind of project is no short of challenges. The one of major challenges faced while implementing the project is building trust with the local community and convincing them about the purpose and benefit of the project. However, NSET is guite successful in this aspect. Carrying out frequent field visit to the geographically harsh landscape is another major challenge. The poor mobile reception is also adding the salt to the injuries to this.

Following are the major outcomes:

- The program has succeeded to provide the local community a sense of security and now local community are feeling safe. This is because, the monitoring system is a real time monitoring and which can pass the message in case of emergency. This system is considered the first of its kind in term of Landslide early warning system. Researcher are trying to build the same type of system in Nepal.
- Mapping of Landslide triggered by 2015 Gorkha Earthquake in the 14 heavily affected districts by the earthquake.
- Monitoring of the mapped landslides for their level of risk.
- Prepare a landslide map of the 14 districts for landslide risk assessment]
- Suggest landslide susceptibility of the areas to National Reconstruction Authority

SEISMIC SAFETY AND RESILIENCE OF SCHOOLS IN NEPAL (SAFER)

SAFER (Seismic Safety and Resilience of Schools in Nepal) is a holistic and multi-disciplinary program for improving the earthquake-related safety of school buildings and the resilience of educational communities in Nepal. It is a consortium of various partners; Bristol University, University of Southampton, California Institute of Technology (CALTECH), University at Buffalo, University of Roma Tre, National Society for Earthquake Technology – Nepal (NSET), Tribhuvan University, Institute of Engineering, Kathmandu University (KU), Arup International Development (ARUP-ID) and Save the Children.

Following activities held under the project:

- 1. Seismic Vulnerability & Risk of School buildings in Nepal;
- Assisted University of Bristol team on the first trials of the SAFER smart school inspection application (SAFER App) (
- SAFER App trials at schools in Swayambhu and borehole site identification at Bijeshworir for geotechnical investigation
- Working with University of Bristol team in updating and refining the SAFER App. Exchange of documents regarding addition and amendments of key questions and parameters in the application for better capturing the essential details of each school inspected.
- School inspection of a total of 127 blocks from 4 districts in western Nepal (Bardiya, Surkhet, Achham and Jumla) using the SAFER App
- 2. Experimental Investigation for innovative, low cost school construction & retrofit;
- Concept of 2D wall tests and 3D tests on stone masonry buildings and non-engineered RC frames building to be conducted at University of Southampton with all engineering designs and drawings
- Out of plane lateral load test for stone in mud masonry walls to study the lateral load behaviour in both retrofitted and non-retrofitted walls to study the qualitative and quantitative improvements upon retrofitting using various methods. Tests started on April 2019 and will continue till April 2020.
- 3. Decision Support System for post-quake recovery;
- Assisting University of Bristol on Incremental Retrofitting of Stone Masonry Buildings in Nepal, where cost benefit analysis of the existing retrofitting practice of Splint and Bandage will be done. Current components of a full retrofitting intervention will be broken down and prioritized. Incremental retrofit stages will be identified wherever feasible, gauging the level of safety they offer, and costs incurred in each stage.
- Sustainability and resilience of the educational communities in Nepal;
- Series of webinar with University of Bristol attended by engineers and structural engineers of NSET, and personnel from Save the Children. The webinar discussed on Pre-earthquake rapid visual survey procedures, its objectives and methodology, post-earthquake rapid visual survey procedure along with a session on the SAFER App and WebApp for RVS in Nepal. Discussion on the App's features and usage was done.
- Webinar training was conducted and trained 24 Engineer/Sub-engineer and Earthquake Safety Promotion Officer (ESPO) of 4 districts in Western Nepal (Bardiya, Surkhet, Achham and Jumla) on usage of the SAFER smart school inspection mobile App, after which 127 blocks were inspected.

BUILDING CODE IMPLEMENTATION IN MUNICIPALITIES OF NEPAL (BCIPN)

BCIPN was conceptualized to address the need to support municipalities mainly in their efforts to implement the National Building Code (NBC). NSET implemented the program with the funding support from US Office of Foreign Disaster Assistance (USAID/OFDA) with the main goal of the program

to enhance earthquake resilience of urban settlements in Nepal through compliance to and enforcement of the National Building Code. The program started in October 2012 and completed in Sep 2017. This project was extension and continuation of first phase which was originally planned till September 2015. The total budget for the program was 1.7 million US dollar.

BCIPN was aimed at ensuring the implementation of the building code through a multifaceted approach which targets enhancement in knowledge and skills of all stakeholders. It was implemented in 30 municipalities of country including Amargadhi, Bhadarpur, Bharatpur, Dharan, Dhangadhi, Biratnagar, Birendranagar, Birgunj among others. NSET implemented program under the overall guidance and directives of the Department of Urban Development and Building Construction (DUDBC), Ministry of Urban Development (MOUD) and Ministry of Federal Affairs and Local Development (MOFALD) of the Government of Nepal and in close coordination with

DUDBC division offices and the municipalities. The objectives of the program were to encourage and assist urban settlements of Nepal for effective implementation of building code, by:

- Raising awareness on importance of building safety regulations to reduce the risk of losses due to earthquakes,
- Developing capacity of municipal professionals and other stakeholders to promote earthquake safe design and construction, and
- Developing policy recommendations to improve enforcement and compliance to the building code
- Raising public awareness of building code regulations in seismically active areas.
- Developing the capacity of municipal professionals to effectively implement the building code.
- Formulating policy recommendations to improve residential building codes, and
- Enhance building permit process of municipality

BCIPN was founded on three main strategic components to implement from local to national level. The first component of the strategy was raising awareness of local community, related stakeholders and government representatives on root cause of earthquake risk in Nepal and possible ways to mitigating the risks. Secondly, building the capacities of construction workforce-local masons and contractors in earthquake-resistant construction technology; and building capacities of engineers and technical professionals to design and supervise construction of safer building is another major strategy. Thirdly building the institutional capacity of municipalities to effectively enforce building code and institutionalize the code compliance system.

BCIPN was a comprehensive program based on creating demand through awareness raising, addressing the demand through capacity enhancement of municipal and private sector engineers and architects as well as masons and petty contractors, and working in partnership with stakeholders in improving the modus operandi and policy environment, and consolidating the gains supporting municipalities in improving building permit systems and the central government through development of national standards and manuals. The program focused on assisting the municipal governments in Nepal in enhancing their capacities to develop and administer the building permits and control system for ensuring improved seismic performance of all new building constructions. This led to, on one hand, helping the municipalities to develop an effective mechanism for building code implementation, and on the other hand, enhancing public awareness, and technical knowledge of the residents, municipal officials, and technical professionals on aspects of earthquake risk management including earthquake-resistant design and construction.

The major accomplished activities were; base line documentation; learning from successful cases of building code implementation, develop mechanism for building code implementation, capacity enhancement, awareness programs, preparation of earthquake scenario and earthquake risk management action plan and sharing of lessons and experiences. The program conducted a series of training programs for technical personnel including the contractors and masons, municipal engineers and by conducting earthquake orientation and other awareness activities.

BCIPN was helpful to demonstrate that technical support to municipalities is the key for successful implementation of building code. The technical support consisted in focusing on 1) awareness-raising of populations on possibility of safer building construction, 2) building capacities of construction stakeholders i.e. masons, technicians, contractors, municipal engineers through training courses, and 3) improving institutional systems. With a view to enhance the capacity of different stakeholders in earthquake resistant construction, and change the perception of people towards the possibility of safer building construction, different types of training programs for engineers, technical professionals, masons, social mobilizers, house-owners and a number of

awareness programs for the municipal professionals, local and political leaders, other BCI stakeholders and community members were conducted in the program municipalities.

BCIPN has been instrumental in developing and piloting methodologies for building code compliance in 30 municipalities and urbanizing settlements of Nepal. The achievements and successes of BCIPN has become very visible with a compliance rate of more than 70% in the program municipalities. During the five years of BCIPN implementation in 30 municipalities, NSET conducted more than 150 numbers of training and awareness activities in close coordination with the target municipalities who also increasingly allocated budget for the implementation of awareness and training activities. More than 700 Engineers, 4600 Masons, 100,000 house owners/community members, 6300 Social Mobilizers, 630 municipal professionals and political leaders 103 Master Instructors have been trained and oriented through the programs.

DISASTER EDUCATION FROM HYOGO IN NEPAL

Schools in Nepal are highly vulnerable to different kinds of disasters. Despite that disaster awareness and preparedness at the schools is very low. Realizing an urgent need of disaster planning, preparedness and response in vulnerable schools in Nepal, a joint consortium between NSET and Team Hyogo led by Sakura-Net, Japan was formed on June 2016 for the implementation of a project titled "Disaster Education from Hyogo in Nepal." The interventions helped make sustainable disaster risk reduction education system in Nepali schools. The program was implemented in Nuwakot District in close coordination with District Education Office (DEO).

The program objectives were; a) Support schools of Nuwakot to enhance capacity on disaster preparedness and response planning through promoting sustainable disaster risk reduction/ management education, b) Develop and disseminate disaster safety education resource materials (awareness and education materials, guide books, text books) and c) provide educational logistic support to children and teachers schools of Nuwakot that were affected by 25 April 2015 earthquake. The program covers 8 schools of two Rural Municipalities: Dubcheswor Rural Municipality and Tadi Rural Municipality of Nuwakot district.

The major activities accomplished under the program were: Development of teaching methods and techniques under which seminars for Teachers conducted where teachers from the 8 schools participated in a series of seminars on disaster education. The seminars were focused on knowledge about the hazard, about aspects of disaster preparedness and response planning. A total of six teacher's seminars have been conducted so far.

Similarly, model classes for children were conducted in all the 8 schools for the students of class 8, 9 and 10. Through the classes, the teachers have been encouraged to facilitate the model classes for children using the knowledge and experiences from the teacher's seminar and action plan.

Development of teaching materials was another task under which a teacher's manual was drafted through the series of teacher's seminars. The manual includes various aspects of DRM including hazard risk knowledge, preparedness and response to the natural disasters. The manual shall work as the reference for the trained teachers and also the implementation partners to conduct various training and orientation events. Likewise, a guidebook for children has been drafted to impart the knowledge on disaster risk reduction education. The project also supported the schools to establish disaster learning corners. It will also provide teaching materials and help to promote e-learning facility. It also helped strengthening of existing Temporary Learning Centre. Chandra Nayan Basic School located at Dansing was selected for a semi-permanent construction. This project supported the construction of two rooms in the school. The community around the school

consists of 75 Households including a population of 500 people. Currently, the construction of the two room block at the school is at its final stage of construction.

ENHANCING CHILDREN SAFETY AND COMMUNITY RESILIENCE THROUGH INTEGRATION OF COMPREHENSIVE SCHOOL SAFETY (CSS) FRAMEWORK

Children are the most vulnerable section of the population and in order to ensure the safety of children, schools are needed to be earthquake resilient and prepared for earthquakes. NSET has been undertaking the School Earthquake Safety Program (SESP) in order to improve the safety of schools around Nepal and in the region since 1997.

Enhancing Children Safety and Community Resilience through Integration of Comprehensive School Safety (CSS) framework was program designed to enhance safety of children and community through integration of Comprehensive School Safety (CSS) framework in education sector.

NSET/ UNICEF Nepal PCA (Partnership Cooperation Agreement) implemented the program to enhance safety of children and community through integration of Comprehensive School Safety (CSS) framework in education sector. The total duration of the program is from June 2016 to December 2017. This is the continuation and expansion of previous PCA with UNICEF that was implemented during February 2014 to March 2016. The total budget for the program was NRs. 69,505,606.

The objectives of the programs were to;

- Increase the capacity of local, district, and national- level education stakeholders to integrate and implement Comprehensive School Safety in education planning processes, strategies and development policies at all levels including the recovery from 25th April Earthquake;
- Increase knowledge, skills and capacity of children, adolescent boys and girls and community members for better preparedness, timely response, risk mitigation of disasters and climate change and
- Strengthen the role of children as agents of change through information sharing, documentation and dissemination of evidence based knowledge, good practices and learning.

The program implemented under the collaboration with the Government of Nepal (Ministry of Education/Department of Education), Education Cluster members, National Centre for Educational Development (NCED) and Curriculum Development Centre (CDC), Regional Education Directorates, District Education Offices (DEOs), Resource Centers, Schools, Academic Institutions and Community members including children covering 680 schools of nine districts Bajura, Achham, Baitadi, Humla, Parsa, Saptari, Dhanusha, Dhading and Dolakha.

The program had intended to strengthen the capacity at national level, district level and at local level to implement and monitor CSS framework in order to achieve the goal of resilient schools. Comprehensive school safety framework includes resiliency of physical facilities, ensure adequate disaster risk management system and promote disaster resilient education in formal and non-formal sector. The program implemented various activities including district level orientation programs, workshops, discussion programs and others.

BUILDING BACK SAFER SCHOOLS FOR ALL NEPAL EARTHQUAKE RESPONSE

The Gorkha earthquake that hit Nepal on 25th April 2015 adversely impacted lives and well-being of Nepali people, let alone damages on properties. Many private and public properties got severely hit, public schools being one of the sectors. The earthquake caused complete collapse of 25,134 of classrooms and caused partial damage to 22,097 classrooms belonging to 8,242 public schools of 31 affected districts. As a result, thousands of children were deprived of education and underwent psychological trauma too. This situation prompted an urgent action of reconstruction of school buildings at the earliest to eliminate the sense of fear on students. It was also necessary to inculcate the idea in children's minds that earthquake doesn't kill people, but the unsafe structures do.

A project titled "Building Back Safer Schools for Nepal Earthquake Response 2015" started as a consortium between PLAN Nepal and National Society for Earthquake Technology-Nepal (NSET) beginning October 2015 till December 2016 with the financial support from Department of Foreign Affairs and Trade (DFAT). The project planned to construct 12 school buildings in 6 districts-Kathmandu, Lalitpur, Sindhuli, Sindhupalchwok, Dolakha and Makwanpur district.

The overall goal of the program was to strengthen the institutionalization of safe, inclusive and resilience schools in the post-earthquake scenario at local, district and national levels. The role of NSET was to provide technical assistance, monitoring, training and support, while Plan played a leading role in implementing, community and school outreach.

The objectives of the project were;

- Model and integrated resource schools are constructed and the process documented for replication and strengthening accountability in the target districts,
- District technical, financial and human resource capacity is strengthened to implement, improve and monitor National policies and guidelines for ensuring safe, inclusive and resilient schools.

As part of the first objective, various activities were carried out. They were;

- Construction of 7 "model" safe schools in 7 VDCs (2 Dolakha, 2 Sindupalchok, 1 Sindhuli, 1 Makawanpur, 1 – Kathmandu Valley) served as an example for the DoE and local masons/contractors in 4 target districts & Kathmandu as they re-construct or rehabilitate other schools in the district under ADB/ DoE or WB/ DoE school re-construction programs.
- Four Integrated/resource schools (1 Dolakha, 1 Sindhupalchok, 1 Sindhuli, 1 Makawanpur, 1 Lalipur) were re-constructed/ rehabilitated and supported to meet high standards (including school WASH, furniture, aids to inclusion etc).
- Training of trainers for DEO, Plan and partner staff for training of masons on safe construction methodologies.
- Training of local masons
- Technical support, supervision and inspection of construction processes (NSET with DEO).
- Developing scorecards and social audit guidelines with community participation for use in future construction/retrofitting projects.
- Trainings for School Management Committee and children clubs on developed topics (including inclusiveness, DRR, psychosocial, behavior change, life skills) and conduct training of School Management Committees and children's clubs
- Support school management committee/children's clubs to implement small scale disaster preparedness and DRR activities in and around the school

• Develop a technical guideline on safe school facilities and school construction.

Under the second objectives, various activities were accomplished. They were;

- Training of DoE engineers for district wide assessments of schools and assessment/ review of existing assessments of schools in the target VDCs in Dolakha, Sindupalchok, Sindhuli and Makwanpur district (Content of damage assessment inbuilt in the engineers training package and on the job practical trainings were facilitated by the district hosted engineers).
- Training of DoE/DEO engineers, Plan engineers and other local building supervisors on standards and construction methodologies, quality assurance techniques and construction monitoring.

The major outputs of the second objectives were; supply of 4 Engineers to support DEO activities at district level for 15 months and holding district level policy dialogues on ways to implement government policies at district level.

The major outcomes of the program were; increased capacity of District Education Office to monitor the implementation of the national building code and safe school construction guidelines and Improved technical capacity of DOE Engineers, DEO and other senior education, planning district staff to assess, monitor and supervise schools for improved safety, resilience and inclusiveness. Strengthened capacity of School Management Committees, child clubs, local masons/engineers, communities to plan, construct and monitor school construction.

TRAINING AND CAMPAIGN FOR EARTHQUAKE NON-STRUCTURAL MITIGATION

National Society for Earthquake Technology-Nepal (NSET) implemented the program from June 2015 to June 2016 in cooperation with Shapla Neer Citizents' Committee in Japan for Overseas Support. The overall goal was to increase the understanding level of the public on earthquake preparedness in Kathmandu and Lalitpur Metropolitan City. The total budget allocated for the project was US\$102,473.00, equivalent to approximately NRs.10,187,865.

The objective of this project was to help internalize the message on earthquake risks and nonstructural mitigation by targeted beneficiaries on their daily works at household of two municipalities namely Kathmandu and Lalitpur.

The major components of this project were Media Campaign for Earthquake Disaster Prevention Messages through Radio Public Service Announcements (PSAs), flex boards on tempos and micro/mini buses demonstrating prevention methods, documentary shows at a variety of events, at a mobile information desk, and on Sajha buses. Likewise, training Program for Community Leaders was another component where trainings were conducted through an "Earthquake Information Booklet" to community leaders interested in Disaster Risk Reduction at community level. Similarly, another component was door-to-door visits to around 250 households and distribute furniture stoppers along with an "Earthquake Information Booklet" and provide training to householders on how to use the tools. Lastly, Disaster Risk Reduction Workshops for local Women's groups.

PROMOTING PUBLIC PRIVATE PARTNERSHIP ON EARTHQUAKE RISK MANAGEMENT (3PERM)

DRM is a collaborative and collective effort of various stakeholders and private sector has also important role to play in it. Averting disaster and safeguarding economies, nations, communities and their own business by investing more in Disaster Risk Reduction (DRR), both for their own

business continuity and for the local communities in which their workforce resides for building community resilience. In developing countries like Nepal where the effects of natural hazards are often severe, Public-Private Partnerships (PPPs) offer a promising alternative to conventional practices. However, despite having vast potentiality, Nepali private sector's contribution is limited largely in post disaster relief and response on an individual basis, charities and ad hoc post disaster.

National Society for Earthquake Technology-Nepal (NSET) implemented program "Promoting Public Private Partnership for Earthquake Risk Management (3PERM)" with the funding support from United States Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA). This program envisioned on tapping the vast potentials of private sector for contribution to earthquake risk reduction in Kathmandu Valley and Nepal. Capacity development of the stakeholders was a focus of the program. The program was launched with view to raise awareness of the private sector, convince the businesses about the significance of ERM, and demonstrate the economic, social and corporate feasibility of PPP in disaster risk reduction. The program also emphasized on the added benefits to other sectors such as tourism, cultural heritage preservation, contribution to social assets generation etc. 3PERM complemented the NSET initiatives for Earthquake Risk Reduction in Nepal, especially the OFDA-supported ongoing Nepal Earthquake Risk Management Project Stage 2 (NERMPII). This was implemented during September 2011 to April 2016 in the Kathmandu Metropolitan City, Four Sub-Metropolitan Cities, 53 Municipalities and 135 Small Towns with rapid urbanization and building up of earthquake vulnerabilities. Originally designed 36 month-long program, began from September 30, 2011 to 30 September 2015 and it was extended twice.

This 3-year program was moduled with the view to;

- Raise awareness of all stakeholders, especially the private sector and other stakeholders that closely relate with potential earthquake risk reduction activities to be led by the private sector,
- Assess the potential of the commitments and potential energy and leadership within the private sector and its potential capacity to exert pressure on the government to consider earthquake risk management as one of the priority areas for mainstreaming into the development processes, and
- Implement a detailed study of the model PPP in urban regeneration to be piloted in a demonstration neighborhood of the core area of Kathmandu.

The key objectives of the program were to increase disaster awareness and promote public private partnership (PPP) for earthquake risk management in Nepal through various activities:

- To conduct Massive Awareness Campaign on Earthquake Risk Management through Radio programs, Television Programs, Print media, Publications, E-Bulletin, Display Boards, Doorto-door Campaign, Street drama and other demonstrations, Production and distribution of short thematic Video films and Development and Distribution of NSET presentations on Earthquake Preparedness
- Enhancement of Public Private Partnership for Earthquake Risk Reduction through One-onone meeting with the top twenty private sector business in Nepal, 10 numbers of Consultative meetings with Corporate Sector, Associations of Business and Industries, Media Houses, Consultant and developers, Professional Societies and groups representation general public such as group of house-wives, religious leaders, Invited Lectures in Rotary Clubs, Design Development and Implementation of DRR programs jointly by NSET and Rotary Clubs
- Feasibility study of a model "Urban Regeneration" in the city core area of Kathmandu.

TECHNICAL SUPPORT FOR EARTHQUAKE SAFER HOUSING RECONSTRUCTION (TSESHR)

Technical Support for Earthquake Safer Housing Reconstruction (TSESHR) was a short term intervention planned for 3 months starting from July 1, 2015 to end of October 2015. NSET implemented the TSESHR program with the funding support from US Office of Foreign Disaster Assistance (USAID/OFDA). The total budget spent for the program was 88,000 USD.

TSESHR was designed to cater the immediate requirement in planning, developing and piloting the potential methodology of technical support for earthquake safer reconstruction. It was anticipated that the government would also benefit from this endeavor in developing a clear strategy for the reconstruction of the massive destruction by the 2015 Gorkha Earthquake in the 31 districts of Nepal. TSESHR was implemented with the goal of "Improved earthquake resilience of Nepal". The project objective was to "Ensure earthquake safer construction of houses by providing technical assistance through housing designs, training and awareness".

Three major sectors of activities were planned to meet the objectives. These sectors comprised of Policy Planning, Capacity Building/Training and Building Community awareness/Mobilization. The direct beneficiaries were estimated at about 2,000 individuals and 190,000 persons of Dolakha district as indirect beneficiaries. The scope of TSESHR was anticipated to reach the entire population affected by the 2015April Grorakha Eartqhuake. This is because TSESHR would be the foundation stone of the rehabilitation and reconstruction process after the earthquake.

A number of awareness and training programs were conducted which produced trained masons on earthquake resistant building construction and trainers to train the masons. TSESHR established District Reconstruction Technology Center (DRTC) in Bhimeshwor Dolakha in a piece of land authorized by the Bhimeshwor Municipality and DDRC. One training hall was constructed which facilitated the conduction of training and awareness activities after TSESHR was completed for the implementation of earthquake resistant housing reconstruction program. TSESHR made a positive impact with its awareness and training programs on the necessity and importance of training of masons to ensure earthquake resistance of every building reconstructed. It was also useful in pursuing the government line agencies to initiate the establishment of district level technology center to raise awareness and train concerned professionals on earthquake resistant construction technology.

ENHANCING CHILDREN SAFETY AND COMMUNITY RESILIENCE THROUGH INTEGRATION OF DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTION (DRR & CCA) IN EDUCATION SECTOR

With the main objective of enhancing Children Safety and Community Resilience through Integration of Disaster Risk Reduction and Climate Change Adaptation in Education Sector, NSET implemented the project from February 2014 to June 2015 in cooperation with United Nation for Children Education Fund (UNICEF).

The overall program goal was to enhance the rights, safety and resilience of children, adolescent girls and boys, women and men in hazard prone communities including those affected by the impact of climate change. NSET and UNICEF came together to join hands with government educational stakeholders, under the leadership of Department of Education to jointly intervene towards making schools safer. The intervention was mainly targeted in integrating DRR/CCA components into education sector including all three pillars: safe physical facilities, school level

disaster risk management (assessment, emergency planning, capacity building, preparedness, response) and risk reduction education through formal and non-formal process.

The specific objectives of the programs were:

- Develop, institutionalize and implement comprehensive school safety framework;
- Integrate DRR and CCA into education plans at district and school level; and
- Increase knowledge and skills of children, parents, teachers and education stakeholders on DRR/CCA.

The total budget spent for the activities under the program was 511,000 USD. Covered in 500 schools of five districts of Nepal, viz. Achham, Humla, Bajura, Dhanusha and Saptari, this intervention was able to realize outcomes towards integration of comprehensive school safety initiative in national plan, policies and programs. The major activities of the program were:

- Preparation of Comprehensive School Safety Framework (Guideline and Action Plan) and endorsement and implement by the Government,
- School and District Annual Strategic Implementation Plans integrate CCA and DRR components including budget allocation,
- Increasing capacity of children, parents, teachers and education stakeholders/ to build a culture of safety and resilience in schools and communities

In the district and local level, this program sensitized stakeholders, students and teachers towards integration of DRR/CCA into their regular school activities. Major accomplishments of this project include development of Comprehensive School Safety Implementation Guideline, Development of Training Materials on School Based DRR/CCA. A total of 125 education stakeholders from 5 districts were trained on mainstreaming DRR/CCA concepts in District Education Annual Strategic Implementation Plans and 25 education stakeholders from 5 districts were trained on school based DRR/CCA as master trainers for district level training. A total of 933 teachers including 719 male teachers and 214 female teachers from 500 different schools of the program districts were reached through the teacher's trainings on DRR/CCA. There were various school level outputs such as 25 functional child clubs (school safety clubs) were established, 25 schools were prepared as learning center for DRR/CCA and 25 schools School

The Major output of the program were:

- Development of Comprehensive School Safety Implementation Guideline.
- Material Development for Master Training of Trainers.
- District Level Workshop on DRR/CCA to 246 participants including 15 female participants and 1 disabled participant benefitted from these workshops.
- Two regional master training of trainers were organized although the initial target was just one such training. In total, 47 participants graduated from these two trainings.
- A total of 141 education stakeholders (24 from Humla, 33 from Bajura, 27 from Achham, 28 from Dhanusha and 29 from Saptari) were trained as trainers on DRR/CCA.
- 4 days training to teachers on DRR/CCA (933 teachers from 500 schools)
- 7 Days Comprehensive Training to teachers and students from model schools on VCA, LSAR and FA.
- School Based DRR/CCA basic components to 388 education stakeholders.
- DRR/CCA incorporation in 125 Schools.
- Orientation to 4208 teachers on DRR/CCA.

NEPAL EARTHQUAKE RISK MANAGEMENT PROGRAM-II (NERMP-2)

Nepal is one of the earthquake-prone countries in the world and ranked 11th worst position globally in terms of earthquake risk. The risks have been multiplied due to human actions such as rapid urbanization, poor quality construction practices, ignorance or reluctance of implementing the building code, lack of risk preparedness and lack of general awareness among the population. The Gorkha Earthquake that struck the country on April 25, 2015, wreaked havoc especially in the central Nepal killing nearly 9000 and injuring more than 22 thousand people. Reducing the earthquake risk in Nepali society, earthquake awareness is important step of the earthquake risk management. The 2015 Gorkha Earthquake taught a big lesson that there are still conspicuous gaps in improvement of seismic performance of new constructions, and in earthquake preparedness for medical and emergency response.

With the view to enhancing earthquake disaster resilience of Nepal through increasing disaster awareness of people, communities and institutions and enhancing the capacity for implementing disaster risk reduction measures; reducing disaster risk of urban areas, public infrastructure and critical facilities through risk assessment, risk reduction planning and implementation, NSET, with support from USAID/OFDA, and many other partners, advocating and successfully implementing earthquake risk management initiatives in Nepal ever since its establishment. This project started on March 15, 2011 and concluded on 30 April 2015. The total capital cost of the project was 1.33 million USD.

NERMP was a logical continuation of the earthquake risk management efforts in Nepal that was started in 1997, and continued since 2001 as the Kathmandu Valley Earthquake Risk Management Action Plan Implementation Project (KVERMAPIP) implemented by NSET with core grant from Office of the Foreign Disaster Assistance (OFDA) / USAID. NSET Implemented the NERMP phase I from October 2007 to 2011 with the funding support from OFDA/USAID. NERMP-II is a part a follow up and continuation of the NERMP I (2005-2011), Action Plan Implementation Project (APIP, 2001-2006) and KVERMP (1997-1999).

NERMP2 was an effort to continue the momentum of successes achieved by its fore-runner project NERMP (2007-2011) in terms of earthquake awareness, earthquake preparedness at household and community levels, school earthquake safety, capacity building for earthquake resistant construction of non-engineered building constructed of local materials through training of masons and other stakeholders in building production mechanisms, partnership building and promotion among various stakeholders.

NERMP-2 had four key activities:

- Enhancing disaster awareness and capacity,
- Disaster risk reduction,
- Enhancing emergency response capacity, and
- Institutional strengthening for sustainability.

Each of these key activities consisted of several interrelated and mutually complimentary activities which provided comprehensiveness to the program and put all activities in a logical order. The program formed the backbone of Nepal's overall preparedness towards earthquake hazard, and influenced, to varying degrees, all main stakeholders in Nepal – from government agencies at central and local levels to donors, private sector businesses, the UN agencies and the NGOs. Several of the initial ideas in NERMP-2 were so strong that they were quickly replicated by other national and international partner agencies, bi-lateral, multi-lateral, and non-governmental ones. Training of masons, shaking table demonstration for earthquake awareness, mason training for earthquake resistant construction or seismic retrofitting, school earthquake safety program, and

so on have entrenched deeply into the lexicon of development and humanitarian programs of Nepal.

The key activities accomplished under the program were; 37 orientations on earthquake awareness to various construction stakeholders,24 mason trainings, Workshop with news editors of the major newspapers of Nepal on disaster risk reduction, Free earthquake clinics for 181 house owners, Building vulnerability assessment of 85 office and resident buildings, 44 Light Search and Rescue (LSAR) training for 1,072 people and 10 schools revisited as follow-up and re-assessment of 44 retrofitted schools.

ENHANCING THE HEALTH SECTOR CRISIS PREPAREDNESS IN THE EVENT OF HIGH INTENSITY EARTHQUAKE IN KATHMANDU VALLEY, NEPAL

Hospitals play a critical role during and immediate aftermath of any disaster incidents. At the times of big disaster like earthquakes, hospitals are required to provide health care services and treatment to many people. So, hospitals, health facilities and health workers should be ready and able to function well in the emergency time. They also needed to build strong health systems to be able to provide medical care during emergency. Apart from that, the first and foremost thing is that their buildings are needed to be resilient and withstand earthquakes so that they could carry out the prompt services.

Enhancing the Health Sector Crisis Preparedness in the Event of High Intensity Earthquake in Kathmandu Valley was the project funded by Save the Children and implemented by NSET during 15th August 2013 to 14th August 2014. As part of project, NSET provided technical service to carry out seismic non-structural vulnerability assessments (non-structural and functional) including WASH component followed by nonstructural retrofitting in two hospitals in two districts: Bhaktapur Hospital, Bhaktapur district and Patan Hospital, Lalitpur district. The total capital cost of the project was 51,266 USD.

It also carried out seismic structural, non-structural and functional assessments of nine health facilities in Kathmandu, Lalitpur and Bhaktapur districts, namely, Imadol health post, Jhaukhel health post, Duwakot health post, Luvu Primary health care centre, Chagunarayan Primary health care centre, Siddhipur Sub-Health Post, Ichangu Narayan health post, Siuchatar health post and Bishnu Devi health post to ensure structurally sound health facilities remain functional in the event of a major earthquake.

Some key activities accomplished under the project were;

- Conduct orientation program as the interaction with the hospital staff for Bhaktapur hospital staff.
- Conduct seismic non- structural vulnerability assessment of Bhaktapur Hospital and Patan Hospital.
- Prepare design, drawing and cost estimate of non-structural retrofitting in Bhaktapur Hospital and Patan Hospital.
- Purchase the nonstructural retrofitting items and implementation of non-structural retrofitting in Bhaktapur Hospital and Patan Hospital.
- Conduct Training Workshop on Structural and Non Structural Assessment and Retrofitting of Health Facilities in Kathmandu Valley for DTO, WSDO and health facility maintenance staff of Kathmandu, Lalitpur and Bhaktapur Districts.
- Conduct structural and non- structural assessment of nine health facilities in Kathmandu, Lalitpur and Bhaktapur districts: Imadol health post, Jhaukhel health post, Duwakot health

post, Luvu Primary health care centres, Chagunarayan Primary health care centres, Siddhipur Sub-Health Post, Ichangu Narayan health post, Siuchatar health post and Bishnu Devi health post.

- Prepare structural and non- structural assessment report along with cost estimation of nonstructural retrofitting for above mentioned nine health posts.
- Conduct a Dissemination workshop at the end of the project

URBAN WASH PREPAREDNESS AND COMMUNITY BASED DISASTER RISK REDUCTION

Funded by OXFAM, NSET implemented the **Urban WASH Preparedness and Community Based Disaster Risk Reduction** project during March 2013 to June 2014. As part of the project, NSET provided technical services for installation of one new deep tube well to enhance the readiness and capacity of two Internally Displaced Person (IDP) camp sites: National Agricultural Research Council (NARC), Khumaltar and Tribhuvan University (TU), Kirtipur to offer emergency drinkable water supply in the event of a major earthquake. The project also included the rehab of existing deep tube wells at NARC and TU and construction of generator house and water treatment plant with its components at both sites.

Some key activities performed under the project were;

- Provide design, drawing, cost estimate, specification and supervision of generator house building at TU.
- Provide design, drawing, cost estimate, specification and supervision of water treatment building retrofit at TU.
- Provide design, drawing, cost estimate, specification of generator house and 50,000 underground water tank at Deikhu, Kirtipur.
- Provide design, drawing, cost estimate, specification of water treatment Plant shed at NARC.
- Provide design, drawing, cost estimate, specification of water treatment units: Sedimentation tank, cascade aerator at NARC and TU along with nonstructural mitigations.

SEISMIC VULNERABILITY ASSESSMENT OF BUILDINGS OF WORLD FOOD PROGRAM SUB-OFFICE FACILITIES IN NEPAL

The project consists of Seismic Vulnerability Assessment of buildings of WFP sub-office within Nepal for its structural safety in the event of IX intensity earthquake.

Following are some key activities performed by project staff:

- Determination of probable earthquake intensity, soil condition and liquefaction potential at the building site
- Identification of the building typology based on construction materials and structural systems
- Detailed visual survey of the building
- Identification of strengths, deficiencies and structural vulnerability factors
- Identification of the building design criteria and structural system, and calculation of design shear forces and checking of stress in ground floor bearing walls or columns as required.
- Evaluation of performance of the building during IX intensity earthquake.

SEISMIC VULNERABILITY ASSESSMENT OF SIX BUILDINGS AT NEPAL RED CROSS SOCIETY PREMISES

The project consists of Seismic Vulnerability Assessment of six buildings within Nepal Red Cross Society Premises for its structural safety in the event of IX intensity earthquake.

Following are some key activities performed by project staff:

- Determination of probable earthquake intensity, soil condition and liquefaction potential at the building site
- Identification of the building typology based on construction materials and structural systems
- Detailed visual survey of the building
- Identification of strengths, deficiencies and structural vulnerability factors
- Identification of the building design criteria and structural system, and calculation of design shear forces and checking of stress in ground floor bearing walls or columns as required.
- Evaluation of performance of the building during IX intensity earthquake

DISASTER PREPAREDNESS FOR SAFER SCHOOLS IN NEPAL -2 (DPSS-2)

NSET implemented the Disaster Preparedness for Safer Schools in Nepal-II (DPSS-2) program with financial support from American Red Cross (ARC) during February 2011 to January 2014. DPSS-2 was designed based on experiences, outcomes as well as realizing the extensive need of disaster preparedness in vulnerable schools in Nepal from the Disaster Preparedness for Safer School in Nepal (DPSS) implemented during 2009 to 2010. The program was implemented in Nuwakot, Bhaktapur and Rasuwa districts. The program was continuation of the first phase adding one district. The total capital cost of the program was 217,000 US dollar.

The program was aimed at aware, train and prepare schools and communities for disaster safety and understanding safety concepts. It also included development and adaptation of training curricula on school-based disaster preparedness, delivery of training courses, preparation and implementation of school disaster preparedness plan, model of VDC level disaster preparedness plan, capacity building of local government, technical staff, community awareness and establishment of links between city community preparedness plan and school preparedness plan.

The project envisioned implementation of disaster preparedness training and disaster preparedness activities in selected schools of the three districts. The program was conceptualized for scaling up and consolidating the experiences and lessons of previous efforts. This program covered 30 schools from three districts namely; Bhaktapur, Nuwakot and Rasuwa.

The overall goal of the project was to reduce the number of deaths, injuries and socio economic impact from disaster through building safer and more resilient schools and communities.

The main objective of this project was the establishment of preparedness in schools and schools to the local communities. The specific objectives were,

- Improve disaster safety of public schools and communities through hazard awareness; improved disaster management skills among school children, teachers and parents; and by establishing proper disaster preparedness and response systems.
- Enhance the disaster management capacity of implementing organizations through building capacity of Junior Red Cross in schools, the Sub Chapters at the local level, and District Chapters at the district level for better response.
- Assist to institutionalize disaster safety concepts into the public education system by advocating the disaster safety concept.

Several activities such as institutional capacity building, development of trained human resources; net-working among local stakeholders, awareness raising, mitigation measures, and economic vulnerability reduction was integral parts of this project. Key approaches, modalities and lessons learned from DPSS-1 was applied during the project activities. To make disaster preparedness a

school priority, focus was given to share the school safer concept at the district, regional and national levels.

The program was implemented in 220 schools. Among them, the program has been implemented intensively in 55 schools (called core program schools) and the remaining 165 schools were oriented/educated through the core program schools. A total of 39,660 students, teachers and community members benefitted directly through the training programs, orientation and program interventions while 250,000 students, teachers and community members benefitted indirectly.

DISASTER PREPAREDNESS FOR SAFER SCHOOLS IN BANGLADESH (DPSS BANGLADESH)

NSET implemented the program during August 1, 2012 to January 1, 2014 in Bangladesh with the funding support received from American Red Cross. The capital cost of the program was 107,000 USD. The main goal of the program was to reduce impact of disasters by building safer and resilient schools and communities. The objectives of the program were:

- Improve disaster safety of public schools through increased hazard awareness; improved disaster management skills among school children, teachers and parents; and by establishing proper disaster preparedness and response systems and
- Increase disaster awareness of communities through disaster awareness and training programs and campaigns using schools as entry point.

Bangladesh Red Crescent Society (BDRCS) and relevant government organizations at different levels were the implementing partners at national level. Schools, local NGOs, professional societies, foundations, and community have been considered to be the partners at the local levels.

DPSS in Bangladesh was a component of regional program proposed to be implemented in few countries of Asia namely, Nepal, Bangladesh and China. The initial stage of the program was implemented in Nepal during 2009 to 2010 and it was highly successful in terms of raising disaster awareness and mobilizing Red Cross district chapters, schools and the communities for disaster preparedness in the schools and communities. Disaster awareness from schools to household by children and household to community through parents became a prime element. The program was the extension of the same program with inclusion of experiences and lessons learned from Nepal.

CAPACITY DEVELOPMENT FOR SCHOOL SECTOR PROGRAM IMPLEMENTATION

In view of increasing vulnerability of schools to seismic safety, Government of Nepal and Asian Development Bank (ADB) agreed to undertake disaster risk management (DRM) activities in the education sector through the School Sector Reform Plan (SSRP). This project was implemented by NSET during December 2012 to July 2014 (20 months) with the support from Asian Development Bank, Nepal Resident Mission. The total capital cost of the project was 3, 12,100 US dollar.

The goal of the project was to enhance school safety under Output 3: Safer Schools as part of the ADB-assisted School Sector Program. With the Government of Australia's co-financing of \$3.46 million, the program targeted to retrofit 260 school buildings in the Kathmandu Valley and awareness building for teachers and students in the selected schools, and training in retrofitting for engineers and masons.

Some key activities accomplished under the project were,

- Formulation of a planning and implementation framework for the government's school safety program;
- Review of the school safety action plan for implementation of Output 3 under the Program;
- Preparation of manuals for detailed assessment and retrofitting designs;
- Seismic vulnerability assessment and retrofit design of 50 school buildings
- Technical support to retrofit 50 school buildings;
- Development of training materials for training to engineers, masons and awareness programs
- Training of 140 engineers and sub-engineers;
- Awareness building program for 500 teachers and 10,000 students; and
- Training on retrofitting for 400 masons.

PROGRAM FOR ENHANCEMENT OF EMERGENCY RESPONSE STAGE-III (PEER-3)

NSET implemented the PEER-3 with core grant received from U.S. Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA). The program was started on April 2009 and concluded on March 2014. This was a continuation of (PEER Stage II), a regional training program managed by NSET with a purpose to strengthen and institutionalize capacities in emergency and disaster response in six participating Asian countries viz. Bangladesh, Indonesia, India, Nepal, Pakistan and the Philippines. The total capital cost of the program was 3.5 million US dollar.

The overall goal of PEER was to reduce mortality in mass casualty events and increase survival rates of disaster victims in the selected target countries of Asia. The PEER Stage 3 was categorized under USAID/OFDA's program sector: Risk Reduction (Natural and Technological Disasters), Sub-Sector: Disaster Preparedness, Mitigation and Management Developing regional instructors for Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR) and Training for Instructor (TFI) was a primary objective of PEER. The main focus was to continue development of qualified instructors in MFR and CSSR courses in identified partner training institutions in each of the six program beneficiary countries. MFR, CSSR, TFI and related components of the third phase of PEER implemented by NSET. Other components implemented by ADPC/Bangkok.

MFR Course aimed at providing individuals with first response tasks the knowledge and skills necessary to assess, provision of appropriate pre-hospital care and transport sick or injured patient as a result of an emergency or disaster. CSSR Course aimed at providing individuals with collapsed structure rescue tasks the knowledge and skills necessary to search for, stabilize and extricate victims trapped in collapsed structures using the safest and most appropriate procedures.

Some key activities accomplished under the program were;

- Program planning with nodal agencies through country planning meeting;
- Program Training Courses (MFR, CSSR, TFI, MFRIW, CSSRIW) conduction in country and regional level;
- Databases management of PEER graduates and instructors;
- Support on nationalization and institutionalization of PEER courses in PEER countries.
- Give technical input to ADPC to conduct HOPE courses in Nepal and other PEER partner countries.

During PEER Stage 3, NSET completed a total of 88 various program activities in six PEER beneficiary countries in this period. In the original Five-Year Work Plan of NSET, there were a total

of 71 program events, composed of meetings, workshops and training events that was mainly directed towards instructors' development. The graduates belong to key emergency response organizations, from the national and local governments, non-government and volunteer sector. The development of skilled instructors also provided the program with sufficient number of course coordinators and course monitors

These PEER-certified instructors were tapped to facilitate in-country PEER courses, and regional instructors were also invited to assist other PEER countries, in their instructors' development. PEER instructors were also participated and delivered other related initiatives in DRR and emergency/disaster preparedness and response.

PEER countries, in general, manifested a very positive response and expressed a strong need for continued capacity building in emergency preparedness and response and assured NSET of a strengthened commitment for PEER-3. The original plan for PEER-3 constituted training of 24 MFR and 24 CSSR instructors in each of the six program beneficiary countries. Producing 24 MFR and 24 CSSR instructors was equivalent to implementing one series of six PEER instructors' development courses, namely two MFR + one CSSR + one Training for Instructors (TFI) + one MFR Instructors' Workshop (MFRIW) + one CSSR Instructors' Workshop (CSSRIW)].

SUPPORT TO DEVELOP RISK SENSITIVE LAND USE PLAN (RSLUP) AND BUILDING BYE-LAWS OF KATHMANDU VALLEY

Under the program "Support to Develop Risk Sensitive Land Use Plan (RSLUP) and Building Byelaws for Kathmandu Valley", NSET together with Genesis Consultancy and Earthquake Safety Solutions (ESS) conducted training of Municipal Engineers/ Planners/ Architects on Risk Sensitive Land Use Planning. The project was focused within the area of Kathmandu Valley. In addition to this, engineers were invited from the municipalities of outside the Kathmandu Valley, as well as planners from other relevant organizations including Government Institutions, Academia etc. for the training. The second phase of the work was training for the trainers, about the delivery of the training skills. This includes design of trainer's course, and implementation of the training. The total capital cost of the project was NPR 19,151,613.74

ENHANCING EMERGENCY HEALTH AND REHABILITATION RESPONSE READINESS CAPACITY OF HEALTH SYSTEM IN THE EVENT OF A HIGH INTENSITY EARTHQUAKE IN KATHMANDU VALLEY

NSET implemented the project during November 2011 to February 2013. As part of project implementation, Medical Emergency Relief International (Merlin) and NSET signed a contract for structural and non-structural assessment and non-structural mitigation in one health center. The DIPECHO-funded project was implemented on behalf of Merlin, in a consortium with WHO, Handicap International and Oxfam. The main objective of the program was to increase readiness and response capacity of health authorities, health institutions and community for an earthquake in Kathmandu Valley. The total capital cost of the project was NRs. 46,00,000 million.

Under the project, various activities were accomplished including selection and Structural and Non-Structural assessment of 3 hospitals, namely, Tribhuvan University Teaching Hospital (TUTH), Civil Services Hospital (CSH) and Birendra Sainik Hospital (BSH) and 2 rehabilitation centers, namely, Army Rehabilitation Center (ARC) and National Disability Fund (NDF) in Kathmandu Valley, Non-Structural retrofitting of 2 hospitals, TUTH and CSH, with WASH components and structural and non-structural assessment of 1 community hospital, 5 primary

health care center (PHCC), 4 health posts (HP), 3 sub-health posts(SHP) in Kathamndu Valley selected by District Development Committee (DDC).

TECHNICAL SERVICES FOR STRENGTHENING RISK SENSITIVE LAND USE PLANNING AND IMPLEMENTATION (RSLUP) IN NEPAL

This project was implemented during September 2011 to February 2013 by NSET in partnership with Earthquakes and Megacities Initiative (EMI) which provided technical assistance to UNDP for Strengthening Risk Sensitive Land Use Planning and Implementation (RSLUP) in Nepal. The total cost of the program was 127,000 US dollar.

The primary aim of the engagement was to provide technical support for the integration of risksensitive land use planning in local development processes and building by-laws primarily in Kathmandu Metropolitan City and draw from the learning process ways to extend risk sensitive land use planning to selected municipalities in Kathmandu Valley through the conduct of consultations, dialogues, advocacy, and planning activities.

This project was in support of the Comprehensive Disaster Risk Management Program (CDRMP) in accordance with the Nepal Risk Reduction consortium. The CDRMP aimed to strengthen the institutional and legislative aspects of DRM in Nepal, by building the capacities of Ministry of Home Affairs, other ministries, and local governments. The CDRMP also established strategic linkages between DRM and development sectors in Kathmandu Valley. The specific activities of the program ware to;

- Collect baseline information and data on land use planning in Kathmandu Valley which was proved to be useful for risk sensitive land use planning (RSLUP),
- Conduct orientation to the relevant stakeholders of Kathmandu Valley on RSLUP and organize consultation workshops,
- Prepare training courses for different target groups on RSLUP and conduct training courses,
- Develop advocacy tools and awareness materials on RSLUP,
- Review and validate the draft RSLUP developed in the past for Kathmandu Metropolitan City (KMC) through consultation meetings and workshops,
- Develop consolidated RSLUP Framework including identification of Key stakeholders, their roles and responsibilities and a broad work plan for entire Kathmandu Valley.

The learning experiences of the project helped in the local and national planning system in drafting a Risk Sensitive Planning Framework useful for Municipalities and VDCs within the Kathmandu Valley in its preparation of a risk sensitive land use plan. It also served as the continuing step to provide a better understanding of the planning process, institutions involved, plan outputs, review and approval process, and implementing tools to ensure a blueprint towards sustainable urban development of the Kathmandu Valley and its component cities and municipalities and VDCs.

RESILIENCE AND DISASTER RISK REDUCTION (DRR) CAPACITY BUILDING PROGRAM FOR THE EARTHQUAKE RECOVERY AND DISASTER RISK REDUCTION PROJECT IN EASTERN NEPAL

With the major objectives of providing Disaster Risk Reduction Capacity Building trainings and guidance to community to prepare District Disaster Preparedness and Response Plans, NSET implemented the program during 1 August, 2012 to 31 March, 2013 with the funding support received from DFID under the ERDRR project. It was implemented in four districts, namely,

Bhojpur, Khotang, Sankhuwasbha and Terhathum in Eastern Nepal. The total budget of the program was 61,000 US dollar.

This program focused on trainings to engineers, sub-engineers, assistant sub-engineers, masons and other skilled construction workers. As part of program activities, NSET were involved in Training delivery and supervision activities of the following training programs:

- Basic Technical Training,
- Training for Instructors,
- Master Mason Training
- Mason training Supervision, Community Based Disaster Risk Reduction,
- Sensitization on DRR to Districts, and DPRP review, CBDRR for social mobilize and TFI for School based disaster preparedness.

DEVELOPING VIDEO TOOLKIT FOR EARTHQUAKE SAFE BUILDING PRACTICES IN NEPAL

In order to promote the awareness among the general population, audio/visual materials are considered one of the effective means. With view to promote awareness for earthquake safe building practices in Nepal, NSET has also been developing and distributing various kinds of Video Toolkit to distribute to its targeted stakeholders in the past.

This program was implemented during 1 August, 2012 to March 31, 2013 with the funding support received from UNDP Nepal under the program called CBDRMP implemented by NSET. The total capital cost of the program was 75,000 US dollar.

The objectives of the program were; to support in the awareness raising/demand creation among existing and prospective house owners regarding earthquake building construction practices following NBC provisions and dissemination of useful tips to the mid-level technicians/masons in the field of construction business and simplification of the provision of codes and its implementation in simple language. The toolkit covered process of all the key activities in a simple residential building construction process right from the foundation to roofing works including the structural and non-structural safety of the buildings.

The toolkit was prepared in a serial order as per the activities in the building construction. Each serial was of 15-20 minutes for one construction activity e.g. one episode for foundation work. In this way there were a series of episodes of the documentaries with more than 12 episodes that were prepared on the basis of key activities in the building construction in RCC framed structure as well as load bearing brick masonry construction.

INSTITUTIONAL CAPACITY BUILDING OF DOE/RED/DEOS/RCS ON EARTHQUAKE PREPAREDNESS PROGRAM IN SCHOOLS UNDER THE SCHOOL EARTHQUAKE SAFETY PROGRAM (SESP)

This project was implemented by NSET under the School Earthquake Safety Program (SESP) program in September 2012. The program was implemented with the financial assistance of UNICEF. The total capital cost of the program was 14,000 US dollar.

The main objectives of the project were the institutionalization of earthquake preparedness in schools of Kathmandu valley and development of methodology to cover entire schools of Nepal. The major specific objectives of the project were to; a) Develop set of standard training materials

for different target groups (Resource persons, Teachers, Students) on earthquake preparedness in schools; b) Develop set of master trainers on earthquake preparedness who will capable of conducting training to teachers; c) Support DoE/RED for the implementation awareness raising among students, teachers and staff members of the schools on earthquake safety through simulation exercise; d) Facilitate on preparing training plans for the targeted schools in participation of concern education personal of the districts.

The training was conducted in close cooperation and coordination with Government of Nepal (GoN), Department of Education, Regional Educational Directorate- Central Region (RED-CR), National Center for Education Development (NCED), UNICEF, District Education Office of Kathmandu, Lalitpur and Bhaktapur.

This project successfully trained 24 persons as master trainers on earthquake preparedness from three districts of Kathmandu valley, who become capable of conducting training to teachers, developed set of standard training materials (5 Days TOT Manual) with view to guide the resource persons to carry out further trainings in resource center level and a set of 3 days training manual to help the trained teacher to implement the earthquake preparedness activities in the Schools.

The TOT covered present earthquake risk of Nepal and Schools vulnerability, need of Education in Emergencies, Emergency preparedness planning in School, training management and proposed curricula for teachers training and earthquake drill procedure and it was conducted in close cooperation and coordination with GON, Department of Education, RED-CR, NCED, UNICEF, District Education office of Kathmandu, Lalitpur and Bhaktapur.

ENHANCING EMERGENCY HEALTH AND REHABILITATION RESPONSE READINESS CAPACITY OF HEALTH SYSTEM IN THE EVENT OF A HIGH INTENSITY EARTHQUAKE IN KATHMANDU VALLEY-DIPECHO-VI

The project was implemented during October 2011- September 2012 as per the contractual agreement between NSET and Oxfam GB Nepal and NSET provided technical assistance for the implementation of earthquake vulnerability reduction measures in water supply system of hospitals in Kathmandu Valley. The objective of the program was to reduce mortality, morbidity and disabling consequences in mass casualty events in Kathmandu Valley within the WHO lead project. The total capital cost of the project was 26,800-pound sterling.

Among the various activities accomplished, some of the major accomplished activities under the project were;

- Assess seismic vulnerability of structural and non-structural aspects of water supply systems in selected 3 hospitals (Tribhuvan University Teaching Hospital TUTH, Civil Services Hospital CSH and BirendraSainik Hospital BSH) and 2 rehabilitation centers (Army Rehabilitation Center ARC and National Disability Fund NDF) in Kathmandu Valley.
- Improve and ensure secure and independent water supply system in TUTH
- Assist in stockpiling emergency water supply materials at TUTH
- Design a deep tube well or new treatment plant at TUTH and assist in installation of the deep tube well/ treatment plant unit
- Enhancing risk awareness and capacity of hospital maintenance & housekeeping staff on maintaining water supply functions in the event of earthquakes.

TECHNICAL SUPPORT TO DEPARTMENT OF EDUCATION ON DISASTER RISK MANAGEMENT IN EDUCATION

In view of an increased vulnerability of schools to seismic safety in Nepal, the Government of Nepal and Asian Development Bank (ADB) agreed to undertake disaster risk management (DRM) activities in the education sector through the School Sector Reform Plan (SSRP). The goal of the program was to enhance school safety under Output 3: Safer Schools as part of ADB-assisted School Sector Program. A total of 7 schools within the Kathmandu valley were retrofitted as a pilot project in the second phase. NSET implemented the project during December 2011 to June 2012 with the financial assistance received from Asian Development Bank. The total capital cost of the project was 32,400 US dollar.

Some key activities performed under the project were; selection of 7 potential school building for retrofit, conducting qualitative and quantitative seismic vulnerability assessment of 7 school buildings in Kathmandu valley and developing appropriate retrofitting options and design for retrofit of 7 school buildings.

TECHNICAL SUPPORT TO DEPARTMENT OF EDUCATION ON DISASTER RISK MANAGEMENT IN EDUCATION

In view of an increased vulnerability of schools to seismic safety, the Government and Asian Development Bank (ADB) agreed to undertake disaster risk management (DRM) activities in the education sector through the School Sector Reform Plan (SSRP). As a result, the ADB-assisted School Sector Program (the Program) seeks to enhance school safety under Output 3: Safer Schools. 7 schools within the Kathmandu valley are to be retrofitted as a pilot project in the second phase.

Following are some key activities performed by project staff:

- 1. Select 7 potential school building for retrofit
- 2. Conduct qualitative and quantitative seismic vulnerability assessment of 7 school buildings in Kathmandu valley.
- 3. Develop appropriate retrofitting options and design for retrofit of 7 school buildings.

DISASTER RISK MANAGEMENT - EDUCATION

In view of an increased vulnerability of schools to seismic safety, the Government and Asian Development Bank (ADB) agreed to undertake disaster risk management (DRM) activities in the education sector through the School Sector Reform Plan (SSRP). This project was implemented by NSET during April 2011 to December 2011. The total capital cost of the program was \$ 42,900. The main objective of the project was to enhance school safety under Output 3: Safer Schools of the ADB-assisted School Sector Program (the Program). Under this project, 15 schools within the Kathmandu valley are to be retrofitted as a pilot project in the initial phase. In addition to this, trainings in seismic vulnerability assessment and retrofit design is provided to engineers from Department of Education.

Some key activities performed under the project were;

• Provide technical guidance to the Department of Education for school earthquake safety program to implement earthquake vulnerability reduction activities in 15 schools of Kathmandu valley.

- Provide technical guidance to the Department of Education for School earthquake safety program to implement earthquake vulnerability reduction activities in 15 schools in Kathmandu valley.
- Conduct qualitative and quantitative seismic vulnerability assessment of 15 school buildings in Kathmandu valley.
- Develop appropriate retrofitting options and design for retrofit of 15 school buildings.
- Provide trainings to engineers and sub-engineers on seismic vulnerability assessment and retrofit design of buildings.

TECHNICAL SERVICES FOR STRENGTHENING IMPLEMENTATION OF NATIONAL BUILDING CODES (NBC) IN NEPAL

The UNDP–Nepal funded program was implemented by NSET in 2011. The goal of the program was to strengthen the institutional and legislative aspects of disaster risk management (DRM) in Nepal. NSET implemented "Support Quality and Implementation of Nepal National Building Code (NBC)" in five municipalities of Kathmandu Valley. The total capital cost of the program was 101,000 US dollar.

Providing support for quality and implementation of Nepal National Building Code (NBC) was the overall objective of the program. Its specific objectives were; a) To support Ministry of Physical Planning and Works (MPPW) and pilot municipalities to prepare replication strategy for awareness-raising on Nepal NBCs implementation, b) To develop a public private partnership strategy (with building material suppliers, manufacturers, banks, insurance industry etc) for awareness raising on EQ safe practices, c) To support MPPW to formulate action plan and to activate the Notational Committee to upgrade and implement NBC, d) To develop a building code implementation guidelines and regulatory mechanism for five municipalities of KV and integrate NBC stipulations into building production process and e) To validate and finalize existing curricula for masons and engineers trainings on earthquake resistant construction technology as Standard National Curricula through conducting test courses

Major activities of the project were; (1) Support Ministry of Physical Planning and Works (MPPW) and pilot municipalities to prepare replication strategy for conducted activities for public awareness raising employed by UNDP and other organizations in recent projects. (2) Develop a public private partnership strategy (with building material suppliers, manufacturers, banks, insurance industry etc) for awareness raising on EQ safe practices, and for development of quality control assurance plan/mechanism for building materials production and supply. (3) Support MPPW to formulate action plan and to activate the Nat'l Committee to upgrade and implement NBC. (4) Organize consultation and sensitization meetings with Ministry of Local Development (MoLD), MPPW and risk prone municipalities in Kathmandu valley (KV) to establish a mechanism for enforcing NBCs, review regulatory systems and develop a draft implementation guideline/strategy to integrate NBCs into building permit system at municipality level. (5) Support to Department of Urban Development and Building Construction (DUDBC) to update, finalize and endorse manuals and training course curricula that are developed under ERRP through at least 4 training courses (2 for masons and 2 for engineers), implement and monitor application of the manual and training courses and update and finalize the tools based on feedback. (6) Enhance capabilities of five risk prone select municipalities for replication and promotion of seismic safe construction practices/implementation of NBC in partnership with other municipalities with support of National Volunteer Services. (7) Organize consultations for enabling engineering universities and poly techniques to include multi hazards risk reduction and NBCs issues in their regular, mandatory course curriculum.

The project objective was set quite broad and its influence constituency encompassing a wide variety of actors from a resident to those involved in the construction of the building and producer/suppliers of construction materials and quality insurers to the permit-giving officials and agencies and the policy formulators and the related ministries.

COMMUNITY BASED DISASTER RISK MANAGEMENT IN NEPAL (CBDRM-N)

NSET implemented the project with the funding support from Lutheran World Relief during 2010 to 2011 in Kathmandu and Lalitpur with active participation of concerned local government. The total budget spent during the program was 104,000 US dollar. This project was aimed at institutional development, capacity building and sustainable activities in disaster risk reduction at the community level. The 15-month project had six major objectives related to empowering the grassroots community including women, children, and people with disabilities, under privileged and marginalized population.

The activities included awareness and education, training programs, drill and model structural and non-structural mitigation to community light search and rescue exercises.

PREPARATION OF MASON TRAINING GUIDELINE AND MASON TRAINING MANUAL ON EARTHQUAKE RESISTANT CONSTRUCTION OF BUILDINGS

Providing awareness and trainings to masons is a critical aspect of earthquake resistant construction practice. Construction of residential buildings in a developing country like Nepal is primarily carried out by the informal sector, mostly the owner/builders. In the Nepali context where more than 90% of the buildings are non-engineered, masons are the key actors who translate designs into reality and they are commonly serving as the "best technical hands" available for building construction. Therefore, masons need to be aware of the technology they are working with in order to ensure optimum, efficient and effective use of the building materials and the construction processes of earthquake resistant construction building. For this, a standard Mason Training Guideline and Mason Training Manual on Earthquake Resistant Construction of Buildings is essential.

This project was implemented in 2005 with the financial support from ADPC. At that time and still today, significant proportions of residential and public buildings are non-engineered and majority of them do not conform to the prevailing building codes. The curriculum for mason training was an attempt to consolidate the experiences of mason training gained KVERMP/AUDMP. It served as the curriculum for training the masons, and used by local professionals in training the mason for enhancing the skills of earthquake-resistant techniques in non-engineered constructions. It also helped to guide for the house-owner, and also for the mason involved in owner-built constructions in remote villages. It formalized the training materials, training exercises, and the approaches of such training that were found useful.

The total budget used for the program was 7,500 US dollar. NSET developed the training Guideline for mason, Training Manual for Mason on Earthquake Resistant Construction of Buildings and training manual for Nepal National Building Code (NBC) on Earthquake Resistant Design of Buildings/Nepal National Building Code and its Implementation Strategy.

The program includes capacity building through training, sensitizing people and giving awareness as well as establishing linkages with partners at different levels to maximize efforts to be prepared for and respond to disasters more effectively.

The objective of the training program was to increase awareness and build the capacity at the local level on earthquake resistant construction. The main goal was to reduce the impact of potential earthquakes on seismically vulnerable communities in Nepal.

PREPARATION OF TRAINING MANUAL ON EARTHQUAKE RESISTANT DESIGN OF BUILDINGS/NEPAL NATIONAL BUILDING CODE AND ITS IMPLEMENTATION STRATEGY

In Nepal, majority of buildings are being built without proper structural safety considerations. Effective enforcement of building codes and control system could be the major steps to reduce the loss of life and properties.

Building codes generally do not specify good practice, but simply a level of resistance to forces to be attained based on the best known data. Despite the tragic loss of life and property caused by the earthquake, it provides an opportunity to learn how to be better prepared for larger earthquakes and how to mitigate the damaging effects of future earthquakes. The National building code was established in Nepal in 1994 and was enacted in 2003. But the implementation is limited to a few municipalities only. The total budget used for the program was 7,500 US dollar.

DISASTER PREPAREDNESS FOR SAFER SCHOOLS IN NEPAL (DPSS) IFIRST PHASE)

School buildings in Nepal are highly vulnerable to different kinds of disasters. Disaster awareness and preparedness at the schools is very low. Hence, there is urgent need of disaster preparedness in vulnerable schools in Nepal. Realizing this need, National Society for Earthquake Technology - Nepal (NSET) conceptualized and implemented a program "Disaster Preparedness for Safer Schools in Nepal (DPSS)" jointly by Nepal Red Cross Society (NRCS) and NSET in Nepal with the funding support from American Red Cross (ARC). The program was implemented in 50 schools from two districts, namely, Bhaktapur and Nuwakot during November 2009 to October 2010.The total budget of the program was 224,000 US dollar.

DPSS was conceptualized as a regional program proposed to be implemented in few disaster prone countries of Asia. The program was designed to increase disaster awareness and improve the disaster safety of schools and communities through awareness, training and capacity building activities. Initially, the program was implemented in Nepal and based on the experiences and lessons of the initial phase, it was extended to other countries.

The overall Goal of this program was to reduce impact of disasters by building safer and resilient schools and communities for which the set objectives were to;

- Improve disaster safety of public schools
- Increase disaster awareness of communities
- Assist institutionalization of disaster safety concepts

Various activities were conducted under the program. As part of the objective 1, development and adaptation training curricula carried out. Likewise, various training programs including School Based Disaster Preparedness Training of Trainers (SBDPTOT), Basic Disaster Management Training (BDMT), Basic First Aid Training (FA), Light Search and Rescue Training (LSAR), Disaster Preparedness Planning/Vulnerability & Capacity Assessment Training (DPP/VCA). Were conducted. Similarly, various Disaster Risk Reduction and Preparedness Activities including Vulnerability and risk assessment, Formation of Student Disaster Safety Clubs, strengthen Junior/Youth Red Cross (J/YRC), Preparation and implementation of School Disaster Preparedness and Response Plan, providing support for Students' Summits in districts, organizing

School Disaster Preparedness Drill, and Developing Handbook on School Disaster Preparedness were implemented.

As part of Objective 2, community Disaster Awareness Sessions and Awareness Campaigns including orientation sessions to parents, community people and the leaders on concepts of hazards, disasters, preparedness and mitigation and disaster safety rallies were held. Likewise, under the objective 3: Assist institutionalization of disaster safety concepts, the activities like District and local level stakeholder meetings, Preparation of Draft National Strategy for Institutionalization of Disaster Preparedness in Schools, Involvement of key government and non-government institutions of education sector in the program, Program Advisory Committee at Central Level and Dissemination and Advocacy were conducted.

With close coordination with NRCS and District Education Office, a total of 25 schools have been selected in each district to implement the program. And out of 50, 20 schools (10 in each district) have been selected as core program school for entire program intervention. A (5-7 member) Program Steering Committee responsible for making necessary decision and providing assistance to the program team as per the need has been formed in each program district, Nuwakot and Bhaktapur.

Further, in order to mobilize and disseminate the message of disaster preparedness through junior and youth Red Cross Circle intensive session on disaster preparedness was provided to the District Level Junior/Youth Red Cross workshop held in both districts during February 2010.

Outputs / beneficiaries

- 650 teachers & management committee members and 5,700 students trained on Disaster Preparedness
- 400 teachers, students & community people trained on Light Search and Rescue and First Aid
- 20 schools prepare Disaster Preparedness Plan and conduct annual drill
- Disaster awareness of approximately 10,000 people of 20 communities increased
- 20 small disaster mitigation projects
- Students' Summit at district and national level
- Central government institutions, line agencies at districts, and other related stakeholders involved in the program
- Draft of National Strategy for Institutionalization of Disaster Preparedness in Schools
- Disaster Recovery Principles and Guidelines

COMPARATIVE RISK ASSESSMENT IN HUMLA DISTRICT

NSET conducted a comparative risk assessment in Humla district in 2009. The goal of the project was to identify villages or clusters of villages at higher risk of being affected by natural disasters, where to conduct further Community Based-Disaster Risk Management (CB-DRM) activities as stated in the DIPECHO proposal. The total budget allocated for the program was 20,000 US dollar.

The primary objective of the program was to identify and map the areas/villages more at risk of multiple hazards in selected VDCs of Humla and review the present risk assessment procedure and model in order to adapt it to Nepali context. The Secondary objective was to review in collaboration with Mission East the present risk assessment procedure and model in order to adapt it to Nepalese context.

NSET with support from Mission East Nepal in the framework of ECHO funded DIPECHO-V program in South East Asia, conducted a comparative rapid risk screening within 7 VDC among 31 of the district as per the contract made on 26 August 2009 between NSET and Mission East (ME) Nepal with the main objective to identify and map the areas/villages more at risk of multiple hazards.

Under the project, a team composed of Natural Hazard and Risk Assessment experts, geologists, community motivators and Participatory Vulnerability Assessment (PVA) experts from NSET visited the selected villages to conduct the community meetings in each village during August-September 2009 and received the information in the form of questionnaire and social maps. The team closely assessed the existing hazards, vulnerabilities and potential risks.

During the study, it was observed that the capacity of the local people to cope with disaster risk was very low due to low level of preparedness and ineffectiveness of awareness campaigns. So, an effective awareness campaign (leading towards preparedness) would be the crucial very first step for the disaster risk reduction process in the region. Unless the potential victims are aware, the risk will remain the same even after the implementation of several risk mitigation programs.

For giving continuity to the project, the first of the foreseen series of workshop on "Review of Disaster Management in Humla District" was organized in Simikot by KIRDARC and Mission East with technical assistance from NSET. The workshop helped to share the Disaster Scenario and existing Disaster Management System in Nepal. It also shared of the findings of Comparative Risk Assessment conducted by NSET in collaboration with Mission East in August 2009. Likewise, it also reviewed the existing Disaster Management System in Humla with special focus to current status of Disaster Response, Preparedness and Mitigation Activities in Humla.

Major Findings

After field study, the collected information including the opinions of community people and experts observation during the field visit were combined for the comparative risk assessment of the selected villages.

The information of 31 villages collected during the field survey was entered in a format developed by Mission East Nepal. The format is designed in such a way it generates a fact sheet containing major information of the villages. Finally, based on fact sheet information it quantitatively calculates the level of capacity, vulnerability and hazard etc. Hence considering different aspects, the villages could be prioritized for the further programs of DRR.

The quantitative risk assessment of list of villages calculated by the software is presented in the table 34. The villages based on different aspect, are grouped as very high risk, high risk, medium risk and low risk indicated by red, orange, yellow and green color respectively. However, the villages could be selected for further DRR programs setting different criteria such as: (1) considering the result calculated by the software itself, (2) considering spatial coverage (by VDCs), (3) considering the impact on resources/infrastructures

DEVELOPING A STRATEGY FOR IMPROVING THE SEISMIC SAFETY OF SCHOOLS IN NEPAL

NSET implemented the program during August 2008 to June 2010 with the support of the World Bank. The total capital cost for the program was 224,000 US dollar. The overall objective of this project was to develop a strategic framework for improving the seismic safety of schools in Nepal and for related public awareness raising and capacity building. The program was implemented

jointly with the Department of Education, Ministry of Education; Government of Nepal. Two Districts, Lamjung and Nawalparasi were been selected for the implementation of pilot projects.

The major components of project include;

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

The program identified six schools for intervention in Lamjung and Nawalparasi. In this districts, three existing structures, and three earthquake-resistant reconstructions were carried out as part of program.

Some key activities accomplished under the project were;

- Developing and implementing a pilot program to identify physical structural-seismic retrofitting needs of schools, and replicable, specific retrofitting measures to scale up and improve school safety across the country;
- Developing a replicable agenda and program for mainstreaming DRR at the school level through awareness raising and related capacity building;
- Developing a pilot program for training of the local construction industry in seismic retrofitting techniques;
- Developing an integrated strategic framework for improving the seismic safety of schools across the country, through a scaling up of the different pilot programs.

PREPARING BACKGROUND PAPER ON EX-ANTE AND EX-POST INVESTMENT ESTIMATES IN DISASTER RISK REDUCTION (EDRR) AT THE COUNTRY LEVEL/NEPAL

This project was implemented by NSET during December 2008 to January 2009. The Global Facility for Disaster Reduction and Recovery (GFDRR)/World Bank and the United Nations International Strategy for Disaster Reduction (UNISDR) jointly commissioned an assessment on the EDRR. As the part of project, NSET prepared the background paper for GFDRR/World Bank on ex-ante and ex-post investment estimates in Disaster Risk Reduction at the country level (Nepal) for this Assessment work.

One of the themes studied as part of the Assessment on the EDRR was balancing ex-ante and ex-post actions and role of public intervention in Disaster Risk Reduction. In this project, EDRR anticipated to estimate country level figures on how much is invested on ex-ante Disaster Risk Reduction measures in contrast to ex-post relief, recovery and reconstruction measures.

The examined investments made across various sectors; examined investments across different kinds of natural disasters; made best estimates of the total public investment made in DRR, both ex-ante as well as ex-post relief, recovery and reconstruction for the period 1998-2007.

COMPREHENSIVE RISK MAPPING IN TRIYUGA, UDAYAPUR

The Comprehensive Risk Assessment and Action Planning project was implemented during November 2008 – January 2009 by NSET in Triyuga Municipality funded by Action Aid Nepal. It was implemented as an additional initiative of Action Aid Nepal under the project "Surakshit Samudaya: Building Safer Community through Disaster Management Initiatives" supported by European Commission through its Humanitarian Aid department under the Fourth DIPECHO Action Plan for South Asia. The capital cost for the activities under the project was 74 000 US dollar/Rs. 542,982.50

The principal objective was to undertake a comprehensive multi-hazard risk mapping and develop appropriate DRR action plan for Ward No. 2 & 5 of Triyuga Municipality, Udaypur District by combining GIS and participatory vulnerability methods to arrive at the analysis of total risk of the target area and generating appropriate action plan to address those risks.

Some key activities performed under the projects were; risk mapping of the two proposed wards, developing Risk Profile, formation of Risk Management Plan for District Administration for the two wards, Risk Mapping exercise and letting people be able to use the document as an advocacy tool to seek government support to reduce risks and vulnerabilities.

RISK MAPPING AND SHELTER RESPONSE PLANNING PROGRAM

This project was implemented during February 2008 to June 2008 aiming at application of simplified RADIUS methodology to the cities of Kathmandu (Nepal) and Maputo (Mozambique) for effective pre-disaster and post-disaster shelter planning with financial support from UN-Habitat. The goal of the program was: "Improved capacity to predict and address post-disaster shelter recovery needs and shelter planning". The specific objectives of the project were:

- Conduct earthquake risk assessment using simplified tool such as Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters (RADIUS) for effective pre-disaster and post-disaster shelter planning
- Develop guide and strategy for addressing shelter needs which will help the contingency planning process by shelter related stakeholders and
- Develop guidelines and training materials for shelter response planning and strategy development based on the experiences to replicate these activities in other cities.

This application includes the testing and calibration of this methodology in two locations; development of a guide, strategy for addressing shelter needs in risk analysis and contingency planning by ESC members and other shelter stakeholders. This guide was planned to 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 was planned to be utilized to design guidance for using this methodology in high risk countries around the world. A guide and training modules was developed to facilitate the quick and effective large-scale implementation of this methodology.

Some major activities accomplished during the project period were:

- Use of a calibrated and widely accepted methodology for the development of Shelter Response Strategic Plans for earthquakes;
- Development of Shelter Response Strategic Plans for Kathmandu and Maputo Cities
- Training to officers both at local and international level in the application of RADIUS tool

- Development of a long-term strategy that would allow the methodology to be replicated elsewhere in the world to prepare Shelter Response Strategic Plans
- Increase awareness and knowledge of existent risk among government and humanitarian professionals through the documented application of RADIUS methodology.

The major output of the program includes preparation of shelter Response Strategy and Plan for Kathmandu Valley, Guidelines for Risk Assessment and Shelter Response Planning and Strategy and conducting of training Course, materials and strategy Earthquake Risk Assessment, Shelter Response Planning and Strategy Development.

EARTHQUAKE VULNERABILITY REDUCTION AND PREPAREDNESS PROGRAM (EVRP) IN MUZAFFARABAD AND MANSEHRA MUNICIPALITIES -PAKISTAN

NSET provided technical support to National Disaster Management Authority (NDMA) of the Islamic Republic of Pakistan under the project "Earthquake Vulnerability Reduction and Preparedness Program in Muzaffarabad and Mansehra Municipalities." This project was implemented during November 2007 to August 2009 in the support of United Nations Development Program (UNDP).

The project aimed at building institutional structures, policies, and systems to integrate earthquake vulnerability reduction in the two municipalities. The main objective of the technical support was to develop local capacity on risk assessment, earthquake scenario development and action planning. The main approaches were:

- Involvement of all concerned stakeholders like technical agencies, academic and research institutions, local governments, line agencies and civil society
- 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 and
- Development of core group of professionals to conduct similar type of projects in other cities in Pakistan

The project employed a multi-pronged strategy, combining 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 major activities were:

- 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
- Conducting building inventory survey of all individual buildings in Muzaffarabad, Mansehra and Quetta City
- Review of collected information and preparation of vulnerability maps
- Preparation of earthquake hazard maps from available secondary information
- Guide on Risk analysis and preparation of risk maps

- Organizing meetings with stakeholders for interaction on developed risk maps and their capacity to tackle such situation
- Organizing earthquake scenario and action planning workshop
- Writing earthquake scenario and action planning documents

The project was built around a partnership approach where it brought 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.

Further, a separate project consisting of similar objectives and activities was initiated for Quetta City in Balochistan Province of Pakistan. Training for local professionals on methodologies of earthquake risk assessment was conducted by NSET professionals in September 2008 later the trained professionals collected, compiled and analyzed information and data required for the risk assessment.

COMPREHENSIVE DISASTER MANAGEMENT PROGRAM – BANGLADESH

The Comprehensive Disaster Management Program (CDMP) of the Government of Bangladesh (GoB) was implemented by NSET in association with the Ministry of Food and Disaster Management (MoFDM) and supported by UNDP, DFID-B and the EC. The program was implemented at three cities Dhaka, Chittagong, Sylhet City during January 2008 to May 2009. The total cost allocated for the program was Rs. 8,032,000 million/ 200,000 US dollar.

CDMP was 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.

NSET in association 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) 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 and
- Contingency Planning for Dhaka, Chittagong and Sylhet city corporation areas.

The program aimed:

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

The major activities performed under the program were;

- Development of Seismic Hazard and Vulnerability Mapping of Dhaka, Chittagong and Sylhet City Corporation areas

- Development of training drills, advocacy and awareness in different cross-section of the people from government officials to community level in Dhaka, Chittagong and Sylhet City Corporation Areas.
- Development of comprehensive geo-hazard risk reduction 'Contingency Planning' strategy for an easy implementation of framework to address the current needs and issues in City Corporation Areas.

DISASTER RISK REDUCTION THROUGH SCHOOL PROJECT (DRRSP)

The project was implemented during October 2007 to September 2009 in 4 districts of Nepal. As part of project implementation, an MOU was signed among NSET, Action Aid Nepal, Centre for policy research and consultancy CPReC), Education Network (ED Net) and Disaster Preparedness Network (DPNet), to implement the Disaster Risk Reduction through School Program in Kathmandu Valley, Makwanpur, Rasuwa and Banke Districts.

The overall goal of the project was to reduce people's vulnerabilities to disasters by contributing towards the implementation of the Hyogo Framework whereas the objective is to make schools in higher disaster risk area, safer and enabling them to act as a locus for disaster risk reduction and to engage the education sector in the Hyogo Framework of Action(HFA).

The key activities accomplished under the project are:

- Carry out safety review of schools selected for piloting DRR in four districts of Nepal in the context of local natural hazards and suggest for repair, retrofit or rebuilding of schools
- Provide technical assistance to local partners at district level in their initiatives towards making schools physically safer
- Conduct initiatives / activities to ensure that new school buildings adhere to building codes
 that incorporate disaster resilience
- Carry out initiatives for the strengthening of public school's safety in NEPAL.
- Organize national policy influencing workshops for integration of DRR in school curricula and school safety
- Organize HFA sensitization workshops / seminars involving government, especially education sector and the civil society
- Develop DRR IEC materials for schools and civil society
- Coordinate with other National partners

PRELIMINARY RESEARCH ON EARTHQUAKE SAFETY OF STONE MASONRY BUILDINGS

The project was implemented during the December 2007 to March 2008. NSET with support from Building Research Institute (BRI) conducted a research on Earthquake Safety of Stone Masonry Buildings. The total cost of the project was NRs. 100,400 million. The preliminary Research on Earthquake Safety of Stone Masonry Buildings aimed at exploring available knowledge on earthquake safety of stone masonry buildings and try to identify exact research direction and needs.

The main research objectives were:

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.

The activities performed under the program were;

- 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, on-going researches, references and information dissemination materials
- Identification of research direction and needs to conduct further research.

MUNICIPAL DISASTER RISK REDUCTION PROGRAM IN NEPAL (MDRIP)

In order to identify and characterize potential natural hazards within and surrounding the two municipalities of Ilam and Panauti of Nepal, to assess the risks associated with the hazards, especially seismic risk, and to assist the two municipalities to develop action plans for earthquake risk reduction and emergency response planning under the Municipal Disaster Risk Identification Project (MDRIP), NSET implemented the project under the Global Risk Identification Program (GRIP) of UNDP/Bureau for Crisis Prevention and Recovery (BCPR) with the funding assistance from United Nations Office for Project Services (UNOPS) during February 2008– December 2008.

The project was implemented the in close collaboration with a variety of stakeholders in the two municipalities, and national level government institutions. This project was conducted under the High Resolution Risk Analysis stream of activities of the GRIP, a program launched by UNDP highlighting the importance of Disaster Risk Reduction in achieving the Millennium Goals. Rich experiences of NSET prompted it to embark upon a program Urban Disaster Risk Atlas of Nepal. The total budget used for the program was 30,000 US dollar. MDRIP covered in two municipalities as pilot areas. The program gradually covered all 58 municipalities of Nepal. It was envisioned that the project could help replication of the successful experiences and lessons learned so as to achieve a uniform and enhanced level of DRM capabilities in other municipalities in Nepal.

The goal of the program was: "Improved Disaster Safety of urban areas of Nepal through participatory risk assessment, capacity building, planning and implementation of disaster risk reduction measures including building codes and preparedness initiatives for effective disaster response." The objectives of the program were:

- Enhance the capacity of program municipalities in Earthquake Risk Reduction and Emergency Response,
- Institutionalize Disaster Risk Management Practices in program municipalities including consolidation of past achievements for mainstreaming Disaster Risk Reduction into Municipal Development Planning Process.

The project had two-pronged strategies. The first was to strengthen the municipal capacities by institutionalization of the process of disaster risk reduction and consolidation of the build-up capacities by follow-up activities and second was start the process of disaster risk reduction.

Some major activities accomplished under the project were; earthquake Risk Assessment of the municipalities, municipal Disaster Risk Reduction and Response Master Plan preparation, implementation of Disaster Risk Reduction Initiatives, capacity building of municipal authorities

and professionals on earthquake resistant design and supervision, mason training and community awareness on earthquake resistant construction technology among others.

The major outcomes of the program were identifying the multi-hazard Disaster Scenario for both the municipalities and carrying out disaster Risk Reduction Action Plan for two municipalities. It also developed trained human resource (Engineers, Technicians and Masons) on earthquake-resistant construction technology (22 engineers and 30 masons were trained in Ilam, 30 masons in Panauti were trained) along with increasing the awareness of House-owners on disaster safety.

GLOBAL ASSESSMENT REPORT ON THE STUDY ON DISASTER-POVERTY LINKAGE

This project was implemented during July 2008 to August 2008. As part of the project, NSET provided consulting service to UNDP/Nepal to implement a study on disaster-poverty linkage in Nepal as one of the pilot studies of the Global Assessment Report executed by UN-ISDR and prepare a country report on "Study of natural disaster-poverty relationship" for Nepal.

The main objective of the study was to see the relationship between disaster and poverty as part of the DesInventar project. Under the project, NSET prepared country profile of natural hazards, disasters, poverty profile, and risk-poverty interface analysis for the Nepal. As part of its responsibilities, NSET analyzed data and prepared country report and submitted to UNDP.

THIMPU VALLEY EARTHQUAKE RISK MANAGEMENT PROJECT

The project was implemented during April 2007 to April 2008.NSET provided a short-term technical advice for the follow-up to the Thimpu Valley Earthquake Risk Management Program in Thimpu, Bhutan as part of a contractual agreement with Standards & Quality Control Authority, Ministry of Works and Human Settlement, Royal Government of Bhutan. The total capital cost of the program was 78,000 US dollar.

The objectives of the program were;

- To conduct detailed seismic evaluation of two buildings (one RCC and one masonry),
- To come up with different retrofitting options with complete drawings
- To implement the retrofitting of one building
- To train the local engineers and artisans and
- To develop Guideline on the seismic evaluation and retrofitting techniques for future reference
- To conduct structural and non-structural seismic vulnerability assessment of buildings,
- To develop the standard guidelines and provide training to engineers.

The major activities that NSET conducted under the project were;

- Conducted seismic vulnerability assessment of one masonry and one RC Building (structural and non-structural).
- Identified retrofitting options for improved seismic performance and select the optimal solution in consultation with specialists and authorities of the concerned offices of the Royal government of Bhutan and UNDP
- Prepared detailed design and drawings for the selected option, one for each building
- Provided guidance and required level of supervision for the retrofitting and non-structural vulnerability reduction actions

- Documented the process and develop it into the form of a standard guideline for Seismic Vulnerability Assessment and Mitigation for Masonry and RC Buildings by incorporating additional materials so that the Guidelines could be used in future works in Bhutan by local specialists, especially those trained during this project
- Provided on-the job training to the counterpart Bhutanese Engineers in structural and nonstructural vulnerability assessment, design and implementation of retrofitting and nonstructural vulnerability reduction.
- Provided guidance and advice on the selection and procurement of equipment and software for vulnerability assessment and analysis.
- Conducted awareness-raising programs in the community; and
- Facilitated and coordinated for involvement of all key stakeholders in the program implementation through meetings, workshops and visits.

AWARENESS RAISING AND CAPACITY BUILDING FOR EARTHQUAKE RISK REDUCTION

This project was implemented during July 2007 to June 2008. Department of Urban Development and Building Construction (DUDBC) and NSET collaborated for the implementation of awareness raising and capacity building programs for earthquake risk reduction in 75 districts of Nepal. The total capital cost of the project was five million rupees.

The major the objectives of the project were;

- To accomplish the programs of DUDBC in a professional manner with highest quality of work
- To utilize the significant experience of NSET in conceptualizing and managing earthquake risk reduction efforts to implement the DUDBC planned activities and
- To institutionalize the earthquake risk mitigation concepts, knowledge and practices into the regular functioning of DUDBC initiative and make risk reduction a national priority.

Some of the key activities performed under the project were,

- Conduction of training for DUDBC engineers, mason, contractor, municipal engineers
- Conduction of training on Building Vulnerability Assessment and Damage Assessment
- Development of Retrofit design; Implementation and development of retrofit norms
- Development of recommended system, associated checklists and guidelines for building code implementation and monitoring
- Organization of annual earthquake safety day
- Review and publication of existing building code and other related document

COLLABORATIVE RESEARCH AND DEVELOPMENT ON NETWORK OF RESEARCH INSTITUTES IN EARTHQUAKE PRONE COUNTRIES

This project was implemented during October 2007 to March 2008 in which NSET and National Graduate Institute for Policy Studies (GRIPS) of Japan made two separate research agreements to a) 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) collect information on disaster education of ordinary people at community people, mainly through internet and publications. The capital cost of the project was NRs. 480,000 million.

As per the agreement on joint research, a study survey of total 800 households around the community of Kathmandu-2 was completed. As discussed, and agreed with GRIPS, NSET had selected the households in Ward no. 13 and 17 of Kathmandu Metropolitan City (KMC) for field survey. The reason behind the selection of the two wards is that the Disaster Management Committee (DMC) of Ward no. 17 was effectively working on disaster preparedness activities and Community of Ward no. 13 of KMC was one of the highly populated areas of KMC. The field survey was extremely successful to understand the earthquake risk perception among community people.

The major activities performed under the program were;

- Complete Study survey of total 800 households around the community of Kathmandu-2 of Kathmandu Metropolitan City.
- Collect information on disaster education of ordinary people at community level, mainly through internet and publications.
- Complete study survey of national/local government officers those responsible for disaster risk management or safer building construction at national level. Complete study survey of the targeted house builders or head masons those who are actually constructing the conventional or common houses, particularly in urban areas.
- Organize workshop and share the survey results with different stakeholders

NEPAL EARTHQUAKE RISK MANAGEMENT PROGRAM (NERMP)

This project was started on Oct 1, 2005 with the funding support from Office of the Foreign Disaster Assistance (OFDA) of the USAID and concluded on September 30, 2008. The capital cost of the project was 786,568 US dollar/ Thirty-four million four hundred eighty-six thousand.

NERMP is the logical continuation of a long term efforts of NSET in reducing earthquake risk in Kathmandu Valley and Nepal, which OFDA / USAID has been supporting since 1997.

Improving seismic safety of Nepal is the broader objective of the project and improving seismic safety of public schools, residences and public infrastructures as well as institutionalizing earthquake risk management in Kathmandu are the specific objectives. The major goal and objective of the project was improving earthquake safety of Nepal through earthquake vulnerability reduction and preparedness initiatives is the goal of the program. The specific objectives of the program were: a) to improve seismic safety of public and private schools, critical facilities, residences and public infrastructures and b) to institutionalize earthquake risk management practice in Nepal.

Some key activities of the project were to improve earthquake safety of schools – by implementing the School Earthquake Safety Program (SESP), help institutions to improve seismic safety of critical facilities, improve seismic performance of new constructions in Kathmandu Valley, assist in enhancing structural and non-structural safety of public institutions, provide technical assistance to the municipalities for implementing seismic building code, conduct training programs for masons, technicians, engineers, business community, and conduct free and mobile earthquake clinics for the house owners, increase earthquake awareness - Help organize Earthquake Safety Day (ESD), Jointly conduct community Radio Programs on Earthquake Safety, assist Municipalities in Improving Disaster Preparedness, institutional Capacity Development of NSET.

Various activities accomplished under the project were;

Assist municipalities/municipal professionals in implementing seismic provisions of building code;

- Provide trainings to the engineers, architects, technicians, contractors and masons on the aspects of earthquake-resistant construction technology;
- Seismic vulnerability assessment of critical facilities, lifeline structures and public buildings within Kathmandu valley, suggest vulnerability reduction measures and assist in implementation of suggested measures;
- Design and implement earthquake-resistant school buildings under the School Earthquake Safety Program (SESP), these include both for new constructions and retrofitting of existing vulnerable buildings, raise awareness of teachers, students, parents and common people and provide on-the-training to the local masons;
- Provide lectures and orientation classes for various communities on the aspects of earthquake risk reduction and preparedness, the community ranges from international community residing in Kathmandu to the business people and the local communities;
- Design shake table, model buildings and other tools for training and awareness-raising and demonstration;
- Advocacy for better policy environment; and
- Design and implementation of various awareness-raising programs jointly with many local, national and international organizations.

The project helped NSET to continue the Earthquake Risk Management (ERM) efforts in Nepal and to implement selected activities in selected communities in Nepal. It also allowed NSET to provide technical support to the efforts of other agencies wishing to invest in ERM in different parts of Nepal.

The major outputs of the program were; improved seismic safety of public and private school system of Kathmandu Valley, improved Seismic Safety of Hospitals and Water Supply System of Kathmandu Valley, improved seismic performance of residential and public buildings of Kathmandu Valley, emergency Response and Disaster Preparedness Plan developed and made operational in the critical facilities systems, 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,, significantly raised level of awareness on earthquake safety and enhanced Community-based Emergency Response Capacity.

PROGRAM FOR ENHANCEMENT OF EMERGENCY RESPONSE-II (PEER-2)

This was a regional program managed by NSET in close collaboration with the national government agencies of six Asian countries. The program was implemented during April 2003 to March 2008. This phase of PEER (2003-2008) with extension up to March 2009 included the initial four PEER countries: Nepal, India, Indonesia and the Philippines with the addition of Bangladesh and Pakistan in 2003 and 2006 respectively. This program was a continuation of a regional training program initiated in 1998 by the U.S. Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA) to strengthen disaster response capacities in Asia. International Resources Group, the Center for International Emergency, Disaster and Refugees Studies of John Hopkins University, and Safety Solutions Inc. supported with a purpose to strengthen and institutionalize capacities in emergency and disaster response in six participating Asian countries. The total budget used for the program was 8.9 million US dollar.

The goal of the program was to reduce mass casualty and increase survival rates of disaster victims. The main objectives of the program were to:

- Establish and strengthen the capability of PEER countries to provide collapsed structure search and rescue and basic & advanced life support, beginning with the first responder and continuing through the medical facilities,
- Develop a training system that continually provides disaster response with qualified personnel for search and rescue and medical first response and medical facilities prepared to receive victims,
- 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 core components the program were:

- Training Course Design, Development, Adaptation and Translation
- Training Courses at the Regional, Sub-regional, National and Local Levels
- Instructor Development and Certification
- Institutionalizing the Training.

Developing a regional cadre of instructors for Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR) and the Hospital Preparedness for Emergencies (HOPE) and Training for Instructor (TFI) is a primary objective of PEER. The three principal courses for PEER were MFR, CSSR, HOPE and TFI and other two courses are Training for Instructors Hand-off Workshop and Medical First Responder Instructor Workshop (MFRIW).

Some activities performed under the program were;

- Program planning with nodal agencies through country planning meeting;
- Program Training Courses (MFR, CSSR, TFI, MFRIW, CSSRIW, HOPE, HOPE-TFI) conduction in country and regional level;
- Databases management of PEER graduates and instructors;
- Support on nationalization and institutionalization of PEER courses in PEER countries.
- Develop Multi-hazard HOPE Course for all six countries

The major achievement of the program was accomplishment of 56 different programs in the region during program period. The course produced 811 graduates and 340 IW graduates for MFR, 637 graduates and 279 IW graduates for CSSR, 533 TFI graduates, 628 graduates and 196 IW graduates for HOPE developed for PEER region. In addition to this PEER produced 55 Master Instructors and 20 K9 experts in the region. The courses are based on principles of adult learning and include testing and evaluation to ensure that participants acquire and can sufficiently perform the life-saving skills and tasks taught in the courses.

COMMUNITY BASED DISASTER MANAGEMENT PROGRAM IN KATHMANDU VALLEY

With the main goal of enhancing the disaster safety of selected communities in Lalitpur District through awareness campaigns, trainings and institutionalization of the disaster risk management process in the local governance system for the sustainability of such initiatives by building the capacity and knowledge of the community, this the program implemented during February 2007 to June 2007 Lalitpur Sub- Metropolitan City. NSET implemented Community Based Disaster Management Program in Kathmandu valley with financial support from Oxfam GB Nepal.

The specific objectives of the program were; a) Capacity building of communities and their institutions to design and implement disaster risk reduction and preparedness activities, b) Capacity building of municipal wards authorities and officials on disaster risk reduction,
preparedness and effective response and c) Institutionalize the Disaster Risk Management (DRM) initiative at various levels of local governance (Ward level and Municipality Level).

Some key activities accomplished under the project include;

- ✓ Capacity building of communities and their institutions to design and implement disaster risk reduction and preparedness activities,
- Capacity building of municipal wards authorities and officials on disaster risk reduction, preparedness and effective response
- ✓ Institutionalize the Disaster Risk Management (DRM) initiative at various levels of local governance (Ward level and Municipality Level).

EARTHQUAKE SAFETY CONSTRUCTION SKILL TRAINING FOR MASONS AND CONSTRUCTION TECHNICIANS

The project was implemented during January 2007 to May 2007. Under the LWF DIPECHO-CPDRR component, NSET provided technical assistance to the Lutheran World Federation (LWF), Nepal in implementing the Earthquake Safety Construction Skill Training for Masons and Construction Technicians in Bhadrapur, Gaur, Bhaktapur, MaddhapurThimi, Kirtipur Municipality and Kathmandu Metropolitan. The capital cost of the project was NRs five million. The main objective of the project was enhancing knowledge and skills of masons and construction workers of specified municipal areas on the earthquake-resistant construction technology.

Some key activities performed under the project include;

- Capacity enhancement of municipal construction technicians for incorporating earthquakeresistant construction technology, disseminating the technology and in implementing earthquake risk management activities,
- Dissemination of earthquake resistant construction technology including the retrofitting technology for existing buildings to the key role players of the building construction process
- Include municipal authorities in the training process and help them to initiate the process of promoting safer building construction practices.
- 70 masons and construction technicians in Bhadrapur Municipality of Jhapa, 70 in Gaur Municipality of Rautahat and 350 in Kathmandu Valley (total 490) have been trained on earthquake-resistant construction technology.

QUALITATIVE EARTHQUAKE VULNERABILITY ASSESSMENT OF UN HOUSE IN THIMPU, BHUTAN

A study for the qualitative earthquake vulnerability assessment of UN House in Thimpu Bhutan was undertaken during August 2007 to October, 2007 under the contract agreement with United Nations House in Bhutan. The total capital cost of the project was 8440 US dollar \$ 12,000.

The methodology of assessment was based on FEMA 310 customized for building types in Bhutan and the region and used a set of checklists. The findings of the assessment was concluded with best engineering judgment arrived at from the available structural drawings, site visit, study of structural systems, non-destructive test carried out at site using Hilti PS 200 Ferro scan detector and smidth test hammer at few possible locations, prevailing practices of building construction in the region and study of previous reports on Seismic Assessment and Seismic Retrofitting/Strengthening Design carried out in October 2004.

A preliminary indication of location risk in terms of earthquake safety was done based on the study of structural and non-structural components and relatively safe and unsafe places were identified in the building. Identification of non-structural components and possible mitigation measures were also described in the report.

This report was prepared based on previous reports on Seismic Assessment and Seismic Retrofitting/Strengthening Design carried out in October 2004. The report was prepared to provide accurate and authoritative seismic vulnerability assessment of the building in the given circumstances of information provided by the client on the details of the building and limited number of field tests.

Some major activities accomplished under the project include,

- ✓ Conduct a survey to determine the structural and non-structural vulnerability assessment of UN House, Bhutan.
- ✓ Assess progression of structural vulnerability of the building by conducting the new assessment and comparing with results of prior seismic assessment carried out in 2004.
- ✓ Identification of relatively safe and unsafe places inside the building.
- ✓ Identification of Vulnerable Non-structural Elements on the basis of visual observation.
- Compilation of report detailing procedures and presenting findings and recommendations for improving their seismic resilience.

SEISMIC VULNERABILITY ASSESSMENT AND RETROFITTING FOR BRITISH EMBASSY BUILDINGS IN KATHMANDU VALLEY

NSET started the project with seismic vulnerability assessment of Chancery building of British Embassy in Kathmandu in 2006. After which, seismic vulnerability assessment of 21 buildings were conducted till June 2011 that included office buildings and staff residences . The methodology adopted was similar to Guideline on "Seismic Vulnerability Evaluation Guideline for Private and Public Buildings; Part I: Pre Disaster Vulnerability Assessment" prepared by NSET and published by Department of Urban Development and Building Construction, Government of Nepal. This guideline is based on FEMA 310 and "IS guideline on seismic evaluation and strengthening of buildings" and customized for Nepal building types. Amongst 21 buildings that were assessed, 10 buildings were designed for seismic retrofitting and implementation was carried out in five staff residences. All buildings assessed were masonry buildings either in mud or cement mortar except one.

UP-STREAMING COMMUNITY BASED APPROACHES FOR PROMOTING SAFER BUILDING CONSTRUCTION IN LORESTAN, IRAN

The project was implemented during December 2006 to October 2007 after an Institutional Contract between UNDP/Iran and NSET was made. The overall objective of the program was upstreaming community based approaches for promoting safer building construction specifically:

- To discuss on community-based approaches for promoting safer building construction and explore potentials of the use of such approaches in Iran,
- To select/localize/customize different available tools and developing new tools for promoting safer building construction through mobilizing community and capacity development of end users,
- To discuss on possible modes of implementation and the role of different stakeholders, and

• To identify the related policies for supporting these activities and to suggest for favorable policy if felt necessary by the stakeholders.

The project was articulated and implemented jointly by UNDP-Iran and NSET considering mainly three facts:

- Community-based approaches are necessary, especially in not-so-well organized construction sector, where control mechanisms for construction do not ensure 100% safety and quality of buildings, and the compliance with codes and by-laws is poor and especially when the main work is being done by lower-category contractor (Petty contractor),
- Up-streaming of community-based approach is necessary also to improve seismic performance of existing, already built, non-engineered constructions, prevalent especially in rural areas,
- Engineering and control mechanism is excellent in Iran, the need is to internalize the excellence into daily life and strengthen the compliance with the well-developed codes through encouraging demand for safety among people and filling the gap of technical knowledge between building workers and engineers.

The activities performed under project include; organization of a series of consultation meetings with all concerned stakeholders to understand, discuss the prevailing community-based methods, tools and programs, and to develop the same for possible collaboration between different stakeholders for safer building construction. The other activities were organizing final workshop by inviting all concerned stakeholders to consolidate ideas raised during consultation meetings; to select best tool/s to pilot/scale-up; to build consensus on the roles of stakeholders.

PROGRAM FOR STRENGTHENING CAPACITIES FOR DISASTER RISK MANAGEMENT IN IRAN

This was a five-year Joint National Program of UNDP-Government of Iran implemented for Strengthening Capacities for Disaster Risk Management. NSET provided technical assistance to Asian Disaster Preparedness Center (ADPC)/Thailand. The program was implemented in Kerman and Gorgan during September 2006 to December 2007.

The goal of the program was to reduce disaster vulnerability and prevention of loss of lives and damages to properties human settlements, infrastructure, and critical facilities in the Islamic Republic of Iran.

The major activities performed under the project include;

- Develop and make disaster risk and risk management information easily accessible for advocacy and decision making in Iran, to link disaster risk management policies to practice by working at the local and intermediate level and demonstrating how disaster risk management actions are implemented.
- Pilot risk management projects across horizontal and vertical risk management stakeholders with a focus on one natural hazard (earthquake) in an urban context.
- Facilitate knowledge networking in the area of disaster risk management in the Central and Southwest Asian Region.

DISASTER PREPAREDNESS AND RESPONSE PLAN FOR SAFE DRINKING WATER IN THE KATHMANDU VALLEY, LALITPUR SUB-METROPOLITAN CITY (DPRP)

This project was implemented in Lalitpur Sub- Metropolitan City during the period of October 2006 to August 2007. NSET provided technical assistance to UNICEF/Nepal in making Disaster Preparedness and Response Plan for Safe Drinking Water for Lalitpur Sub-Metropolitan City with financial support from European Commission through its Humanitarian Aid department. The total capital cost of the program was 64,000 US dollar.

The project had two components, notably:

- Development of an outline of a Comprehensive Framework of Disaster Preparedness and Response Plan for the Lalitpur Sub-Metropolitan City (LSMC), emphasizing the linkages between the different critical facilities and emergency response services, and
- Development and implementation of pre-positioning of water supply at identified potential evacuation site ensuring a minimum supply of safe water after a scenario earthquake resulting in IX MMI intensity of shaking.

The main objective of the project was to contribute to the Disaster Preparedness and Response of LSMC by building local capacities. Its specific objectives were:

- To develop an outline of a Disaster Preparedness and Response Framework,
- To identify the potential evacuation sites within LSMC, and,
- Select existing tube wells, which are accessible to the identified evacuation sites and make them earthquake resistant.

Under the project various tasks including seismic vulnerability assessment of existing and identified water wells, identification and implementation of possible structural and non-structural interventions, and encouraging wider ownership of the experiences gained, lessons learned were the main activities that were carried out with wide consultations and participation of all stakeholders.

The key activities of the projects were; development of an outline of a comprehensive Framework of Disaster Preparedness and Response Plan, development of a disaster preparedness response plan for safe drinking water in LSMC for scenario disaster condition, and dissemination of the Disaster Preparedness and Response Plan and the findings of the Well assessment and encourage wider ownership of the experiences gained, lessons learned, and the proposed recommendations for further enhancing disaster preparedness and participation of all stakeholders.

The major outputs were identification of possible evacuation sites, selection of deep tube wells, detail assessment and retrofitting the selected deep tube well system, preparation of Disaster Preparedness Response Framework (DPRF).

COMMUNITY-BASED DISASTER MANAGEMENT PROJECT (CBDMP)

The CBDMP was formulated to initiate Community Based Disaster Management initiatives at three wards of each of the selected six municipalities in Central and Western Development Regions of Nepal. The project was initiated in April 2006 and was completed in September 2007 with the support of UNDP Nepal. The selected municipalities were: Putali Bazar Municipality, Syangja, Vyas Municipality, Tanahu, Bharatpur Municipality, Chitwan, Hetauda Municipality, Makwanpur, Malangwa Municipality, Sarlahi ,Kamalamai Municipality, Sindhuli.

The overall goal of CBDMP was to enhance the safety of communities vulnerable to natural disasters and protect common property and community resources in select disaster prone districts through appropriate capacity building measures at community, district and central levels and supporting and replicating community-based disaster mitigation initiatives that preferably enhance livelihood opportunities. The specific objectives to fulfil the targeted goal of the project were:

- Public awareness-raising,
- Formation of Community Disaster Management Groups,
- Capacity building of communities and their institutions to design and implement disaster risk reduction and preparedness activities
- Capacity building of municipal authorities and professionals on disaster risk mitigation
- Institutionalize the Disaster Risk Management (DRM) initiative at various levels of local governance.

The activities accomplished under the project were; Public awareness-raising, Capacity building of communities and their institutions to design and implement disaster risk reduction and preparedness activities, Capacity building of municipal authorities and professionals on disaster risk mitigation, Institutionalize the Disaster Risk Management (DRM) initiative at various levels of local governance, Seismic vulnerability assessment of the school and other building selected by the municipality, Disaster Management Awareness training at schools selected by the municipality, consultation meetings and workshops, formation of Community Disaster Management Groups (CDMG), Disaster Mitigation and Capacity Building Programs, Vulnerability Assessment Training to the CDMGs, Facilitate Planning and implementation of Community level Mitigation program, Training on Disaster Management Leadership training for women, Training Program on HIV/Aids, Violence against Women and Girl Trafficking, Training Program for Capacity Building of Municipality professionals on DM.

The project succeeded to formulate the 18 Ward Level Disaster Management Committees. Likewise, project enhanced the security of men and women vulnerable to natural disasters and protect common property and community resources in selected disaster prone districts through appropriate capacity building measures at community, district and central levels and supporting and replicating community-based disaster mitigation initiatives that preferably enhance livelihood opportunities.

RISK SENSITIVE LAND USE PLAN OF KATHMANDU METROPOLITAN CITY, MAINSTREAMING DISASTER RISK REDUCTION IN MEGACITIES, A PILOT APPLICATION IN METRO MANILA AND KATHMANDU

NSET and Earthquakes and Megacities Initiative (EMI) implemented a project "Risk Sensitive Land Use Plan of Kathmandu Metropolitan City, Mainstreaming Disaster Risk Reduction in Megacities, a Pilot Application in Metro Manila and Kathmandu during 2006-2010. This project was supported by the German Federal Foreign Office (FFO) through the German Committee for Disaster Risk Reduction (DKKV). The main objective of the project was to ensure that the detailed land use plan of KMC fully integrates disaster risk reduction provisions within its spatial and physical development strategies, its regulatory and non-regulatory planning tools, and its related bylaws, regulations and procedures.

NATIONAL STRATEGY FOR DISASTER RISK MANAGEMENT IN NEPAL (NSDRM)

NSET provided technical assistance to UNDP in assisting the Government of Nepal in preparing the National Strategy for Disaster Risk Management (NSDRM) in Nepal based on Hyogo Framework of Action (HFA) with financial support from European Commission through its Humanitarian Aid department. The total budget of the program was 25,000 US dollar/ Rs. 1,087,703 million. It was implemented during October 2006 to July 2007.

The project was aimed at drafting strategy documents for eight specified sectors: Agriculture and Food Security, Health, Education, Shelter, Infrastructure and Physical Planning, Livelihood, Water and Sanitation, Information, Coordination and Logistics, and Search and Rescue, Damage/Need Assessment and will also address cross cutting issues such as Human Rights and Protection, Gender and Social Inclusion, Staff Safety and Security and Decentralization and Local Self Governance. All these collectively have constituted the consolidated National Disaster Strategy on DRM. The strategy had expected to provide the road map for all sectors to prepare sector specific programs for DRM and formulate the necessary policy decisions for facilitating mainstreaming DRM into the development process.

The major activities of the project were to review of policies, guidelines, acts, regulations and other related literature on Disaster Risk Management, consult with technical experts, national and international institutions, prepare and present Inception Report to Steering Committee and to the stakeholders during Inception Workshop on NSDRM, hold consultation meetings with member of Central Natural Disaster Relief Committee (CNDRC) as well as steering Committee members, assist UNDP in holding half day sectoral workshops and final sharing workshop, prepare sector specific strategies after getting feedback, comments and suggestions from the stakeholders and prepare final strategy document based on HFA guidelines after getting feedback, comments and suggestions from the stakeholders.

The outcomes of the project were contributing to National Strategy for Disaster Risk Management of Nepal including specific strategic priorities or various key development sectors, wide engagement and participation of stakeholders in the strategy development process resulting in greater ownership of the process and the outcome, enhancing awareness on HFA 2005-2015 and its implication for DRM in Nepal and ensuring ownership of DRM process by stakeholders.

SEISMIC VULNERABILITY ASSESSMENT OF SAUDI PAK TOWER IN ISLAMABAD, PAKISTAN

Seismic vulnerability assessment of the Saudi Pak Tower in Islamabad, Pakistan was done by National Society for Earthquake Technology-Nepal in April 2006. The main objective of the task is to evaluate the seismic safety of the existing building with recommendations for improving the structural as well as non-structural performance of the targeted building. The assessment of the building was done based on the best engineering judgment arrived at from the site visit, study of available drawings, non-destructive test carried out at site at few possible locations. The evaluation involves detail structural analysis, use of set of checklists, calculation for critical checks and identification of potential weakness in the buildings.

TRAINING SUPPORT FOR EARTHQUAKE RESISTANT RECONSTRUCTION IN PAKISTAN (TSERR)

This project was implemented during March 2006 to July 2007. NSET assisted the Earthquake Reconstruction and Rehabilitation Authority (ERRA) of the government of Pakistan by providing technical assistance in designing capacity building strategy for housing reconstruction and by imparting training to various construction stakeholders under the program. With financial support from OFDA of USAID, NSET provided technical support working in close co-ordination with UN-HABITAT. The total cost of the program was 355,212. US dollar.

The basic objective of the program was to assist the UN-HABITAT Chief Technical Advisor in Pakistan to implement the Training Strategy in close collaboration with the Emergency Shelter Project Manager and staff of ERRA. The specific objectives were;

- To provide training on earthquake resistant construction for masons and other stakeholders of building industry
- To assist in the development of training policies and in enhancing capacity of technical and non-technical personnel involved in earthquake reconstruction of houses
- To develop suitable training curricula and training materials for various target groups

The scope of work for NSET were, 1. Review and updating existing guidelines on earthquake resistant housing reconstruction, 2. Development of training curricula and training materials, 3. Assist in development of training strategy and compliance strategy, 4. Implementing a training of trainers (ToT), 5. Assisting the development of an operational manual for urban housing reconstruction, and 6. Supporting the implementation of a public awareness campaign.

As part of the project, 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. NSET developed training curricula and training materials for various target groups based on its experience in conducting similar training programs in Nepal and elsewhere. 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 in the remote areas of northern Pakistan.

Under this support, series of end-user training programs for masons, technicians, engineers and house-owners, Training of Trainers for potential master trainers have been conducted; construction guidelines, checklists and posters have been published. A total of 5,505 people comprising of technical professionals, construction workers and the army officers of Pakistan were trained by NSET- or NSET-trained local trainers in around 130 training events conducted between February and August 2006. A total of 28 master instructors and 850 other trainers were developed during the project. The training curricula developed were adapted to 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.

CAPACITY BUILDING AND KNOWLEDGE MANAGEMENT: INSTITUTIONALIZATION OF EARTHQUAKE PREPAREDNESS IN SCHOOL OF EARTHQUAKE AFFECTED AREAS OF PAKISTAN (CBKMP)

This project was implemented during November 2006 to April 2007. With funding support from UN-ISDR, NSET implemented the project in close collaboration with Focus Humanitarian Assistance Pakistan (FOCUS) and Aga Khan Education Services, Pakistan (AKES, P). The total capital cost of the project was 100,000 US dollar.

The overall goal of the project was to contribute to building resilience of communities to disasters through capacity building of teachers and students in earthquake affected areas in Pakistan.

The specific objectives were three-fold; a) to introduce the knowledge and skills on earthquakeresistant construction of new and seismic retrofitting of existing school buildings in Gilgit and Northern areas of Pakistan by undertaking pilot demonstration program in each areas and conducting appropriate training for masons and school operators, b) to enhance earthquake awareness among 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, and so on 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.

Some key activities accomplished under the project were;

- Produce Teachers' Training Module and conduct TOT training
- Conduct Pilot training for trainers conducted and select potential trainers.
- Finalize training module and translate into local language and provide supervision to the Pakistani trainers as well as develop of a draft check list of safe school programmes, including an earthquake contingency plan, evacuation drills which can be modified based on each school specific situation.
- Upgrade understanding and knowledge in construction of seismically resilient housing through the collection of information on knowledge related to seismically safe construction practices and techniques, by conducting interviews among a group of key providers of seismically safe construction practices and techniques in the aftermath of earthquakes as well as preparing an analytical report on the current seismically safe construction practice and techniques and organizing of workshop on seismically safe construction practice and techniques workshop.

TECHNICAL SUPPORT FOR EARTHQUAKE RESISTANT HOUSING RECONSTRUCTION IN PAKISTAN

With financial support from OFDA of USAID, NSET provided technical support to Earthquake Reconstruction and Rehabilitation Authority (ERRA) of Pakistan working in close co-ordination with UN-HABITAT since February 2006. The total budget of the program was 5,000 US dollar.

As part of the project, various tasks were accomplished. They were; policy support in developing strategies for Earthquake Reconstruction and Capacity Building for Earthquake-resistant reconstruction, technical support in capacity building including development of training curricula and training of partnering organization and their Master Trainers, Mobile Teams for reconstruction as well as monitoring of the training activities throughout the earthquake-affected areas of the October 2005 South Asian Earthquake in Pakistan. Training of Engineers in earthquake-resistant

design, refreshers training to engineers, training of masons and development of earthquake awareness materials, provision of assistance in the development of an operation manual for urban housing reconstruction; support implementation of a public awareness campaign etc., were some other tasks that were undertaken.

CASE STATION AND FIELD CAMPUS (CASIFICA)

NSET and Disaster Prevention Research Institute (DPRI) of Kyoto University, Japan had signed a Memorandum of Understanding for the establishment of Case Station and Field Campus (CASIFICA) at Tsukuba, Japan on March 1, 2006.

The goal of CASIFICA was to conduct action research in the field of disaster mitigation and disaster preparedness in five countries including Nepal and extend the cooperation for similar collaborative work at regional and international levels.

The objectives of program ware two-fold: a) Help institutionalize disaster risk education based on national/regional necessities and demands on academic education and researches, b) Provide academic assistance to the initiatives on disaster risk management by government, non-government or financial institutions and private sector by starting NGO-College collaboration on joint researches and implementation.

The projects included in CSFC was implemented by NSET and KU in partnership with other government or non-government organizations.

The projects can be basically categorized as: Project for critical assessment if the impact of earthquake risk management works being done by NSET in the past decade in Nepal, Project for critical assessment of a program such as the School Earthquake Safety Program (SESP), and the Project for critical assessment of the progression of disasters risk management works in a particular geographical or administrative area of Nepal.

COMMUNITY BASED DISASTER RISK MANAGEMENT IN NEPAL (CBDRM-N)

NSET implemented Community-Based Disaster Management Project in six districts, namely, Tanahun, Syangja, Chitwan, Makwanpur, Sarlahi and Sindhuli during April 2006 to September 2007 under the CBDRM program of UNDP/Nepal. The CBDRM-N was one of the many interventions that NSET had undertaken at the community level. This project aimed at institutional development, capacity building and sustainable activities in disaster risk reduction at the community level. The 15-month project had six major objectives related to empowering the grassroots community including women, children, and people with disabilities, under privileged and marginalized population. The objectives were expected to be achieved through special focus to process oriented actions to facilitate the technology transfer at the community level.

The activities carried out during the project period include awareness and education, training programs, drill and model structural and nonstructural mitigation to community light search and rescue exercises. It was also planned to work in three communities in Kathmandu Valley with active participation of concerned local government. The program was supported by the Lutheran World Relief.

This project helped to enhance the security of men and women vulnerable to natural disasters and protect common property and community resources in selected disaster prone districts through appropriate capacity building measures at community, district and central levels and supporting

and replicating community-based disaster mitigation initiatives that preferably enhance livelihood opportunities.

SCHOOL EARTHQUAKE PREPAREDNESS PROGRAM IN JHAPA, RAUTAHAT AND KATHMANDU VALLEY

The project was implemented during November 2006 to February 2007 in Jhapa and Rautahat Districts and in Kathmandu Valley. NSET provided technical assistance to the Lutheran World Federation (LWF), Nepal under the LWF DIPECHO-CPDRR component..

The major activities accomplished under the program include;

- Preparation and publication of School Teachers' Training Manual for Earthquake Preparedness;
- Awareness raising and capacity building of schoolteachers on earthquake risk and earthquake preparedness.
- Developed trained schoolteachers for conducting training programs on earthquake preparedness through Training of Trainers (TOT) programs;
- Assisted schoolteachers to prepare the earthquake preparedness plan for their schools and accordingly implementing the plan.
- Awareness-raising of common people through the trained schoolteachers and the children.
- Development and printing of Schoolteachers Training Manual for School Earthquake Preparedness.
- Trained 140 schools teachers (20 from Jhapa, 20 from Rautahat, 100 from Kathmandu valley, total 7 batches) in school earthquake preparedness.
- Prepared comprehensive School Earthquake Preparedness Plan (Action Plan) for 70 schools.

A total of 143 teachers have been trained under different training programs conducted in Bhadrapur Municipality of Jhapa, Gaur Municiplity of Rautahat and Kathmandu Valley.

Keeping in view of current need of earthquake preparedness at schools, this project has met five major objectives ; notably a) publication of School Teachers' Training Manual for earthquake preparedness, b) awareness raising and capacity building of school teachers on earthquake risk and earthquake preparedness, c) develop trained school teachers for conducting training programs on earthquake preparedness through Training of Trainers (TOT) programs, d) assist school teachers to prepare and implement earthquake preparedness plan for their schools and e) awareness raising of common people through programs conducted by the trained school teachers and students.

CAPACITY BUILDING FOR RECONSTRUCTION OF EARTHQUAKE-AFFECTED AREAS OF PAKISTAN (BAGH AND MUZAFFARABAD)

The 7.6 Magnitude 2005 earthquake that jolted northern Pakistan caused death of over 73,000 people and injured another 83,000 rendering more than 3.3 million people homeless. This is a project implemented during November 2005 to March 2006 where NSET provided technical assistance to UNDP/Pakistan to demonstrate people-centered, cost-effective, environment-friendly rubble removal and emergency housing strategy that facilitate incorporation of earthquake-resistance in transitional as well as permanent reconstruction of the building to ensure sustainable livelihoods and habitats for the earthquake-affected communities. The total cost of the program was 151,000 US dollar.

The main objective of the project was to provide technical assistance sought to transfer knowledge on earthquake resistant construction to builders and the industry and assisting in confidencebuilding processes by taking these techniques to rural communities. The specific objectives 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.

UNDP/Pakistan sought technical assistance from NSET to demonstrate people-centered, costeffective, environment-friendly rubble removal and emergency housing strategy that facilitate incorporation of earthquake-resistance in transitional as well as permanent reconstruction of the building, and to ensure sustainable livelihoods and habitats for the earthquake-affected communities.

The program covered building two model houses and two Shake Table demonstrations. The training was conducted in two tiers. First NSET resource persons conducted end-user training on earthquake-resistant construction for engineers and technicians. Trainees with potentials 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.

The scale of damage urged for a massive intervention in terms of capacity building and training against popular expectations for immediate relief, rather than know-how on earthquake-resistant reconstruction. 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. Towards the end of the project, a Nepalese team of senior government officials visited the earthquake affected area in Pakistan and participated in various events and activities related to capacity building for safer construction conducted by NSET. The visit provided a great learning opportunity to the delegates. The visit was managed by NSET with its own financial resources.

DEVELOPING EXISTING SCHOOL BUILDING ASSESSMENT METHODOLOGY AND CONDUCTING TRAINING PROGRAM

This project was implemented during January 2005 to May 2005 for development of comprehensive school assessment methodology development in consideration of Educational requirements fixed by the government of Nepal and as well structural vulnerability of school built up infrastructures and training of the mid-level technicians to conduct the school assessment. The project implemented with the support received from UNICEF/Nepal.

Some key activities accomplished under the project include;

- Methodology for carrying out the vulnerability assessment of existing school buildings with consideration of all the existing building typologies available in the area developed.
- Survey formats, checklists and questionnaire for collecting necessary information from school building sites developed.
- Training Curriculum and required materials for training the local professionals on the vulnerability assessment of the existing buildings prepared.
- Training programs for local professionals on the methodology in 2 districts. Completed

KATHMANDU VALLEY EARTHQUAKE PREPAREDNESS INITIATIVE (KVEPI)

This program was implemented during March 2004 to June 2005 at 10 wards within five municipalities of Kathmandu Valley as a joint program of Nepal Red Cross Society (NRCS), American Red Cross and NSET. This program used a combined approach of building capacity of NRCS volunteers, pre-positioning critical emergency supplies and rescue equipment, training people in basic first aid and rescue techniques, and helping the general public to identify and advocate for safer building practices. Primary goal of the initiative was to help communities develop preparedness capabilities and to reduce potential sufferings from earthquake disasters.

The major goal of the program was to improve resiliency of communities to deal with seismic hazards and reduce sufferings in case of an earthquake. The objectives were: a) to build disaster management capacity of NRCS at the national, district, and sub-chapter level, b) to build preparedness and response capability of 10 municipal wards in Kathmandu Valley and to increase public awareness about earthquake safety and preparedness practices at the ward level

The major activities carried out under the project were;

- Enhance the Earthquake Preparedness and Capacity of NRCS including vulnerability Assessment of Warehouse of NRCS Districts;
- Develop detailed curricula and conduct training programs for on Earthquake Preparedness Training (4-day training course), Disaster Management Training of Trainers (10-day course), Community level Disaster Management Training (5-day course and 10 Training Programs), and Community Level Light Search and Rescue Training (3-day course and 10 Training Programs);
- Facilitate the formation of 10 Ward Level Disaster Management Committee (10 Wards) in coordination with the municipalities and help them to carry out risk assessment to the planning and implementation of risk mitigation and preparedness activities; and
- Develop and produce materials for awareness and education: brochures, Booklets and and Frequently Asked Questions.

The major outputs of the program include; formulation of Ward level Disaster Management Committees, pre-position rescue equipment kits at 4 wards in Kathmandu Valley, development of curricula and implementation of training programs on Warehouse Management, Disaster Management, Training of Trainers (TOT), Earthquake Preparedness and First Aid, two tube-wells constructed at Tundikhel for water supply during emergencies, Improved NRCS human resource capacity, volunteer base, and ability to provide disaster management training and technical assistance, Enhanced capacity to deliver relief services to the most vulnerable and hazard maps created and preparedness and response plans in place and practiced in different Wards, improved human resource base in Wards to administer first responder services in the aftermath of an earthquake and increased access to information for the general public on what to do before, during, and after an earthquake.

SEISMIC VULNERABILITY ASSESSMENT AND RETROFITTING OPTIONS FOR BRITISH EMBASSY BUILDINGS IN TEHRAN

The project was implemented during September 2004 to December 2005 in Tehran, Iran with from the support of Reynolds Geo-Sciences Ltd. Seismic vulnerability of altogether 25 residential and office buildings of British Embassy Premises in Tehran, Iran were assessed under this project.

The project started with developing and adapting the assessment methodology applicable for the typical Iranian buildings prevailing in the British Embassy Premises as well as in the city of Tehran. The methodology was developed based on the FEMA methodology. However, the checklists and methodology suggested in FEMA lacks the same appropriateness for the Iranian buildings. The project did qualitative structural assessment of all the select buildings of the embassy to identify their structural strength and weaknesses and the possible consequence during the most likely earthquake shaking in the area. Detail quantitative assessment of few select buildings was done and different retrofitting options were developed for those buildings. Typical retrofitting options were also developed for typical buildings.

Some key activities performed under the project are:

- Develop, adapt methodology for seismic vulnerability assessment of typical Iranian building prevailing in the British Embassy Premises of Tehran, develop survey checklist and questionnaire;
- Conduct qualitative as well as detail quantitative structural assessment of buildings;
- Assess non-structural seismic vulnerability;
- Identify intervention measures for enhancement of seismic capacity of the buildings and detail design the intervention measures; and
- Identify non-structural vulnerability reduction measures and recommend relatively safe and unsafe locations in the buildings.

DISASTER INVENTORY / INFORMATION MANAGEMENT SYSTEM (DIMS) IN NEPAL

Prior to 2003 in Nepal, exact statistics on the loss of lives and property caused by historical disaster events were not available. Few available records then were only on the events with big impacts but thousands of small events were missing from the scene. Due to this fact, the vulnerability profile of the country was virtually unknown. This was an impediment to the mainstreaming of disaster risk reductions into the development process.

In the view of total absence of organized and uniform data and exact statistics pertaining to natural disaster losses in the country, this project was implemented throughout the country during December 2003 to August 2004 as a part of effort to establish a systematic data base of natural disaster events in Nepal with financial support during UNDP, Nepal. In this context, the NSET with financial and technical support of United Nations Development Programme (UNDP), endeavored to establish a systematic data inventory of natural disaster events in Nepal. The initial phase of this program covered the time period of 1971-2003 AD. The effort was focused mainly on collection, computer-entry, and analysis of natural disaster data for 33 years. A standard data collection format was developed and used to capture the data from different sources and entered into the "DesInventar System", a methodological tool developed and successfully implemented by Latin American Network of Social Studies on Disaster Prevention (LARED).The total budget was 35,200 US dollar.

The overall goal of the initiation was the Institutionalization of the Disaster Inventory/Information Management System in Nepal. To achieve this goal, the project was formulated with the broad objective to prepare a systematic database of natural disasters occurred in Nepal for a period of 33 years.

The specific objectives of the program were: to, a) identify the types of disasters in Regional, District and Municipality/VDC level, b) find the time variation of natural disasters in different geographical units, c) identify the human and property losses caused by natural disasters, d)

prioritize the area mostly affected by natural disasters, e) develop the information library in a system database format on natural disaster at the national level.

The major activities of the project were a) definition of Disaster Events in the context of Nepal and Development of a Standard Survey Format, b) identification of Main Data Sources: daily newspapers, periodicals, relevant reports, government records, journals and researches, c) data collection, e) data verification and entry, f) data analysis, g) calculation of economic Losses, h) dissemination of results and findings: The results and findings will be disseminated to the related institutions and individuals through workshops and meetings to make the stakeholders informed about the results to buy-in suggestions and for consensus building, reporting and documentation

The major outputs of the project were availability of consistent and sound database on the historical disasters of Nepal with details on the event and impacts are recorded into the DesInventar System since 1971. It worked as a tool for disaster risk mitigation strategy for the country. Such analysis of natural disasters from different angles helped to develop future plans and programs for disaster risk mitigation in the country in one hand and make people aware from the disasters on the other hand. Further, in the following years, it envisaged establishment of an adequate, stable, sustainable, and operational system for systematic disaster inventory and management of the disaster database for effective risk reduction and emergency response planning in the country.

SEISMIC VULNERABILITY ASSESSMENT OF DRINKING WATER SUPPLY NETWORK OF KATHMANDU VALLEY

This project was implemented during December 2002 to March 2003. As part of the project, a study for the assessment of seismic vulnerability of drinking water supply system of Kathmandu was undertaken with support from UNICEF Nepal. The total budget of the program 63,800 US dollars.

Some key activities accomplished under the project include;

- Design survey questionnaire and formats for interviewing key stakeholders of the drinking water supply;
- Survey of critical locations of pipeline network, collection of information on the water supply system, interview stakeholders; assess the institutional capability;
- Develop, adapt methodology for the seismic vulnerability assessment of water supply pipeline network since the regional lacks such methodology;
- Analyze the system based on the developed, adapted methodology, identify weak locations in the network; and
- Identify strategy for mitigation of the seismic vulnerability of the system in the long run, recommend medium-term and short-term measures for better preparedness.

During the project, a practical methodology for assessing the seismic vulnerability of the water supply network was developed. Assessment results have been presented in the form of a network system damage scenario. Optimum routes for the most expedient restoration of the water supply services are identified and possible emergency evacuation points are also suggested in view of the water demand in case of large earthquake event.

PROGRAM FOR ENHANCEMENT OF EMERGENCY RESPONSE (PEER)

The Program for Enhancement of Emergency Response (PEER) was a regional training program initiated in 1998 by the U.S. Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA) to strengthen disaster response capacities in Asia. The National

Society for Earthquake Technology (NSET) implemented the phase 1 of the program in close collaboration with the national government agencies in six Asian countries: Bangladesh, India, Indonesia, Nepal, Pakistan and the Philippines during 1998 to 2003. These countries were selected to participate in the program based on their high seismic vulnerability, their need to improve disaster response capacity, and the interest on the part of their national governments and civil society to participate in the program.

The goal of the program was to reduce mortality in mass casualty events and increase survival rates of disaster victims. The objectives of the program were to a) Establish and strengthen the capability of PEER countries to provide collapsed structure search and rescue and basic &advanced life support, beginning with the first responder and continuing through the medical facilities, b) Develop a training system that continually provides disaster response with qualified personnel for search and rescue and medical first response and medical facilities prepared to receive victims, c) 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.

There four core components comprise the program were, namely, a) Training Course Design, Development, Adaptation and Translation, b) Training Courses at the Regional, Sub-regional, National and Local Levels, c) Instructor Development and Certification and d) Institutionalizing the Training.

The three principal courses for PEER training were Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR), Hospital Preparedness for Emergencies (HOPE) and additional Courses include Training for Instructors (TFI) in which Training for Instructors Hand-off Workshop and Medical First Responder Instructor Workshop (MFRIW) were held. Likewise, Collapsed Structure Search and Rescue Instructors Workshop (CSSRIW) in which Master Instructors Workshop (MIW) carried out. Similarly, Subsidiary Courses also include Canine Search and Rescue and Introduction to Disaster Management (IDM)

The PEER partners in the respective countries include government agencies, training institutions, national and international NGOs, emergency services organizations, existing networks and associations. Relationships with these groups have been established within each of the PEER Countries, including national working groups and focal point agencies to coordinate the program. Now Phase 4 is being implemented with the extensive scope of works.

PEER conducted 56 different programs in the region during April 2003 – March 2009. The course produced;

- Graduates and instructors: 811 graduates and 340 IW
- Graduates for MFR, 637 graduates and 279 IW graduates
- For CSSR, 533 TFI graduates, 628 graduates and 196 IW
- Graduates for HOPE developed for PEER region. In addition to this PEER produced 55 Master Instructors and 20 K9 experts in the region.

The courses are based on principles of adult learning, and include testing and evaluation to ensure that participants acquire and can sufficiently perform the lifesaving skills and tasks taught in the courses.

The implementing partners of the program which managed by NSET include U.S. Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA), International Resources Group (IRG) Ltd., Washington, D.C., Johns Hopkins University Center for

International Emergency, Disaster and Refugee Studies (JHU/CDIERS) Baltimore, MD and, Safety Solutions Inc., Boynton Beach, Florida.

SEISMIC VULNERABILITY ASSESSMENT OF MAJOR HOSPITALS OF NEPAL

"Structural Assessment of Hospitals and Health Institutions of Kathmandu Valley" was implemented by NSET implemented with WHO-Nepal and the Ministry of the Health, Government of Nepal in 2003. Sesmic vulnerability of 14 major hospitals in Kathamandu Valley was assessed. As a recommended follow-up of the aforementioned study, another study called "Non-structural Vulnerability Assessment of Hospitals in Nepal" was carried out in 2004 by NSET with support from WHO-Nepal. The study covered structural and non-structural vulnerability assessment of 9 major hospitals of Nepal: 4 within Kathmandu Valley and 5 outside Kathamandu. Both studies were envisaged by the Health Sector Emergency Preparedness & 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.

It was the first time in the region that NSET conducted a seismic vulnerability assessment of all major hospitals of Nepal. The total budget of the program was 5600 US dollar.

The major objectives of the program were, a) Development of a systematic approach towards assessment of structural vulnerability of hospital buildings and health institutions of Nepal by way of implementation of such assessment for hospitals in Kathmandu Valley, b) Identification of appropriate measures for improving earthquake resilience of the existing health infrastructure, c) Transfer of Technology and development of local capacity for such work in the country, and d) Dissemination of the findings for facilitating implementation of the identified earthquake risk reduction measures.

The major activities of the project were,

- Collection and Review of Pertinent Secondary Data and Information for familiarization of the current situation of the health facilities, identification of the requirements of the assessment methodology, identification of the target hospitals and their buildings for the assessment, and detailing of the work plan,
- Development of Methodology and formats for assessment including Survey of the Hospitals for both structural and non-structural aspects, for collection of all pertinent parameters for the analysis of the structural strength of the building components, the stability of the buildings and further Identifying Critical Systems and Facilities and Survey Data Analysis – for both Structural Vulnerability Assessment and Non-Structural Vulnerability Assessment,
- Preparation of Report and Presentation in a Public Workshop A one-day Public Workshop was organized for presenting the Project findings to the stakeholders.
- Design survey checklists and formats, conduct survey of hospital buildings along with the repair and maintenance or engineering division of hospitals, collection of other pertinent information about the hospitals;
- System analysis, analysis for structural and non-structural vulnerability of hospitals buildings as well as the overall hospital system and functionality;
- Identification of feasible mitigation options; and
- Inform and aware hospital staff and health institutions on the seismic vulnerability of the major hospitals and their possible improvement measures.

The assessment estimated that most of the hospitals would withstand the occasional earthquake of MMI VII without collapsing, but 10% of the hospitals might be functional, 30 % partially functional,

and 60% out of service in case of a major earthquake shaking of intensity IX MMI. The major cause of possible functional loss was considered to stem from non-structural damage and one of the recommendations of the project was to conduct detailed non-structural assessment of major hospitals. Likewise, systematic approach towards assessment of structural and non-structural vulnerability of hospitals in Nepal was developed through implementation of such assessment work in about 20 major selected hospitals during the study. Appropriate measures for improving seismic performance of the selected hospitals were identified and the findings were disseminated in order to facilitate the implementation of the identified earthquake risk reduction measures.

The major outputs of the program are;

- Performance Assessment of Hospital: Based upon the structural and non-structural vulnerability assessment of the hospital buildings and different critical systems and facilities, the functional assessment of the hospitals was made for two different scenario earthquakes.
- Identification of Vulnerability Reduction Measures: Considering the opportunity of immediate implementation of non-structural risk mitigation measures, some examples of mitigation options to solve the problems were developed to guide the hospital maintenance division to start implementation. For e.g. Improving Safety of Operation Theatres
- 80% of the hospitals assessed falls in the unacceptable performance area for new construction i.e. they are in the situation beyond the Collapse Prevention Building Performance Level, in severe earthquake and remaining
- 20% of the hospitals pose life safety to collapse prevention performance level. The result shows an alarming situation and demanded immediate reconstruction or retrofitting of most of the hospital buildings to achieve standard acceptable level of safety

Systematic approach towards assessment of structural and non-structural vulnerability of hospitals in Nepal was developed through implementation of such assessment work in about 20 major selected hospitals during the study. Appropriate measures for improving seismic performance of the selected hospitals were identified and the findings were disseminated in order to facilitate the implementation of the identified earthquake risk reduction measures.

ENVIRONMENTAL MAPPING PROJECTS

NSET implemented various Environmental Mapping Projects in four municipalities with the main objective to prepare a strategy for urban environmental management plan and to generate systematic digital database for the municipalities. The first EMP was initiated in 1998 in Madhyapur Thimi Municipality. Similarly, it was initiated in Kirtipur, Dharan and Banepa Municipality in 1999, 2000 and 2002 respectively. This project was partly funded by Regional Urban Development Office (RUDO)/South Asia, United States Agency for International Development (USAID).

The project focused to develop municipal environmental map such as sensitive areas, noise pollution, water quality, geological condition and proposed future growth in a manner that would support disaster mitigation and emergency response during disasters.

EARTHQUAKE RISK ASSESSMENT OF KATHMANDU USING RADIUS TOOL (UNESCO-CCT PROGRAM)

With the technical support from NSET, "Earthquake Disaster Risk Reduction in Kathmandu" under "UNESCO CCT Initiative: Disaster Risk Reduction in Asia, Latin America and the Caribbean" was implemented by Kathmandu metropolitan City (KMC) (NSET) as a part of the UNESCO Cross

Cutting Theme initiative in 2003 to 2004. This project was implemented through in kind contribution of UNESCO.

In order to carry out the project work, a Working Group was formed with the Chief of department of Social welfare, KMC as a coordinator and members from Department of Urban Planning, Department of Public works, Department of Environment and Information System Centre of the city.

A number of training programs were organized during the project period targeting to KMC professionals to build up their capacity in disaster risk management. The first training was conducted in June 2003 focusing on the use and application of RADIUS tool in managing the earthquake risk of the City. Then, NSET assisted in installing RADIUS tool in municipal professionals' computers. The tool was installed in computers in Social Welfare Department, Information System Centre, Urban Development department, Public Work Department and Environment Department.

RADIUS software CD and booklets and publication on RADIUS were distributed among professionals. After RADIUS installation, NSET professionals gave training to the Working-Group members on execution of the program. During the course of training, the Working-Group members felt need on orientation on earthquake disaster and its management particularly the planning aspects of disaster mitigation of the city. As per their demand, NSET conducted series of lecture programs for working group members and other municipal staffs. The objective of the project was to build capacity of KMC to assess the potential risk of their city and to analyze the situation for planning to reduce the risk. This helped them understand the risk and fundamentals of risk management principles. The required technical input, particularly on use of RADIUS tool, was given to the members of the group through trainings.

For the earthquake risk assessment of the city, data of infrastructures and housing of Kathmandu metropolitan area was collected from different sources and processed for input in RADIUS tool which assisted KMC authorities to understand the earthquake disaster risk of Kathmandu and helped in developing affordable and effective risk management measures and sound urban growth policies. Likewise, a presentation was made to make aware the City's Earthquake risk to local and international community.

PROJECT FOR PRE-POSITIONING OF EMERGENCY RESCUE STORES (PPERS)

This project was jointly carried out by NSET and different ward disaster management committees of Kathmandu Valley and was supported by Civil Affairs Group of the British Army.

The purpose of PPERS was to provide a reserve of essential tools and equipment to assist in the immediate community level response to a major disaster, such as an earthquake.

PPERS was intended to help those 'first responders' on the ground at the local level to enable neighbors to rescue neighbors. Organizational structures such as local level disaster management committees and community emergency response teams are constituted as required to assist in setting up the stores and its effective operation. Such stores are pre-positioned in 8 locations of Kathmandu Valley.

NEPAL GUJARAT MASON EXCHANGE AND TRAINING PROGRAM (NGMET)

In 2001, an earthquake wreaked havoc and destroyed large parts of Indian state of Gujarat. After the earthquake, Sustainable Environment and Ecological Development Society (SEEDS) New

Delhi implemented the Patanka Navajeevan Yojana (PNY) – a post-earthquake reconstruction project for Gujarat State Disaster Management Authority (GSDMA) in the village of Patanka, Patan District, Gujarat. In this bid, NSET assisted SEEDS to implement the project. PNY was intended to facilitate the earthquake victims to rebuild their homes, plan and implement various activities pertaining to sustainable rehabilitation with active community participation in Patanka.

Under the PNY, the "Nepal Gujarat Masons Exchange and Training Program" (NGMETP) was formulated as a joint program by NSET and SEEDS in August 2001 and continued till the completion of PNY to replicate the past experience of NSET in identifying and implementing simple earthquake resistant construction technology transfer at the grassroots level through awareness and training. The total capital cost of the program was 10,000 US dollar.

Masons are the key actors in translating the building designs into reality. NGMETP was conceived to share the experiences of trained and experienced masons from NSET to fellow masons from Gujarat and vice versa. Exchange visits of Gujarat masons to Nepal and Nepali masons to Gujarat helped to fortify the learning process as well as acquire new techniques in safer building construction. The NGMET involved Nepalese Masons, trained by NSET in earthquake-resistant construction, imparting hands-on training to their Gujarati counterpart masons, in ways of improving construction quality and practice.

The overall objective of the program was to start mitigation and preparedness through training and awareness at community level, in specific the objectives were:

- To train at least 20 local masons from Patanka in earthquake resistant construction technology while rehabilitating and or reconstructing the houses demolished by the earthquake
- To organize at least three exposure visits of masons from NSET-Nepal and Patanka
- To document and disseminate the outstanding achievements and explore its replication in the needy communities elsewhere.
- To allow Nepalese masons and engineers to be in earthquake devastation scene and learn lessons especially those on seismic reconstruction

The major activities of the program were

- Analysis of existing situation Assess the existing rehabilitation process, planning appropriate interventions and initiating them
- Upgrading construction quality in Patanka Navajeevan Yojana with focus on workmanship, quality control, bar- bending
- Seismic strengthening of existing buildings
- Conduction of training programs for skill upgrading of practicing masons and shake table to demonstrate the effectiveness of earthquake resistant components in a building
- Organize and facilitate exchange visits of Nepali and Gujrati masons to Patanka and Kathmandu to interact and learn from the experience of various seismic retrofitting works being implemented in Kathmandu by NSET and in Patanka by SEEDS/ GSDMA.

SOLID WASTE MANAGEMENT PROJECT IN DHARAN MUNICIPALITY

The Dharan Environmental Mapping Program (DEMP) conducted by NSET in association with Dharan Municipality with the financial support from USAID. The program was implemented because Dharan Municipality was identified the waste management of the municipality as the next major problem after water supply in 2003 with support from Regional Urban Environment Policy

and Management Program of Regional Urban Development Office (RUDO) for South Asia, USAID, India. The total budget of the program 12,000 US dollar.

It was then realized that sustainable waste management has become a priority for urban environmental improvement in Dharan. Further, inadequate and improper management in disposing solid waste generated in the municipal area has resulted serious environmental hazard and affected the health of people living in the area. "Feasibility Study on Community Based Solid Waste Management for Dharan Municipality" was carried out in the process to develop a model of sustainable SWM systems. This effort was carried out as a follow-up work of the Dharan Environmental Mapping Project (DEMP).

STUDY ON EARTHQUAKE DISASTER MITIGATION IN THE KATHMANDU VALLEY

NSET provided technical support to JICA in the Study on Earthquake Disaster Mitigation in the Kathmandu Valley.

To establish a holistic plan for earthquake disaster management in the Kathmandu Valley was the broader goal of study which were focused on:

- Study on Earthquake Disaster Assessment of KTM Valley
- Study on Strengthening socio-economic systems, and
- Study on Protecting the stability of governance even in case of earthquakes.

The study report published following 4 volumes:

- English Summary (consisting of blueprint for KTM valley Disaster Mitigation, Earthquake Disaster Assessment and Database System
- Main Report Volume 1: Earthquake Disaster Mitigation Plan
- Main Report Volume 2: Damage Estimation

NSET broader role was to coordinate with government agencies and development disaster mitigation plan and detail building damage estimation, strengthen socio economic system of project area.

KATHMANDU VALLEY EARTHQUAKE RISK MANAGEMENT ACTION PLAN IMPLEMENTATION PROJECT (APIP)

NSET implemented this project during November 2000 to August 2005 with the funding support from Office of the Foreign Disaster Assistance (OFDA) of the USAID. The activities, suggested in the Kathmandu Valley Earthquake Risk Management Action Plan, were implemented under this project.

The budget of the program was 428000 US dollar. NSET has implemented this project since 2000 with the funding support from Office of the Foreign Disaster Assistance (OFDA) of the USAID.

The overall goal of the project was to significantly reduce the level of earthquake risk in Kathmandu Valley and to establish institutions and processes that can be sustainable to continue such actions for the decades ahead. Improving seismic safety of Kathmandu Valley was the broader objective of the project and improving seismic safety of public schools, residences and public infrastructures as well as institutionalizing earthquake risk management in Kathmandu are the specific objectives. Its specific objectives were: a) To make significant progress in earthquake risk management in Kathmandu Valley by improving the safety of school children and school buildings and improving the seismic performance of existing buildings, b) To monitor the implementation of Kathmandu Valley Earthquake Risk Management Action Plan and update it, and c) To strengthen the capability

of NSET to implement and promote earthquake risk management works in Kathmandu Valley and Nepal in an ongoing and sustainable way

Some of the key activities of the project include implementing the School Earthquake Safety Program (SESP) for making schools safer against earthquakes which protects school children, and educates communities to protect themselves, Improving seismic performance of existing buildings - mainly through dissemination of information regarding non-structural hazards and ways of mitigating them assisting in enhancing structural and non-structural safety of public institutions, providing technical assistance to the municipalities for implementing seismic building code, conducting training programs for masons, technicians, engineers, business community, and conducting free and mobile earthquake clinics for the house owners, Monitor Plan annually- by conducting meetings to help government and other institutions to plan, schedule and budget earthquake risk reduction measures, and Strengthen organizational capability of NSET.

Some key activities accomplished under the project were;

- Assist municipalities/municipal professionals in implementing seismic provisions of building code;
- Provide trainings to the engineers, architects, technicians, contractors and masons on the aspects of earthquake-resistant construction technology;
- Seismic vulnerability assessment of critical facilities, lifeline structures and public buildings within Kathmandu valley, suggest vulnerability reduction measures and assist in implementation of suggested measures;
- Design and implement earthquake-resistant school buildings under the School Earthquake Safety Program (SESP), raise awareness of teachers, students, parents and common people and provide on-the-training to the local masons;
- Provide lectures and orientation classes for various communities on the aspects of earthquake risk reduction and preparedness, the community ranges from international community residing in Kathmandu to the business people and the local communities;
- Design shake table, model buildings and other tools for training and awareness-raising and demonstration;
- Advocacy for better policy environment; and
- Design and implementation of various awareness-raising programs jointly with many local, national and international organizations.

The major outputs of the program were visible signs of improvement in building construction practices in Kathmandu Valley, Raised awareness of common people, school family and others about earthquake hazards and preparedness, Municipalities initiated to improve building permit process, and the government declared compliance to the National Building Code mandatory, School earthquake safety developed and accepted as a sustainable and feasible earthquake risk reduction strategy and Seismic vulnerability of major hospitals and water supply system assessed and vulnerability reduction strategy proposed.

MUNICIPAL EARTHQUAKE RISK MANAGEMENT PROJECTS (MERMP)

As a replication process of the successes of the Kathmandu Valley Earthquake Risk Management Project (KVERMP), NSET implemented Municipal Earthquake Risk Management Project (MERMP) in four municipalities of Nepal: Banepa, Vyas, Dharan and Pokhara, during January 2003 to October 2003 under the Asian Urban Disaster Mitigation Program (AUDMP) of Asian Disaster Preparedness Center (ADPC) with core funding from OFDA. Before this, the MERMP was tested successfully in three municipalities of Banepa, Dharan and Vyas in the year 2002-2003 under the Asian Urban Disaster Mitigation Program (AUDMP) of the Asian Disaster Preparedness Center (ADPC). The total budget of the program was 37000 US dollar. \$ 50,000

The project aimed at reducing and managing the earthquake risk at the municipal level by providing technical assistance to the municipalities and local institutions and it also focused on capacity building of the local professionals to implement earthquake risk reduction activities as well as institutionalization of the efforts.

The broader objective of the program was to reduce earthquake vulnerability of the cities by evaluating the current earthquake risk, preparing action plan for earthquake risk management, and implementing feasible risk reduction activities.

The specific objectives are:

- Evaluate earthquake risk of cities by using RADIUS methodology, prepare risk maps and use those for awareness-raising and better risk perception;
- Prepare action plans for risk reduction for the cities with the participation of all key stakeholders;
- Implement earthquake vulnerability reduction (EVR) measures such as School Earthquake Safety Program (SESP) as demonstration project of mitigation; and
- Awareness-raising and capacity building of the common people, professionals and the authorities on earthquake risk reduction and preparedness.

The Project activities consisted of developing earthquake damage scenarios of the cities including building inventory surveys, preparing an action plan for earthquake risk management, construction or retrofitting of school or other public structure as demonstration of feasible mitigation measures, awareness-raising, training, capacity building and institutionalization. Likewise, Public Awareness and Capacity building including awareness raising activities such as include observing the National Earthquake Safety Day (awareness march along with main function, earthquake safety exhibition, Shake Table demonstration, guiz competition for school children, folklore competition etc, wide discussion of earthquake and other disaster issues in community level workshops and orientation programs, Training programs for masons, technicians and engineers are conducted to enhance the capacity of local craftsman and professionals in earthquake risk reduction. Similarly, implementation of Earthquake Vulnerability Reduction (EVR) measures: The program also targets at implementing some of the most feasible earthquake vulnerability reduction measures such as seismic retrofitting or earthquake-resistant reconstruction of school buildings. Similarly, public awareness programs, establishment of municipal level disaster management committee, and organization of training programs for different target groups are also conducted as the implementation of the action plan.

Some key activities performed by the project include;

- Liaise and coordinate with municipalities, local institutions and other key stakeholders on designing and implementing project activities;
- Provide technical assistance and train local professionals on building inventory survey and evaluation of earthquake risk of the cities by using RADIUS;
- Facilitate in developing action plans for risk reduction;
- Organize training programs for engineers, technicians, contractors and masons on earthquake-resistant construction technology;
- Design earthquake-resistant school buildings and implement School Earthquake Safety Program (SESP); and

• Organize shake table demonstration and other awareness-raising programs.

The project was a grand success. The major outcome of the projects were ; a) Increased earthquake awareness leading to attitudinal change of stakeholders from passive observers to active participants, b) Enhanced capacity of municipalities to implement earthquake risk reduction and preparedness programs, c) visible change in construction practices in the cities: many earthquake- resistant features have now become part of the construction process, c) The need for mandatory implementation of seismic building code has been augmented, d) Municipalities have started to put the disaster risk management activities into their regular plans and programs with nominal budgetary allocation, 3) the program activities are found successful also to positively affect the nearby urban centers and surrounding rural settlements.

KATHMANDU VALLEY EARTHQUAKE RISK MANAGEMENT PROJECT (KVERMP)

The Kathmandu Valley Earthquake Risk Management Project (KVERMP) is one of pioneer program implemented by NSET. KVERMP was implemented during 1 September 1997 to 30 December 1999 by the National Society for Earthquake Technology –Nepal (NSET) in technical collaboration with GeoHazards International (GHI), as a part of the Asian Urban Disaster Mitigation Program (AUDMP) of the Asian Disaster Preparedness Center (ADPC), with core funding by the United States Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA). The total budget of the program was 45,000 US dollar/ Seventeen million two hundred eighty thousand.

The major objectives of the project were 1) To evaluate Kathmandu Valley's earthquake risk and prescribe an action plan for managing the risk; 2) To reduce earthquake vulnerability of public schools; 3) To raise awareness among the public, government officials, international community resident in Kathmandu, and international organizations about Kathmandu Valley's earthquake risk; and 4) To build local institutions that can sustain the work launched in this project.

KVERMP included a wide variety of activities aimed at beginning a self-sustaining earthquake risk management program for Kathmandu Valley. Some of the key activities performed under the program are;

- Assist municipalities/municipal professionals in implementing seismic provisions of building code;
- Provide trainings to the engineers, architects, technicians, contractors and masons on the aspects of earthquake-resistant construction technology;
- Seismic vulnerability assessment of critical facilities, lifeline structures and public buildings within Kathmandu valley, suggest vulnerability reduction measures and assist in implementation of suggested measures;
- Design and implement earthquake-resistant school buildings under the School Earthquake Safety Program (SESP), raise awareness of teachers, students, parents and common people and provide on-the-training to the local masons;
- Provide lectures and orientation classes for various communities on the aspects of earthquake risk reduction and preparedness, the community ranges from international community residing in Kathmandu to the business people and the local communities;
- Design shake table, model buildings and other tools for training and awareness-raising and demonstration;
- Advocacy for better policy environment; and
- Design and implementation of various awareness-raising programs jointly with many local, national and international organizations.

The activities accomplished under the project were;

- Development of an earthquake scenario and an action plan for earthquake risk management in the Kathmandu Valley in which Simple earthquake loss estimation was conducted and a scenario was written describing possible consequences of the valley's next major earthquake using layman's language, and distributed widely and an action plan was created outlining procedures and projects to begin comprehensively managing the valley's earthquake risk.
- School Earthquake Safety Program: A survey of all of the public school buildings in Kathmandu Valley was conducted. Study was conducted to determine the most vulnerable types of school building construction prevalent in Kathmandu Valley and to determine methods for retrofitting these structures. Programs were initiated to motivate local communities and international agencies to strengthen vulnerable school buildings,
- Awareness raising and institutional strengthening: Many public awareness activities were conducted, including Earthquake Safety Day, earthquake orientation, earthquake drills, displays, and demonstrations and existing local institutions related to disaster management were given training and managerial support. New organizations to manage disaster risk were created within local community groups and municipal governments during the course of this project.

The project output includes development of Simplified Earthquake Scenario and Action Plan, Community-based School Earthquake Safety Program (SESP) was identified as sustainable mitigation process with various methodologies for seismic retrofitting, Increased public awareness was gained, Earthquake Safety Day was identified as an attractive awareness raising strategy, Institution Building, With a well-defined mission, vision and strategic objectives, NSET became strong enough to continue earthquake risk management activities in Nepal and provide technical assistance to other institutions. KVERMP was a milestone in earthquake risk management in Nepal and the region. The project methodology was replicated in 9 cities in the world during RADIUS project implemented by UNIDNDR.

The key lessons learned were:

- Earthquake damage scenario is a very effective awareness promotion tool.
- Awareness raising is key for promoting earthquake risk reduction
- Community involvement is a must to bring any change
- Simple and low-tech solutions work,
- Technology Transfer should be accompanied with Institutional Development
- Building safer community requires sustained efforts and co-operation

C) REGULAR PROGRAMS/PROJECTS

EARTHQUAKE SAFETY SAY (ESD)

Nepal observes Earthquake Safety Day (ESD) annually on 2nd of Magh (10th month in Nepali Calendar) that falls on 15 or 16 of January to commemorate the Great Nepal-Bihar Earthquake of 1934. Government of Nepal first declared to mark the day on 1999 with view to promote the earthquake safety and enhance public awareness. ESD aims to make the general public aware about the earthquake risk and available risk reduction measures and preparedness programs. The day is also for sharing the experiences and exchange good practices and create common platform for the stakeholders to join hands in improving seismic safety in Nepal. ESD, in fact, unwraps the culmination of earthquake risk management works implemented in the country in the preceding 12 months and allows taking stock of the achievements and shortcomings. On this occasion, many public events such as National Meeting, Symposium, Earthquake Safety Rally, Exhibition, various awareness-related and learning & sharing programs are organized. NSET serves as Member Secretary of the Organizing Committee led by Ministry of Home Affairs (MoHA) and two Sub Committees on Event Management and Publicity Campaigns led by government agencies.

SCHOOL EARTHQUAKE SAFETY PROGRAM (SESP)

Nepal has high risks of earthquake and other kind of disasters. Schools are highly vulnerable if not properly constructed as well as prepared for earthquakes. Ensuring the safety of children while they are learning is important aspect as schools are the place where children spend much of their time. Despite the high risk of earthquakes, school construction in Nepal has largely ignored the issues of structural safety and they are built very informally just like common residential buildings. NSET has been undertaking the School Earthquake Safety Program (SESP), a holistic approach taken by NSET, to improve the earthquake safety of communities by intervening in schools from its very early days.

Children are considered very effective carrier for disseminating information to mass people in the society. By preparing and educating children and teachers for disasters, we can also effectively reach the wider community, as students are able to help their families be better prepared as well. It is a complete program to make schools safer and also reach communities with the message of earthquake safety promotion. 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. This project was initiated after the findings of the Kathmandu Valley earthquake vulnerability assessment survey of public schools carried out in 1998 as it showed as much as 60% of the public school buildings being highly vulnerable and risky to use even in normal conditions. This scenario urged NSET to implement vulnerability reduction programs in schools, which led to a pilot program of retrofitting one of the public schools in a rural area of Kathmandu Valley in 1999. The total budget of the program is set 1,100,000 US dollar. The program was implemented in more than 42 schools in different parts of the country with the support from OFDA/USAID UNICEF, Give 2 Asia, Global Fund for Children, GeoHazards, International, USA Maiko High School, Kobe, Japan Support for International Disaster Education, SIDE Kobe, SNV Nepal, Room to Read, Help Nepal, World Bank, Action Aid Nepal, District Education Office Department of Education, Save the Children, Alliance, World Vision, Lutheran World Federation, Municipalities Village Development Committees and District Development Committees of Relevant Districts Different Chapters of Rotary Club Business Enterprises and Communities of Nepal.

The main goal of the project is to gradually ensure that school children in seismic regions go to earthquake-safe schools and that local communities build their capacities to cope with earthquake disasters. The targeted beneficiaries are Students, teachers and the surrounding community of the selected schools. The School Earthquake Safety Program consists of three closely inter-knit sub-components, namely, (1) Training of masons, (2) Training of teachers, parents and students on earthquake preparedness and preparedness planning, and (3) seismic retrofit or earthquake-resistant reconstruction of public school buildings.

The objectives of the program are:

- To assess the structural and non-structural vulnerability of public school buildings
- To identify and implement measures to reduce the vulnerability through retrofitting of existing buildings or construction of new buildings.
- To raise awareness of earthquake risks and preparedness of teacher's students, local and government officials and the local communities.
- To train local masons on earthquake-resistant building construction technology and
- To help schools develop and implement School Earthquake Preparedness Plan

Under the program, various activities have been accomplished. Among them designing survey questionnaire for seismic vulnerability assessment of existing school buildings, providing trainings to school headmasters and technicians for school survey, conducting survey and analysis; developing retrofitting options for typical school buildings (masonry as well as RC framed), detail design of retrofitting and implement; developing architectural designs for schools buildings, design for earthquake resistance and implement; providing training to school teachers and students on earthquake preparedness and assist schools in preparing earthquake preparedness plans for the schools and conducting awareness-raising programs in the community.

This program has been probed as a very successful in promoting community participation in all components of program activities and to raise earthquake awareness significantly. The effort has demonstrated technical, economic, political and socio-cultural feasibilities of enhancing earthquake performance of about 300 public schools in Nepal located within the Kathmandu Valley and in districts located at various physiographic regions of Nepal from the high Himalayan settlements to the plains of Terai in the south. The masons who were trained during the program are now adopting the earthquake resistant technology in their communities and replicating the technology while constructing new buildings. SESP has been very successful in promoting community participation in all components of program activities and to raise earthquake awareness significantly. It was also successful in terms of developing appropriate technical methodologies and a procedure for community-based implementation.

SEISMIC VULNERABILITY ASSESSMENT OF OFFICE AND RESIDENCES OF VARIOUS ORGANIZATIONS/INSTITUTIONS LOCATED IN NEPAL AND BEYOND

This is an ongoing program of NSET under which residential and office buildings of various national and international organizations located in Kathmandu valley and outside 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. Since there are not many institutions or consulting firms having experience and knowledge in such assessment and vulnerability reduction works NSET has been carrying out such works and trying to transfer the knowledge and technology to the concerned institutions and consultancies in Nepal. The program is being implemented since 2003. Till now, NSET has carried out more than 50 residential

and office buildings of institutions which include buildings. The total capital cost of the program is Rs. 6,000,000 Six million. Various donor agencies including American Embassy to Nepal, Kathmandu; British Embassy, Nepal; Save the Children US, Kathmandu; Save the Children-Sweden, Save the Children-Alliance, Kathmandu; ICRC, Kathmandu; Nepal Red Cross Society, Kathmandu; Rule of Law, Kathmandu; UNDP Nepal, Kathmandu; UN-OCHA, Kathmandu; WHO/Nepal; Nepal Red Cross Society– Blood Banks; Department of Health Services, Teku provided financial assistance for the program.

Some key activities accomplished under the program so far are;

- Develop, adapt methodology for seismic vulnerability assessment of typical Nepali buildings, develop survey checklist and questionnaire;
- Conduct qualitative as well as detail quantitative structural assessment of buildings;
- Assess non-structural seismic vulnerability;
- Identify intervention measures for enhancement of seismic capacity of the buildings and detail design the intervention measures; and
- Identify non-structural vulnerability reduction measures; recommend relatively safe and unsafe locations in the buildings.

Here are various seismic assessments tasks carried out by the NSET.

A. Seismic Evaluation of Keshar Mahal, Kathmandu

NSET conducted seismic vulnerability assessment of the Kaiser Mahal building, one of the historic buildings in Nepal, was built in 1895 A.D in June 2014 through September 2014 as per the tripartite agreement between the Department of Money Laundering Investigation (DMLI), Ministry of Finance, Kathmandu Valley Development Authority (KVDA) and National Society for Earthquake Technology-Nepal (NSET). The assessment was the first time in Nepal for historic buildings, before which the seismic evaluation was limited to ordinary residential, office and school buildings in Nepal. The main objective of the study was to provide recommendations for increasing the seismic safety of the building. Some specific objectives were;

- To assess the reliability of the building for different intensities earthquakes
- To provide a retrofitting option to increase the seismic safety of the building if the building has unacceptable risk level.

Documentation of the existing situation such as architectural plan, elevation and section, condition of the building were the primary goal of the project. As part of the work activities, building details, architectural details and visible physical condition was recorded. Detail field investigation was carried by implementing Non-destructive tests such as the use of micro tremor or intrusive tests as shear test, flatjack test, wood drill test and making inspection holes, to determine the structural system and the expected strength of structural elements. This was followed by detail seismic analysis of the building using SAP 2000/ETABS Structural analysis and design software.

From the investigation, it was found that all the walls are made of burnt clay brick masonry in mud mortar. The walls were laid properly with offset between adjacent layers of brick, along the length and breadth of the wall, with average mortar thickness of 10mm. Most of the load bearing walls is 900mm thick however there are some walls which have thicknesses 300mm, 450mm, 650mm, 1000mm and 1200mm.

Detail seismic evaluation of the building showed that the building needs seismic strengthening. Some structural modifications, floor stiffening and wall strengthening are required to enhance the building performance. Since, the building is in national heritage list, preservation of architectural and archaeological value is vital. As such, NSET strategy was to intervene as little as possible. So, the proposed strategy to bring the building performance within the acceptable level of safety are, addition of internal buttresses and cross walls; increase floor rigidity by floor bracing or by inserting planks on the floors; metal strapping at jambs of opening and corners; and metal strapping at sill, lintel and floor level.

B. Seismic Vulnerability Assessment and Retrofitting for British Embassy Buildings in Kathmandu Valley

This project was implemented by NSET during August 2006 to June 2011 with financial support from British Embassy in Nepal. The total capital cost of the project was 65,000 US dollar. NSET started the project with seismic vulnerability assessment of Chancery building of British Embassy in Kathmandu in 2006. After which, seismic vulnerability assessment of 21 buildings were conducted till June 2011 that included office buildings and staff residences. The methodology adopted was similar to Guideline on "Seismic Vulnerability Evaluation Guideline for Private and Public Buildings; Part I: Pre Disaster Vulnerability Assessment" prepared by NSET and published by Department of Urban Development and Building Construction, Government of Nepal. This guideline was based on FEMA 310 and "IS guideline on seismic evaluation and strengthening of buildings" and customized for Nepal building types. Amongst 21 buildings that were assessed, 10 buildings were designed for seismic retrofitting and implementation was carried out in five staff residences. All buildings assessed were masonry buildings either in mud or cement mortar except one.

Some key activities performed under the project include;

- Prepare building plan for those buildings where appropriate
- Conduct non-destructive tests
- Conduct qualitative as well as detail quantitative structural assessment of buildings;
- Identify probable structural performance of the building at different level of earthquakes
- Compare the probable performance of the building to recommended level of performance as envisioned in Nepal National Building Code
- Identify intervention measures for enhancement of seismic capacity of the buildings and detail design the intervention measures;
- Identify relatively safe and unsafe locations in the buildings
- Identify non-structural vulnerability reduction measures;
- Supervision while implementation of retrofitting work

C. Seismic Vulnerability Assessment of buildings of World Food Program sub-office facilities in Nepal

The project was implemented during August 2013 to November 2013 with the support of World Food Program. The total capital cost of the program was \$ 14,075. The project consists of Seismic Vulnerability Assessment of buildings of WFP sub-office within Nepal for its structural safety in the event of IX intensity earthquake. Description of actual services provided by your staff within the assignment: Some key activities performed by project were;

- Determination of probable earthquake intensity, soil condition and liquefaction potential at the building site

- Identification of the building typology based on construction materials and structural systems
- Detailed visual survey of the building
- Identification of strengths, deficiencies and structural vulnerability factors
- Identification of the building design criteria and structural system, and calculation of design shear forces and checking of stress in ground floor bearing walls or columns as required.
- Evaluation of performance of the building during IX intensity earthquake

D. Seismic Vulnerability Assessment of six buildings at Nepal Red Cross Society Premises

The project was implemented by NSET during July 2013 to Sep 2013 with the support from International Federation of Red Cross and Red Crescent Societies (IFRC). The total capital cost of the project was \$8,838 (NRs. 8,58,910). Some key activities performed by project were;

- Determination of probable earthquake intensity, soil condition and liquefaction potential at the building site
- Identification of the building typology based on construction materials and structural systems
- Detailed visual survey of the building
- Identification of strengths, deficiencies and structural vulnerability factors
- Identification of the building design criteria and structural system, and calculation of design shear forces and checking of stress in ground floor bearing walls or columns as required.
- Evaluation of performance of the building during IX intensity earthquake

E. Seismic Vulnerability Assessment of Saudi Pak Tower in Islamabad, Pakistan

With the view to evaluate the seismic safety of the existing building with recommendations for improving the structural as well as non-structural performance of the building, the project was implemented by NSET in April 2006 with the support of UNDP Pakistan. The assessment of the building was done based on the best engineering judgment arrived at from the site visit, study of available drawings, non-destructive test carried out at site at few possible locations. The evaluation involves detail structural analysis, use of set of checklists, calculation for critical checks and identification of potential weakness in the buildings. The major activities performed by the project were,

- Collect as-built drawings of the building and verify details at site
- Prepare inventory of non-structural items
- Conduct a survey to determine the structural characteristics of the building
- Assess non-structural seismic vulnerability;
- Assess the structural earthquake vulnerability of the building by detail analysis
- Prepare the report detailing procedures and presenting findings and recommendation

SHAKE TABLE DEMONSTRATION

Shaking Table Demonstration is an innovative concept of adopting shaking table, a very scientific too, for public awareness which has brought NSET, TECH Museum Award (Microsoft Education

Category) in 2002. As part of the Shake table demonstration, two similar models of same shape and size but one with earthquake resistant features and other without it are shaken together on a shake table in public so people can compare effectiveness of earthquake resistant construction. NSET has been successfully implementing it in various parts of the world, namely, Afghanistan, India, Indonesia, Iran, Japan, Nepal, Pakistan, Tajikistan. For this, the estimated 150,000 US dollar received from various organizations. The project was implemented in various countries including Shelter for Life (SFL) Afghanistan (2003) and Tajikistan (June 2004), United Nations Center for Regional Development (UNCRD), CODE-Kobe, Japan – Bam Iran (October 2004), UNDP – Bam Iran (December 2004 - March 2005), UNCRD, Building Research Institute (BRI) and Hyogo Prefectural Government - demonstrations during World Conference on Disaster Reduction (WCDR) (January 2005), Asian Disaster Reduction and Response Network (ADRRN) and MERCY Malaysia – Banda Aceh, Indonesia (April 2005), Department of Urban Development and Building Construction (DUDBC), Municipalities, Society for Consulting Architects and Engineering Firms (SCAEF) Lutheran World Federation and many other national international agencies for demonstrations in various locations of Nepal(more than 20 demonstrations (1999 - till date), JICA/Pakistan on PP Band Technology in Pakistan (2006), World Bank/Indonesia and BRI/Japan in Banda Aceh, Indonesia (2006) and UNCRD/Japan, BDPC/Bangladesh - in Dhaka (2007).

The work includes design and fabrication of shaking table, model design and construction supervision, and demonstration of model performance in public. Some key activities performed under the project are;

- Design and fabrication supervision of shaking table;
- Section of local building type and model design;
- Model construction supervision; and
- Demonstration of building behavior in public.

A. Shake Table Demonstration in Banda Aceh

The Shake Table Demonstration was a part of the training to the housing facilitator of the World Bank in Banda Aceh, Indonesia. NSET provided technical assistance to the World Bank/Indonesia in association with Building Research Institute (BRI) of Japan to conduct a shake table demonstration of model buildings in Banda Aceh, Indonesia between June 2006 to July 2006 in order to raise awareness on earthquake resistant construction practices and promotion of safer houses in Aceh. The total budget 22,000 US dollar. The program period was for a month for making the model buildings and conducting the shaking table demonstration.

B. Shake Table Demonstration of PP Band Technique in Pakistan

NSET provided technical assistance to JICA/Pakistan in association with Tokyo University to conduct the shake table demonstration of model buildings with PP Band technology in Muzaffarabad and Bagh (earthquake affected areas) of Pakistan. The program period was for two months during Feb 2006 to March 2006 for making the model buildings and conducting the shaking table demonstration. The total budget for the project was 17700 US dollar. The objective of the program was to raise awareness of earthquake resistant construction technology to the large number of people in Pakistan and disseminate information on new PP Band technology in building construction and train the technicians on this new technology in Pakistan as well as see the possibility to bring this new construction technique to Nepal.

PUBLIC AWARENESS PROGRAMS

All the NSET programs consist of public awareness-raising components and that has helped raise significant awareness and disaster literacy among commoner people, policy makers and implementers. The target groups of NSET's awareness activities are not only the poor and illiterate but also the educated urban elite, not only the 'community people' but also the top-level officials, policy and decision makers including professional of allied disciplines.

NSET aims to accomplish its mission through

- Knowledge & Information Management: develop, produce and disseminate IEC Materials (Publications, A/V Materials etc.);
- Coordination & Collaboration with mass media, new media and all means of public communications to enhance earthquake safety; and
- Networking & Outreach: connecting, sharing, learning and working with multiple stakeholders at local, national, regional and global level to institutionalize risk reduction initiatives.

NSET uses all the possible and available media for raising awareness on disaster risk and earthquake related issues. NSET's awareness raising messages are scientifically proven (in the country and abroad) and NSET takes responsibility for the contents. NSET packages the content in such a way that it is well understood, accepted, internalized and that helps changing the behaviours.

A. Awareness (IEC) Materials production and dissemination

NSET produces various information, education and communication (IEC) materials and disseminates in different communities and clusters. NSET has been producing publication materials in the form of Flier, Poster, Advisory, Guideline, Manual, Booklet, Story Book, Brochure, Notebook, Diary, Dictionary and Kit targeting to community people and various social groups including school children, teachers, community front-liners, house-owners, women groups, DRR practitioners, policy makers and others. These materials are widely disseminated.

NSET also produces various A/V materials such s Short Video, Film, Documentary, Telefilm and Visual messages (Public Service Announcements - PSAs) focusing on Earthquake Risk Management. NSET, in association with various stakeholders, has produced more than 40 videos and more than 50 PSAs so far related to earthquake safety and disaster risk management. NSET manages dissemination of these visual materials through national national and local television channels as much as possible. NSET visual materials are available on NSET's Youtube Channel.

NSET produces and distributes visual materials in DVD also. NSET has produced 20 thousand of orientation video in DVD and distributed to schools, community organizations and various stakeholders. NSET produced a 60-minute Telefilm entitled "Ghar" meaning "House" which was broadcasted from national television channels. NSET also produced a 5-minute video "Feeling the Risk" that reveals and highlights the various seismic vulnerability factors of Kathmandu. NSET worked with UNDP in developing Video Toolkit for Earthquake Safe Building Practices in Nepal. The storyline is based on contents of National Building Code (NBC) provisions and also on the experiences of building construction practices in Nepal

B. Mass Media Campaigns

NSET works with different mass media which have been proved as effective advocacy tools in a bid to promote education, knowledge and awareness among the common people to policy/decision makers & implementers. NSET works to coordinate with mass media institutions for disaster

reporting, helps build their better understanding on disaster issues and encourages media discourses on various facets of Disaster Risk Management.

NSET also collaborates with media institutions for the regular or periodic media activities focused to the theme of Earthquake Risk Management and Disaster Risk Reduction.

a. Collaboration for Radio Program

NSET has established partnership with a number of FM radio stations to spread awareness messages about the risks associated with earthquakes and advocate on risk reduction issues. NSET began collaborating with radio stations from the first community radio in South Asia, Radio Sagarmatha, in Kathmandu from 2002. Outside the Valley, NSET first collaborated with Annapurna FM station in Pokhara to disseminate earthquake safety tips and preparedness. The weekly talk and discussion programs aim at enhancing earthquake awareness and influencing public policy on disaster management by creating public demand. As of now, NSET has collaborated with more than 45 community and private radio stations, with the program aired to cover almost 85% of country's territory.

b. Television Program

In a bid to promote the earthquake resistant house construction practices and disseminate the important information to households in this regard, NSET has also been producing and broadcasting a weekly TV program called Balio Ghar through four Television stations namely, Kantipur Television, Image TV, Avenues TV and News24 Television. Previously, NSET had also produced and broadcasted two television talk shows (Talk of the Town and Shankalpa) as well as one TV magazine (Surakishit Samudaya), weekly on different television stations for earthquake risk reduction. Likewise, a TV magazine (Bhukampia Suraksha) was also broadcasted weekly on different televisions aiming at earthquake risk reduction and safer construction practices.

c. Print Media

NSET works with Print Media in coordination and partnership at the level possible. The purpose is to disseminate earthquake safety messages timely, accurately and widely. NSET conducts orientations, workshops, field visits and interactions for media people including print media with the view to promote their engagement in media issues.

d. Awareness through Social Media Campaign

By utilizing the multi-purpose social networking platform, NSET is campaigning through social media platforms and other new media. NSET prioritizes the messages on earthquake safety, preparedness and now safer reconstruction practices and make them public. NSET along with its program's social media platform has got wider followers.

C. Orientations

NSET is conducting orientation programs on earthquake safety in the communities, schools, hospitals, government offices, provate sector businesses, NGOs, CBOs, and international as well as diplomatic agencies. The NSET conducted orientation programs are intended to make the group familiar with earthquake hazard and risk of Nepal, provide risk reduction ideas and also make them knowledgeable on earthquake preparedness and life saving tips such as what to do before, during and after an earthquake; how to prepare at individual, family and community level; and etc. These programs have been very helpful to enhance public understanding on aspects of Earthquake Risk Management that has helped in DRR policy efforts to actions on risk reduction and preparedness at various level.

D. Street Drama

Realizing the effectiveness of drama as means of public awareness promotion, NSET has been working with Drama teams to use the innovative ways of awareness raising. NSET collaborates with street drama team/s on regular basis as part of program activities and also on certain occasions such as Earthquake Safety Day.

E. House owners Consultation Program

Free consultations in the form of workshops are provided to the potential house owners who are planning to construct new house in Kathmandu Valley. This weekly consultation program focuses on how to construct earthquake resistant buildings and usually the house owners come with their masons, contractors or the technicians to learn about the technology.

F. Mobile Earthquake Clinics

"Mobile Earthquake Clinic" is to provide on-site consultation on earthquake resistant building construction to the house-owners who are constructing new houses. NSET team consisting of Engineer, construction technician and social mobilizer visits building construction sites, observes the construction process and advises further as needed. The aim of the Mobile Clinic is to help improve the construction practices. NSET has conducted such clinics under various programs such as building code support programs, reconstruction support program etc. Mobile Clinics have been very effective to indetifying the problems in the real ground and also help make correction to improve the seismic safety level of building structures.

G. Earthquake Vulnerability Walks

Vulnerability Tour is a guided tour in a defined route or a defined location to observe different vulnerability factors. NSET conducts such tours in different routes in Kathmandu valley. The purpose is to make feel how vulnerable the city's buildings and critical facilities are to earthquakes. The tour aims to convince common people to 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, lifeline structures and their combination.

COMMUNITY BASED DISASTER RISK MANAGEMENT PROGRAM

NSET started community based earthquake risk reduction initiative in ward number 34 of Kathmandu Metropolitan City in 2001. This program seemed to be very much promising at the initial stage. The lessons from the first initiative were applied in ward number 17 in 2002. NSET carried out similar intervention but involving the local authority - the ward office and also local rotary club. NSET clearly mentioned that it would facilitate them to work for earthquake risk reduction. The local committee then required to active in carrying out the works independently after a couple of years of technical input from NSET. This model worked better, and 17 wards Disaster Risk Management Committee has remained active till date.

NSET then started to replicate the CBDRM initiatives in other communities with improved implementation strategy from the lessoned learned. There was high need to cover multi-hazard disaster risk reduction initiatives as the community people were facing frequent disasters like epidemics, fire, flash floods and landslides every year where as earthquakes have a long return period with heavy devastations as compared to other disasters.

NSET works as a facilitator for the community and the local government to develop and implement the Local Disaster Risk Management Plans (LDRMP) which are prepared as guided by LDRMP Guidelines. NSET has a three-pronged implementation strategy consisting of Institutional Development, Capacity Building and Demonstration. Networking with the local, national and regional organizations has been also considered to enhance the sustainability of the disaster risk reduction endeavors.

TRAINING PROGRAMS:

NSET, as an outcome of the rich experiences gained during last 20 years, 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. A series of training courses are being organized as part of the various project activities, and also in collaboration with the Department of Urban Development and Building Construction (DUDBC), municipalities, professional societies, business community and other partnering institutions.

NSET PUBLICATIONS

- Nepali Version of "Earthquake Scenario of Kathmandu Valley, 1999
- The Kathmandu Valley Earthquake Risk Management Action Plan, 1999
- Nepali Version of "Earthquake Preparedness Hand Book," 1999
- Proceedings of Asian Seismological Commission, ASC 2002
- A Manual for Designers and Builders, 2002
- Bhaicha (illustrated Story on Earthquakes)
- Non-Structural Vulnerability Assessment of Hospitals in Nepal, 2003
- Nepali Version of "Earthquakes (Frequently Asked Questions and Answers), 2003
- Guidelines for incorporating Earthquake Safety Measures in Repair and Maintenance of Buildings with Historical/ Archaeological importance, 2004
- What to do during an Earthquake (In Nepali), 2004
- English Version of "Earthquake Scenario of Kathmandu Valley", 2004
- "Training Course for Masons on Earthquake Resistant Construction technology, Instructors' Manual", published jointly by NSET and ADPC, 2004
- "Guideline for Seismic Vulnerability Assessment of Hospitals," published jointly by NSET, WHO and Ministry of Health, 2004
- Nepali Version of "Nepal National Building Code NBC- 2004,
- Earthquake Resistant Construction of Building Curriculum for Mason Training (Guidelines for
- » Post Gorkha Earthquake Scenario of Kathmandu Valley
- » House Owner's Guideline
- » 30 FAQ and Answers by NSET
- » NSET Newsletter July-Oct 2019
- » NSET Newsletter Oct-Dec 2019
- » NSET Profile
- » Safer Society 2018
- » Safer Society 2019

Non-Structural Vulnerability Assessment of Hospitals in Nepal

<u>A Structural Vulnerability Assessment of Hospitals in Kathmandu Valley</u> <u>Safer Society</u>

- » Retrofitting of Common Frame Structural (Pillar System) Houses
- » What are the tricks for Constructing Earthquake-resistant Buildings
- » Earthquake Resistant Construction of Buildings Curriculum for Mason Training
- » Guidelines for Seismic Vulnerability Assessment of Hospitals
- » School Earthquake Preparedness: A TOT Manual for Teachers Training
- » The Kathmandu Valley Earthquake Risk Management Action Plan
- » Earthquake Preparedness Handbook
- » Earthquake Scenario of Kathmandu Valley
- » Earthquake Scenario of Kathmandu Valley
- » Protection of Educational Buildings Against Earthquake Manual for Designers and Builders
- » What to Do during an Earthquake Ten tips
- » Guidelines for incorporating Earthquake Safety Measure in Repair and Maintenance of buildings with H
- » Adobe Homes Brochure V17
- » Nepal Disaster Report 2011
- » Views from the Frontline 2011 Nepal Report
- » Seismic Vulnerability of the Public School Buildings of Kathmandu Valley and Methods for Reducing It
- » Shocks & Reverberation A Creative Journey 2012
- » Proceedings of the Symposium on Seismology, Earthquake Hazard Assessment and Risk Management Octob
- » <u>FAQ</u>
- » Terminology on Disaster Risk Reduction
- » Safer Society NSET Report 2013
- » Safer Society NSET Report 2014
- » LDRMP Dharan
- » Atlas of Open Spaces KVDA
- » Emergency Preparedness and Response Planning for Business
- » Handbook on Non-Structure Mitigation for residences and offices
- » Baliyo Ghar Brochure (English)

(https://www.nset.org.np/nset2012/index.php/recent)

NSET PARTNERS: INSTITUTIONS THAT HELPED US GROW THROUGH COLLABORATION AND SUPPORT

National

- Armed Police Force (APF)
- Bhaktapur Sub-Metropolitan City
- Bagmati Rural Municipality
- Department of Education (DoE)/(Center for Education and Human Ressource Development)
- Curriculum Development Center (CDC)
- Department of Archeology (DoA)
- Department of Mines and Geology
- Department of Urban Development and Building Construction
- Disaster Management Committee, Alapot
- Disaster Management Committee, Ward No.12, Lalitpur Sub Metropolitan City
- Disaster Management Committee, Ward No. 18, Kathmandu Metropolitan City
- Disaster Preparedness Network (DPNet), Nepal
- Diploma Engineers' Association, Nepal
- Federation of Contactors' Associations of Nepal (FCAN)
- Federation of Nepalese Chamber of Commerce and Industries (FNCCI)
- Heavy Equipment Association Nepal (HEAN)
- Hotel Association of Nepal (HAN)
- Institute of Engineering, Tribhuvan
 University
- Institute of Medicine, Tribhuvan University
- Initiative Outdoor (IO), Nepal
- Kamal Rural Municipality
- Kathmandu Valley Development Authority (KVDA)
- Kathmandu University
- Kirtipur Women's' Network
- Lalitpur Metropolitan City
- Lumanti Support Group for Shelter
- Ministry of Education, Science and Technology
- Ministry of Health
- Ministry of Home Affairs (MoHA)
- Ministry of Federal Affairs and Local Development (MoFALD)
- Ministry of Environment, Science and Technology
- Ministry of Physical Infrastructure & Transport (MoPIT)
- Ministry of Urban Development (MoUD)

- Ministry of Women, Children and Social Welfare
- Municipalities of Kathmandu Valley and other districts
- National Disaster Management Network of Nepal (DiMaNN)
- National Network of Women for Community Resilience
- Nepal Academy of Fine Arts (NAFA)
- Nepal Amateur Radio Operators' Society (NAROS)
- Nepalese Army (NA)
- Nepal Association of Tour and Travel Agent (NATTA)
- Nepal Bankers' Association (NBA)
- Nepal Bureau of Standards and Metrology
- Nepal Engineering Council (NEC)
- Nepal Engineers Association (NEA)
- Nepal Forum for Environmental Journalists (NFEJ)
- Nepal Geological Society (NGS)
- Nepal Red Cross Society (NRCS)
- Nepal Mediciti Hospital
- Nepal Police (NP)
- Nepal Telecommunications Authority (NTA)
- Nepal Tourism Board (NTB)
- Nepal USA Chamber of Commerce and Industry (NUSACCI)
- National Police Academy
- Rotary Club, Bhainsepati
- Sakha & Co. Private Limited
- Shivam Cement Private limited
- Social Welfare Council
- Society of Consulting Architectural and Engineering Firms
- Society of Nepalese Architects
- Disaster Management Committee, Ward No.12, Lalitpur Sub Metropolitan City
- Bhaise, Bagmati Gaupalika- 3, Lalitpur
- Society for Urban Poor (SOUP)
- Shaplaneer
- Forum for Awareness and Youth Activity, Nepal (FAYA) Kailai
- Ratanchura VDC (Golonjor Gaupalika-5) sindhuli
- Jhagajholi Ratmata VDC (Sunkoshi Gaupalika 3,4) Sindhuli
- Katunjebeshi VDC (Roshi Gaupalika 7) Kabhre
- Banepa Municipality, Kabhre
- Dhangadhi Sub-Metropolitan City
- Bhimdutta Municipality
- Nepalgunj Sub-Metropolitan City
- Thankot Women's Cooperative Network

- Karnali Integrated Rural Development and Research Center (KIRDARC)
- Nepal Mediciti Hospital
- Nawa Prabhat Nepal
- Architects Sans Frontiers Nepal
- Institute for Social and Environmental Transition-Nepal (ISET)
- JICA Nepal
- Earthquake Safety Solutions
- Three H Management

Building Code Implementation Program Municipalities

- Amargadhi Municipality, Dadeldhura
- Baglung Municipality, Baglung
- Bardaghat Municipality, Nawalparasi
- Bardibas Municipality, Mahottari
- Besishahar Municipality, Lamjung
- Bhadrapur Municipality, Jhapa
- Bharatpur Metropolitan City, Chitwan
- Bheriganga Municipality, Surkhet
- Bhimeshwor Municipality, Dolakha
- Biratnagar Metropolitan City, Morang
- Birendranagar Municipality, Surkhet
- Birtamod Municipality, Jhapa
- Butwal Sub-Metropolitan City, Rupandehi
- Damak Municipality, Jhapa
- Dhangadhi Sub Metropolitan City, Kailali
- Dhankuta Municipality, Dhankuta
- Dharan Sub-Metropolitan City, Sunsari
- Gaindakot Municipality, Nawalparasi
- Ghorahi Municipality, Dang
- Godawari Municipality, Kailali
- Gorkha Municipality, Gorkha
- Guleriya Municipality, Bardiya
- Siddharthanagar Municipality, Bhairahawa
- Tansen Municipality, Palpa
- Triyuga Municipality, Udaypur
- Tulsipur Municipality, Dang
- Vyas Municpiality, Tanahun

Media Partners

- All Three Media Ghar, Ktm
- Bhimeshwor FM, Dolakha
- Bulbule FM, Surkhet

- Hetauda Sub Metropolitan City, Makwanpur
- Inaruwa Municipality, Sunsari
- Itahari Sub-Metropolitan City, Sunsari
- Janakpur Sub-Metropolitan City, Dhanusha
- Kamal Rural Municipality, Jhapa
- Kamalamai Municipality, Udaypur
- Karyabinayak Municipality, Lalitpur
- Kawasoti Municipality, Nawalparasi
- Khandbari Municipality, Sankhuwasabha
- Kohalpur Municipality, Banke
- Lalitpur Metropolitan City
- Manthali Municipality, Ramechhap
- Mithila Municipality, Dhanusha
- Narayan Municipality, Dailekh
- Nepalgunj Sub Metropolitan City, Banke
- Phidim Municipality, Panchthar
- Putalibazar Municipality, Syangja
- Sainamaina Municipality, Rupandehi
- Shuklagandaki Municipality, Tanahun
- Shuklaphata Municipality, Kanchanpu

- Dinesh FM, Kailali
- Hamro Radio, Dolakha
- Kalinchowk FM, Dolakha

- Media Helpline, Ktm
- Mero FM, Ktm
- Nuwakot FM, Nuwakot
- Radio Audio, Ktm
- Radio Bihani, Dhading
- Radio Dhading, Dhading
- Radio Jalapa, Nuwakot
- Radio Janasanchar FM, Bhaktapur
- Radio Krishnasar FM, Banke
- Radio Sagarmatha 102.4MHz, Ktm
- Radio Trishuli, Nuwakot
- Sailung FM, Dolakha
- Saptakoshi FM, Sunsari
- Ujyalo 90 Network, Ktm
- Vijaya FM, Nawalparasi
- Watch Dog Media Services
- Media Helpline
- Radio Khandbari FM 105.8 MHZ, Sankhuwasabha
- Samad F.M. (102.6 MHz) Siraha
- The Radio Makalu Dhankuta

- Radio Sargam Jhapa
- Radio Nepalbani F.M.94.9 Ilam
- Radio Triveni 100.6 Mhz Chitwan
- Radio Rudraksha (103.4 Mhz.) Mahottari
- Radio Sarlahi, Sarlahi
- Star FM, Kathmandu
- Radio Myagdi 104.4 MHZ, Myagdi
- Community Radio Vijay FM Nawalparasi
- Butwal FM Rupandehi
- Radio Marsyangdi 95 MHz Lamjung
- Shreenagar FM Palpa
- Radio Annapurna 93.4 MHz Pokhara
- Bulbule FM Surkhet, Surkhet
- Community Radio Nepali Aawaj FM, Kalikot
- Radio Krishansar F.M. Banke
- Radio Karnali, 105.2 MHz, Jumla
- Radio Madhyapaschim, Dang
- Saipal FM 100.6 MHz, Bajhang
- Radio Mahakali, Kanchanpur
- Dinesh FM 93.8 MHz, Kailali

International

- Action Aid International Nepal
- All India Institute of Hygiene & Public Health (AIIH&PH), India
- Ambulance 118, Indonesia
- American Heart Association
- American Red Cross
- American Society of Nepalese Engineers
- Amity Public Safety Academy of Philippines
- Asian Development Bank (ADB)
- Asian Disaster Preparedness Center (ADPC)
- Asian Disaster Reduction Center (ADRC)
- Asian Disaster Reduction and Response Network (ADRRN)
- Asian Seismological Commission
- Alliance for Adaptation & Disaster Risk Reduction, India
- Badan Koordinasi National of Indonesia
- Badan Search and Rescue National of Indonesia
- Bangladesh Disaster Preparedness Centre

- Global Network of Civil Society Organisations for Disaster Reduction (GNDR)
- Bangladesh Red Cresent Society (BDRC)
- Beijing Normal University, China
- Boarder Security Force of India
- Building Research Institute of Japan
- CAN-USA
- Central Reserve Police Force, India
- Central Industrial Security Force, CISF, India
- Chittagong University of Engineering & Technology (CUET)
- Christian Aid-UK
- Commissioner ate of Health & Medical Services, Gujarat, India
- Center for Participatory Research and Development, Bangladesh
- Crown Agents, UK
- Danish Cultural Institute, Denmark
- Directorate General of Health Services (DGHS), Bangladesh

- Disaster Management Bureau of Bangladesh
- Disaster Prevention Research Institute DPRI/Kyoto University
- Durham University, Institute of Hazard, Risk and Resilience (IHRR)
- Earthquake and Megacities Initiatives
 (EMI)
- Earthquake Engineering and Research Institute
- Emergency Rescue Unit Foundation of Philippines
- Emergency Medical Relief (EMR)/ Directorate of Health Services, New Delhi, India
- Earthquake Reconstruction and Rehabilitation Authority (ERRA), Pakistan
- European Center of Training and Research in Earthquake Engineering (EUCENTRE), Italy
- EHIME University, Japan
- Fire National Training Institute of Philippines
- Fire Service and Civil Defense Directorate of Bangladesh
- Focus Humanitarian Assistance, Pakistan
- GeoHazards International
- Give2Asia
- Global Earthquake Model (GEM)
 Foundation, Italy
- Global Network of Civil Society Organizations for disaster Reduction (GNDR)
- Graduate Research Institute for Policy Studies (GRIPS) of Japan
- Handicap International
- Indian Tibetan Boarder Police (ITBP), India
- Indian Medical Association, (IMA), India
- Indonesian Red Cross
- Institute of Mountain Hazards and Environment, Chengdu
- Integrated Research on Disaster Risk (IRDR)
- International Association of Earthquake
 Engineering
- International Centre Integrated Mountain
 Development
- International Federation of Red Cross Crescent Societies (IFRC)

- International Resources Group
- Janathaksan, Sri Lanka
- 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
- Karlsruhe Institute of Technology (KIT)
- Kunming University, China
- Lutheran World Federation
- MERCY Malaysia
- Mercy Corps, Nepal
- 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 Disaster Response Force (NDRF), India
- National Health Emergency Preparedness and Response Network (NHEPRN), Pakistan
- 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
- Network of Disaster Management Practitioners (NDMP), Pakistan
- New Zealand Society for Earthquake
 Engineering
- OGS, Istituto Nazionale di Oceanografia e Geofisica Sperimentale (National Institute of Oceanography and Applied Geophysics)
- Oxfam GB Nepal
- Pakistan Red Crescent
- Plan Nepal
- Practical Action, Nepal

- Philippines General Hospital
- Punjab Emergency Services, Rescue 1122, Pakistan
- Reynolds Geo-Sciences Limited, UK
- SAARC Disaster Management Center, SDMC
- Safety Solutions Incorporated, USA
- Save the Children, Nepal
- Sustainable Environment and Ecological Development Society (SEEDS/India)
- Shanti Volunteer Association
- The International Institute for Geo-Information Science and Earth Observation (ITC)
- The World Bank
- United Mission to Nepal
- United Nations Center for Regional Development - Disaster Management Planning Hyogo Office

- United Nations Development Programme, Geneva, Pakistan, India, Nepal, China, Thailand offices)
- United Nations International Strategy for Disaster Reduction (UNISDR)
- United Nations Educational, Scientific and Cultural Organization
- United Nations International Children's Emergency Fund (UNICEF)
- United Nations World Food Programme (WFP)
- University of Basilicata, Potenza, Italy
- University of Sapienza, Rome, Italy
- University of Durham
- United Nations Human Settlements
 Programme (UN-Habitat)
- U.S. Office of Foreign Disaster Assistance (USAID/OFDA)
- World Health Organization
- World Seismic Safety Initiatives (WSSI)



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