Safer Society

NSET Report 2017

सुरक्षित समुदायका लागि समर्पणको २५ औं वर्ष

NSET

Earthquake Safe Communities in Nepal

National Society for Earthquake Technology-Nepal (NSET)

Safer Society
Annual Report 2017

National Society for Earthquake Technology-Nepal (NSET)

Cover Photo (Front)
Female participants during practical session of Mason Training conducted by NSET under USAID program on Baliyo Ghar in Dolakha

Cover Photo (Back)
Shake table demonstration held in district Headquarter of Dhading on the occasion of Earthquake Safety Day 2017 Dhading

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Earthquake Safe Communities in Nepal

National Society for Earthquake Technology-Nepal (NSET)

Message from the President

Mr. Varun Prasad Shrestha

We are happy to present NSET Report 2017. This report is a compendium of achievements and lessons from NSET's endeavours towards enhancement of disaster resilience of Nepal during the year 2014-2017. We could not bring its edition in 2015 and 2016 due to 2015 Gorkha Earthquake and urgent mobilization in reconstruction works. This year has been momentous in the sense that NSET completes the 24 years of collaboration, commitment and actions in Earthquake Risk Management in Nepal and the Region; and hence enters into the Silver Jubilee Year.

Gorkha Earthquake 2015 has taught us much and we are not to forget the lessons of this devastating earthquake. Our beloved families suffered much, our Nation suffered much and we had to incur irreparable losses of human lives. We feel very much saddened to witness this amount of loss. We, together, should commit that this should not continue in the days to come.

Nepal has a big responsibility to rebuild such a big number of residential buildings, schools, hospitals and heritage sites. This is also a huge opportunity too. Our reconstruction should help reduce potential seismic threat. Reconstruction is progressing slowly but we have had good start with globally recognized better policies. Need is to continue technical assistance for Build Back Better. We, from NSET, are committed to continue the same.

NSET strongly believes that the earthquake resiliency of communities can be achieved through enhancing awareness and building capacity by helping them to understand seismic risk and providing them with simple and practical methods in mitigating the risks.

NSET is grateful that its work has been recognized with the wider acceptance of concepts, methodologies and safety measures NSET has been developing and propagating in Nepal and the region.

On behalf of the NSET Board, I would like to thank all Government agencies, civil organizations, international agencies and individuals for their initiatives and partnerships with NSET in their Disaster Risk Management Programs.

In conclusion, I would personally like to commend all the staff at NSET for their hard and dedicated work. With your continued and sustained efforts, I'm sure we can achieve NSET Vision of 'Earthquake Safe Communities in Nepal'.

Thank you!

U. P. Shrestha

Message from the Executive Director

Dr. Amod Mani Dixit

Gorkha Earthquake 2015 was a real life test of rightness of our mission, vision, objectives and the reason of our existence and this publication wants to convey our sense of pride at the service to the people and the nation in aspects of earthquake risk management over the past 24 years of our existence. It also wants to underscore that this unique mission to help people become safer from earthquakes and other forms of natural hazards was possible because of the understanding and cooperation we received from our stakeholders in Nepal and the world over. This publication wants to convey a story of the adaptive use of modern science and technology and their contextualization considerring the ground realities in a weak economy country, story of developing and improvising methodologies of risk reduction, risk communication, creation of models of seismic vulnerability reduction, making schools and hospitals safer, and establishment a culture of safety, recognizing the traditional wisdom of safe construction as seen widely in our monuments and its use for enhancing peoples' acceptability of the scientific approaches of earthquake risk management efforts.

This also wants to convey the patriotic story of our young scientists, engineers and social mobilizers who have been serving successfully the municipalities and house owners in ensuring improved seismic performance of new constructions, working with the masons and construction contractors in establishing the concept and acceptance of seismic retrofitting in the context of Nepalese construction practices, in ensuring maximum compliance of standards and code provisions in earthquake reconstruction, in ensuring embedment of experiences and lessons learned into policies by providing scientific evidences, in conducting scientific researches and inculcating a culture of evidence-based decision making. This publication wants also to report on NSET fruitful collaboartion with international academia and research stations not only for ensuring high standards of our work in Nepal but also in our collaborative work in exploring the solutions for hazard risk reduction globally.

We also want to announce about our programs and prospects for the Silver Jubilee year of NSET, which we will observe during June-2017-June 2018. We will organize an International Conference in the summer of 2018 with the purpose of conveying to the world our successes and challenges of earthquake reconstruction, of our preparedness for the next Big One which looms over our head, of our quest for bringing science and techninology to the last mile and to the last household to assist our government's vision of decentralising disaster risk reduction in line with Nepal's commitments to the Sendai Framework for DRR, in parallel with the natioanl pursuit of devolving the governanvce authority to the village councils and municipalities, and in line with the national commitments made by Nepal towards achieving the sustainable development and enviromental preservation goals.

We also want to reassure our friends and well wishers, federal and local authorities, scientists and masons, and the people that we will continue in years to come to serve the nation by continuing doing what we did so far, and will add new dimensions to our services. NSET has already promoted a "Profit not distributing Company" called Earthquake Safety Solutions (ESS) as an idependant legal institution that aims to provide fee-based consulting services in Nepal and the region on every aspects of earthquake risk management. In the near future, our aim is to promote a similar institution for providing standard quality services in laboratiory and field testing of soil and materials, a full fledged training institute that will provide training on science and techniologies of integrated hazard, risk and social and economic vulnerability assessment and mitigation.

We request for continued understanding and support from all for your support, critique, sugestions and encouragements for ensuring that or work continues to serve the nation meaningfully.

Thank you!

Earthquake affected family at Information Desk set up by NSET implemented by Baliyo Ghar Program in Nuwakot

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Participants of "Disability Inclusive Earthquake Safety Walkathon" held in Patan, Lalitpur during Earthquake Safety Day 2017

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 is the national member of the International Association for Earthquake Engineering (IAEE), and it also sits in various regional and global networks on earthquake and disaster risk management.

Vision

Earthquake Safer Communities in Nepal by 2020

Mission

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

Objectives

NSET has a three-pronged strategy:

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

NSET's Values

NSET has been guided by its institutional beliefs, values and principles developed internally and also adopted from good practices of various institutions; local, regional and/or global. Bringing "substantial change in the application of technology to the many facets of earthquake disaster management for saving the lives of the people" has remained the guiding philosophy of NSET ever since its inception.

NSET:

- Is concerned with the ever-growing earthquake risk in the country, and is deeply convinced in the possibility of making a change despite the generally adverse economic condition of the country, and is determined to achieve reduced earthquake risk in Nepal with time.
- Firmly believes that Nepalese initiatives are primary for achieving any risk reduction. International assistance can, at best, help the local initiatives.
- Will act as a working platform for all, national or international, irrespective of caste, creed, religion, age, gender, race, to contribute towards reduced earthquake safety in the country.
- Will not endorse political parties or candidates, political philosophies or policy issues other than those directly related to the primary mission of reducing death and injury from earthquakes in Nepal, but will engage in political processes, as necessary, to advance earthquake safety.
- Will operate as a NGO governed by highest ethical/professional standards, uphold the principles of integrity, including transparency and accountability in the use of funds, and decisions regarding projects, people and remuneration.
- Will not confront or compete with any individual or organization, but will facilitate the work of other organizations and will help them and individuals develop the skills needed for earthquake risk mitigation; will participate developing network and synergy.

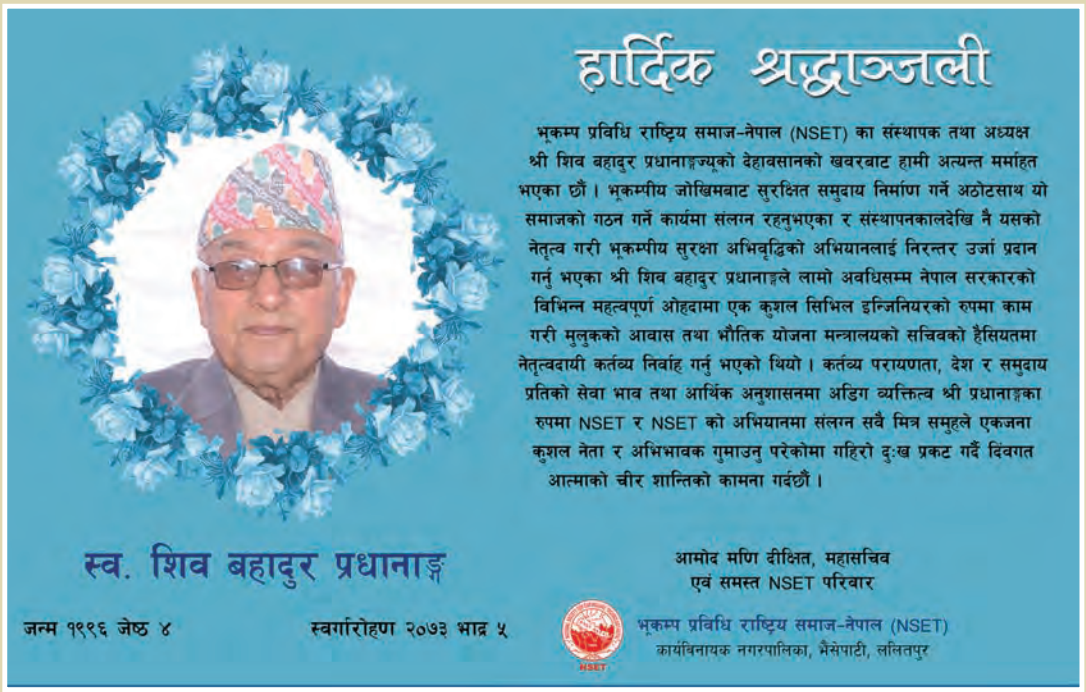
- Is non-judgmental. It understands the overriding national developmental priorities such as basic and primary health, education, infrastructure, etc. but firmly believes in the benefits of integrating mitigation in development efforts. Therefore it will try to influence new investments by multilateral and bilateral agencies to consider earthquake -resistance adequately in their investments in Nepal.
- NSET will seek, translate and transfer foreign and domestic knowledge and research results to the earthquake problem in Nepal, as also to bring state-of -the -act earthquake technology to Nepal.

NSET mourns at sad demise of Founder and President Mr. Shiva B Pradhanang

NSET deeply mourns at the sad demise of Founding President Mr. Shiv Bahadur Pradhanang. Mr. Pradhanang passed away at the age of 77 years on August 21, 2016. Mr. Pradhanang commanded respect from all because of his excellence of engineering decision, strict financial management and compliance of the rules of law, transparency of decision and sincerity in the sense of duty to the people and nation. His loss was deeply mourned by all who knew him including the NSET staff and board members.

NSET Family pays high regards and tributes to departed soul of Late Mr. Shiva Bahadur Pradhanang and also commits to uphold the values and spirit of the organization encrypted and ever enhancing since the very inception under the guidance and guardianship of Mr. Pradhanang.

Prayers and Heartfelt Condolences



Mr. Pradhanang was a natural leader of engineering community of Nepal – he commanded respect from all because of his excellence of engineering decision, strict financial management and compliance of the rules of law, transparency of decision and sincerity in the sense of duty to the people and nation.

Change in NSET Management Committee: Mr. Varun Prasad Shrestha - President, Dr. Ramesh Guragain - Member

NSET Executive Board has elected Mr. Varun Prasad Shrestha as the new President. Mr. Shrestha had been serving in past Executive Committee of NSET since 2005. Special General Meeting of NSET held on Sep 3, 2016 filled in the vacant position in the Executive Board created after the sad demise of NSET Founding President Mr. Shiva Bahadur Pradhanang. Mr. Shrestha has been unanimously elected for the position to lead NSET efforts on helping build resilience.

Mr. Varun Prasad Shrestha is professionally a Civil Engineer. He holds Master's Degree in Civil Engineering from the University of Utah, Salt Lake City, USA. Mr. Shrestha is a former Secretary of Nepal Government in various ministries; namely Ministry of Housing and Physical Planning, Works and Transport; Ministry of Population and Environment; and Ministry of Tourism, Culture and Civil Aviation. He served with the Government for various positions in his 30 years tenure. After retirement from the government service, Mr. Shrestha joined NSET as Senior Technical Advisor and also provided leadership and guidance for NSET's implementation of regional program "Program for Enhancement of Emergency Response (PEER)" as Deputy Chief of Party.

Special General Meeting has also inducted Dr. Ramesh Guragain as a member in the committee.

NSET family congratulates a newly elected NSET President and Management Committee member, and also extends best wishes for the worth tenure ahead.

Newly elected NSET President Mr. Varun Prasad Shrestha with NSET Management Committee Members and NSET General Members after Special General Meeting of NSET, September 2016

NSET Annual General Meeting held, focus is on Post EQ Reconstruction

The National Society for Earthquake Technology-Nepal (NSET) held its 23rd Annual General Meeting (AGM) on December 11, 2016. NSET President Mr. Varun Prasad Shrestha welcomed all members and appreciated their efforts. Mr. Shreshta stressed on the very need to pay yet more hard efforts from NSET for the cause it has been advocating for more than two decades.

NSET General Secretary, Dr. Amod Mani Dixit presented Progress Report on NSET's one year achievements, its completed programs and ongoing programs, challenges and way forward. Dr. Dixit flagged on massive reconstruction needs and roles NSET has to play. Dr. Dixit also highlighted NSET's long term strategy, vision and its trusting & recognition from international and local communities for reducing risks of earthquake disaster.

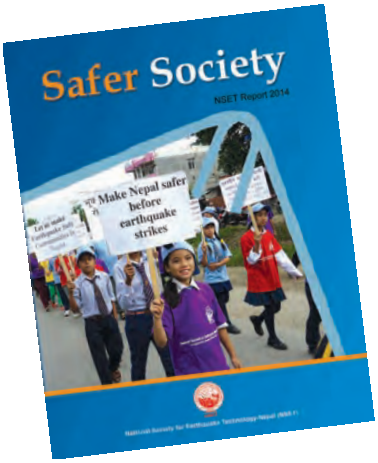
The Treasurer of NSET Management Committee, Mr. Yogeshwor Krishna Parajuli submitted the Financial Statements of the organization including Auditor's Reports for the last Fiscal Year.

The General Body unanimously endorsed both the Reports.

General Secretary of NSET Dr. Amod Mani Dixit displaying the certificate of IRDR International Center of Excellence at NSET General Meeting, Dec 11, 2016

Group photo after Annual General Meeting of NSET, Dec 11, 2016

Crafting NSET vision, mission, objectives and strategic directions



Though NSET was conceptualised in 1993 and formally registered in 1994, its structure and organizational strategy in the form of vision, mission, and strategic objectives were formulated only in 1998 through a strategic planning exercise. By that time NSET was already successful to carve out its space in the society as a key organization for supporting earthquake risk management in Nepal. Even the NSET's operation was not much systematised strategically.

Noted international experts Dr. Thomas Tobin, Dr. Shirley Mattingly and Dr. Brian Tucker – the stalwarts, who were part of the broader development of earthquake risk management concepts in the US, assisted the management of NSET in exploring the optimum modus operandi for the newly born institution. Together with NSET Committee members and the staff, the US team of experienced professionals brought in the business strategies of mainly three US -based institutions namely, Seismic Safety Commission (SSC) of California, US Forestry Service (USFS), and GeoHazards International (GHI) as models for NSET to emulate.

In addition, business models and strategies of 10 other similar institutions working in DRR and environmental studies from the Latin America, Europe and West Asia were considered and surveyed. Based on such review, NSET and the team of international experts jointly outlined draft alternate strategies and business models for NSET. Karuna Management – a Nepalese business consultant assisted NSET in streamlining the progress in strategy formulation.

NSET organized a Strategic Planning Workshop during June 11 – 13, 1999 to look into the propositions in the Nepalese context, evaluate the underlying potentials, review the suggestions made by international experts and recommend strategic directions for NSET. The workshop, attended by around 40 key officials from different government institutions, professional societies, donor agencies and other non-government organizations, made suggestions on the final draft.

NSET Management Committee subsequently reviewed the draft critically and accepted the strategies unanimously. The whole exercise of strategy visioning for NSET lasted about nine months.

Till date, NSET is still guided basically by the Strategic Visions formulated in 1999, albeit with subsequent updates. Major revision process was held in 2006 that endorsed the NSET philosophy and approaches for the next period. The strategies have fundamentally been successful in driving NSET to its present day position.

Revisiting NSET vision, mission, objectives and strategic directions

Glipse from NSET workshop on organizational strategy self assessment, June 2014

As NSET was completing 21 years of establishment in 2014, NSET felt a need of introspection to achieve better clarity on its strategic intents and roles and responsibilities commensurate with the global, regional, national and local needs and possiblities. NSET did on assessment of its organizational core – its vision, mission, objectives and strategies – for which, it felt the need to design and implement a strategic assessment procedure. NSET held two days' Workshop, during June 7-8, 2014 on "Organizational Strategic Self-Assessment" among its top management and core team members with design input, moderation and facilitation of a management consulting firm, which focused on organizational self-assessment that helped in building unified understanding of the organization and its present state among decision makers and get inputs for the future. The process was facilitated/ moderated by Sohan Babu Khatri from Three H Management, a 360 degree management consulting firm. The team has consolidated the findings and results into a Final Report with set of actions recommended, and that has been guiding document in our pursuit of incremental improvements.

NSET is committed to implement the findings and recommendations of the assessment.

Capacity Assessment and Development Initiative for NSET Senior Manager

NSET has carried on Human Resource Audit of the organization by Third Sector Partners, a management consulting group from India. Third Sector Partners' team participated as Observers in a 2 day workshop conducted with the leadership team on strategic visioning for NSET. This was interspersed by intensive interactions with the Executive Director and Deputy Executive Directors to understand the organization's future growth plans and corresponding people processes. Subsequently, two Assessment Centers were conducted in Aug, 2014 for the Leadership Team & the Senior Management Team. Detailed Assessment reports of all the participants were submitted after giving feedback on the strengths & development areas to the respective participants. As a next step, NSET wanted to start a Development Intervention with a select set of high potential managers to prepare them to take larger roles to achieve NSET immediate goals & its long-term vision. After understanding the needs of NSET, Third Sector Partners had run a Development Initiative for the select batch of people.

Organizational Capacity Assessment (OCA) of NSET

NSET recently conducted its Organizational Capacity Assessment (OCA) with technical facilitation support by FHI360 and Nepal Participatory Action Network (NEPAN) during May 29 – June 2, 2017.

OCA is a facilitated self-assessment that assesses organization's institutional capacity, set priorities for change and develop an action plan with the support of an expert facilitator.

The OCA tool assesses organizational capacity across seven domains—Governance, Administration, Human Resource Management, Financial Management, Organizational Management, Program Management, and External Relations—with each domain having a number of sub-sections. Taken together, the domains and subsections represent the core organizational performance functions.

Utilizing a consensus-based process of open dialogue, each subsection within a domain is rated by the organization at one of four stages along an organizational development continuum.

During the assessment, participants use the OCA tool to rate capacities in key organizational domains across a development continuum. The assessment yields both an organizational profile and quantitative measures that present a baseline from which to track the future evolution of the organization along a development continuum.

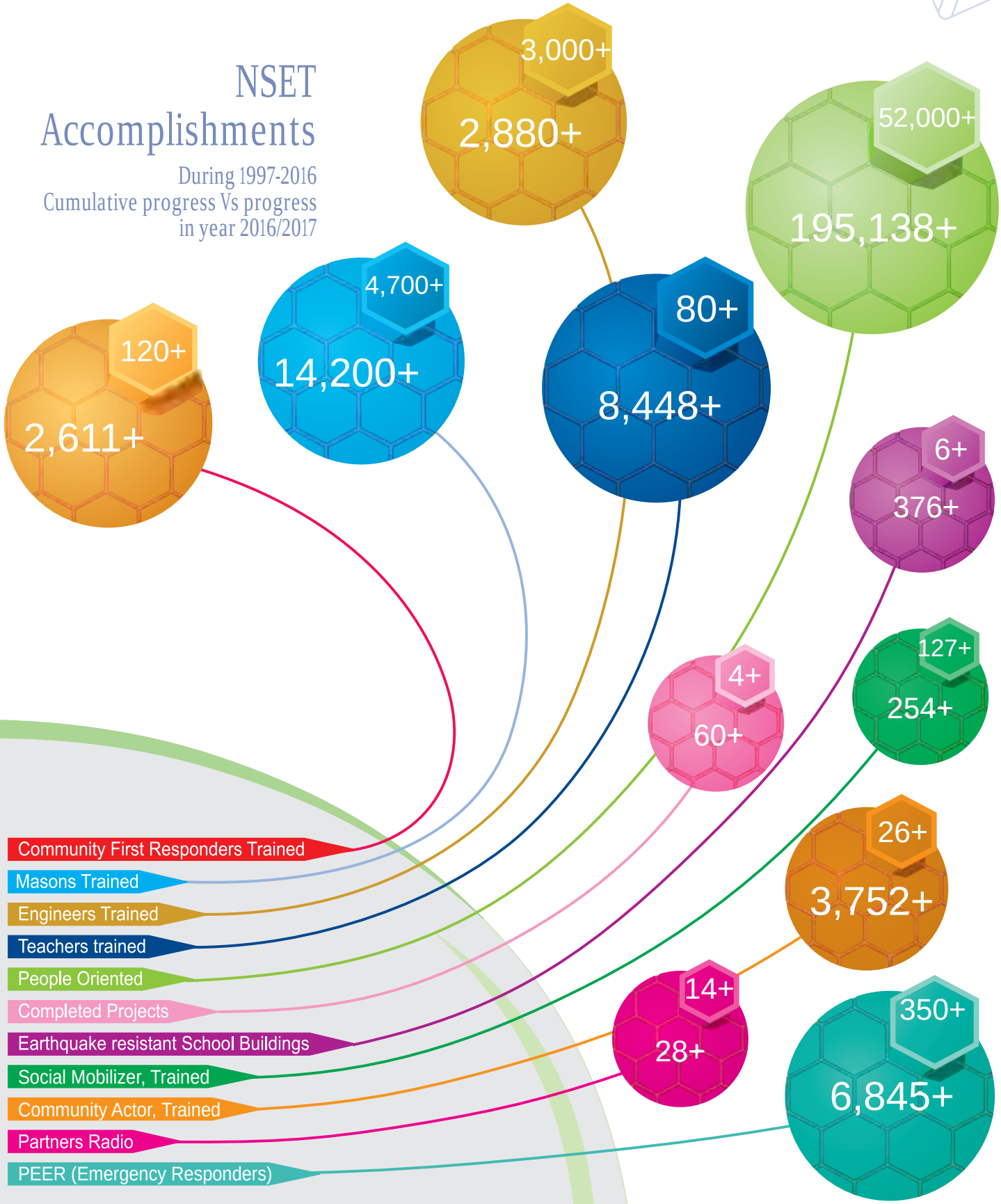
Senior professionals and officials of NSET were engaged for the assessment during the OCA process. NSET intends to use the outcomes and findings of OCA for preparing and implementing improvement plans.

Group works at organizational capacy assessment of NSET, May 2017

Organizational Capacy Assessment of NSET, May 2017

NSET Accomplishments

During 1997-2016
Cumulative progress Vs progress in year 2016/2017



Progress achieved during 2016/2017
Progress achieved during 1997-2016

Worst hit street of Sankhu by Gorkha Earthquake 2015
- Photo: Sarika Gulati

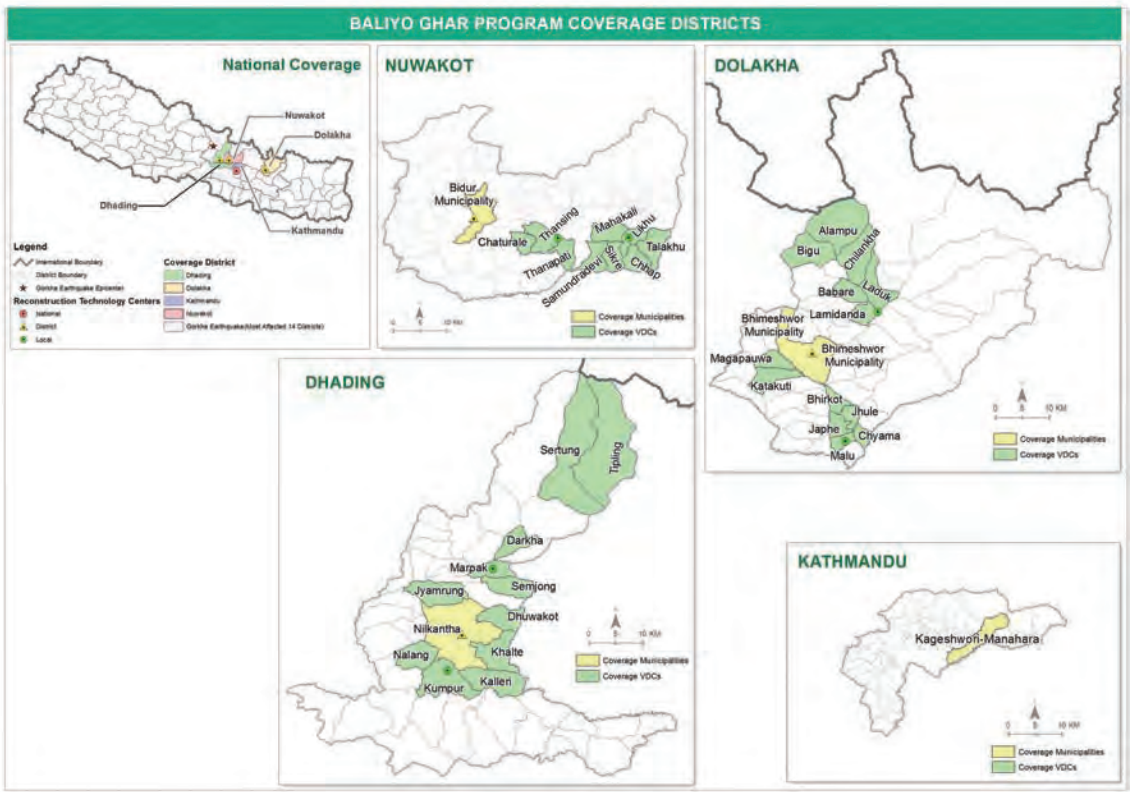
Chapter 1

Rebuild Nepal Safer and Better: Efforts through Baliyo Ghar Program

The Gorkha Earthquake of April 25, 2015 and the sequence of aftershocks caused more than 8,700 deaths and around 25,000 injuries. The Government of Nepal (GON)'s Post-Disaster Needs Assessment (PDNA) completed on June 15, 2015, found that total value of damage and losses resulting from the earthquake sequence amounted to about US$7 billion, and the reconstruction needs amounted to about US$6.7 billion. The earthquake sequence destroyed 490,000 houses - mostly traditional mud-brick and mudstone houses built and occupied by the rural poor; and rendered another 265,000 houses at least temporarily uninhabitable. The largest sectoral need identified in the PDNA is housing and human settlements, accounting for $3.27 billion in reconstruction costs, or almost half of the total needs.

According to the PDNA report, at least 500,000 buildings require reconstruction, and another 250,000 buildings require retrofitting and/or repair. Considering a 5-year reconstruction period, a total of 50,000 - 60,000 masons are required for the construction and retrofitting of buildings. This entails that a total of 1500-2,000 mason training courses are required for training the existing masons in skills of resilient construction.

The need for mason training mentioned above is indicative of the scale of works to be accomplished in the next 5 year. This physical reconstruction alone



demanded creation of an umbrella structure to manage the post-earthquake rehabili-tation and reconstruction. A sustainable and long-term planning is the need for better reconstruction. People need proper guidance and technical help to reconstruct their houses in a safer manner so that the buildings would not become killers during any future potential earthquake. Training and technical support to the house-owners, construction workers, technical professionals and also municipal/VDC officials is necessary to make reconstruction process better.

To support ongoing efforts of the Government of Nepal (GON), the National Reconstruction Authority (NRA) and other ministries and departments engaged in post-earthquake reconstruction, NSET, with the funding support from United States Agency for International Development (USAID), is implementing **Baliyo Ghar** Program meaning 'Strong House' with the goal of promoting earthquake safer housing reconstruction through owner-driven approaches. The program intends to provide technical assistance to the people for reconstruction by establishing Reconstruction Technology Centers (RTCs) and Mobile Teams, and conducting awareness and training activities to build seismically safer homes in the wake of the April and May 2015 earthquakes.

This is a five years (October 2015 – September 2020) program implemented in selected villages/municipalities of 4 districts out of 14 severely earthquake affected districts. The program has following two-fold goals.

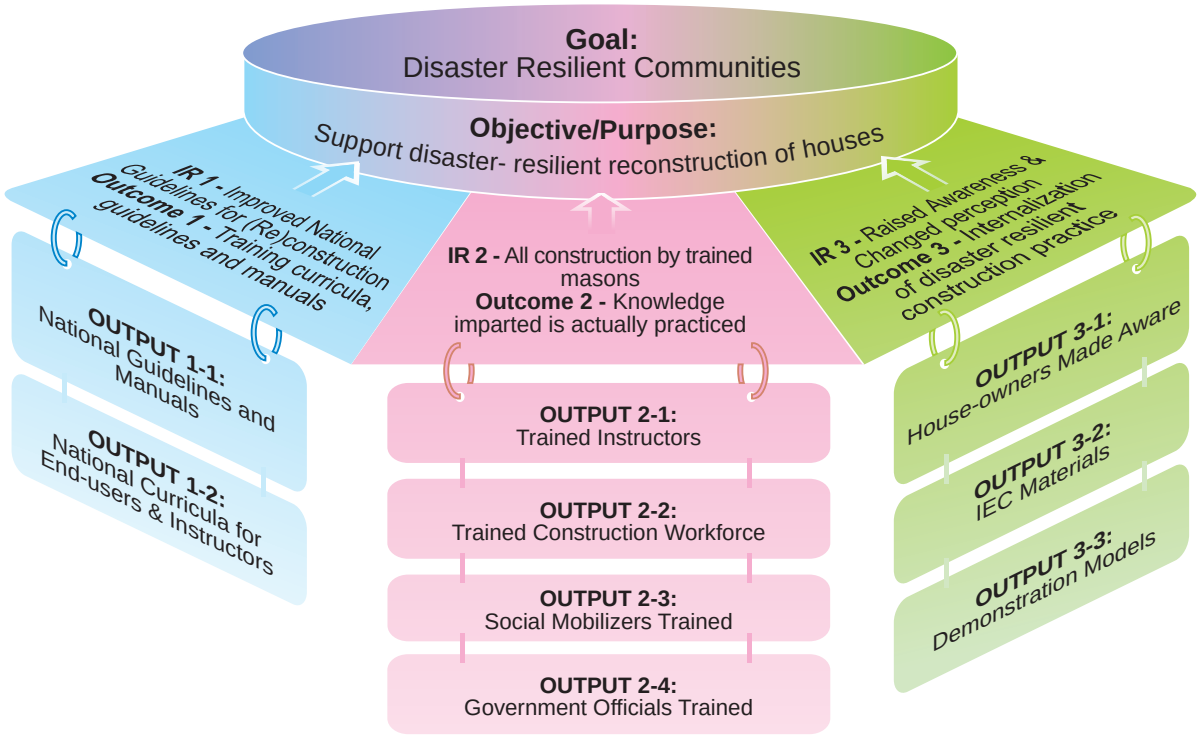
Two-fold goals of BALIYO GHAR

1. In shorter-term, the program aims at ensuring disaster resilient reconstruction of all houses in the program areas;
2. For longer-term, the program aims to establish a system of disaster-resilient construction to achieve the goal of disaster-resilient communities in Nepal.

The goals will be achieved by providing technical assistance for reconstruction, and in future, for disaster-resilient housing designs and construction, and by supporting the GON's plan to achieve long-term disaster resilience. This project does not fund housing reconstruction, but provides technical assistance necessary for owner-driven reconstruction.

The goal will be achieved through the following three Intermediate Results (IRs):

- IR 1: Improved government guidelines for housing reconstruction and multi-hazard resilient housing construction
- IR 2: Increased numbers of masons, engineers, and other craftsmen trained in earthquake-resistant construction methods and techniques
- IR 3: Improved awareness of disaster-resilient construction in Nepal



The following are the main guiding principles for Baliyo Ghar Program:

- Country-led policies and processes
- Strategic planning, standarized impementation and involvement of all stakeholders.
- Inclusion and access
- Integrating DRR
- Flexibility and context specific approaches

In addition to the above guiding principles, NSET will subscribe to the following main principles and approaches for technical support for the reconstruction:

a) "Build Back Better" the fundamental principle of reconstruction, means that the houses reconstructed should possess earthquake-resistant features and other hazards resistant as demanded by the national building code.

b) Work closely with government agencies and local authorities following the rules and regulations.

c) The need for housing reconstruction is large and widespread. The number of available trained technical professionals is limited. Therefore, huge number of professionals and construction workers need to be trained on earthquake-resistant construction technology. Hence, emphasis is given to develop trainers and master trainers for providing technical training to various stakeholders. Training courses will be conducted to develop trainers in large numbers.

d) Reconstruction of houses should also consider the promotion of local construction materials and indegenious technologies.

UNITED STATES INCREASES SUPPORT TO HOUSING RECONSTRUCTION

For Immediate Release
Wednesday, October 28, 2015

The U.S. Government, through the U.S. Agency for International Development (USAID), today announced three initiatives to support the Government of Nepal's model of ownerdriven housing reconstruction following the April 25, 2015 earthquake. Building on previous investments, USAID programs will train an estimated 13,500 local construction professionals and educate more than 285,000 affected homeowners on building earthquake-resistant homes over the next five years.

Baliyo Ghar (Strong House) is a five-year, $8 million project that will train local masons, carpenters, engineers, and affected homeowners. Baliyo Ghar will also support the establishment of a National Reconstruction Technology Center and three training centers at the district and local levels in Dolakha, Dhading, and Nuwakot districts. Baliyo Ghar will be implemented by the National Society for Earthquake Technology (NSET) in cooperation with the Ministry of Urban Development, Ministry of Federal Affairs and Local Development, Council for Technical Education and Vocational Training, and National Planning Commission.

USAID will also expand its ongoing resilience project, Sabal, to invest $2.7 million in training local masons in Sindhupalchok and Kavrepalanchok districts. In addition, USAID has made a $9.6 million contribution to the World Bank Nepal Earthquake Reconstruction Multi-Donor Trust Fund. This contribution will directly support the Government-led beneficiary survey in the 14 most-affected districts, as well as the provision of housing reconstruction cash grants to affected homeowners.


https://www.usaid.gov/nepal/press-releases/oct-28-2015-united-states-increases-support-housing-reconstruction

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Working in Crises and Conflict
NEWSROOM

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"This week, as Nepal marks six months since the April 25 earthquake, we are pleased to announce our new and expanded initiatives and pledge that we will continue to help rebuild a safer and stronger Nepal," shared U.S. Ambassador Alaina B. Teplitz. "These new projects and expansions of existing programs are valued at more than $20 million, and are part of the $130 million committed by the U.S. government in response to the earthquake and demonstrates our continued commitment to Nepal."

Copied from: https://www.usaid.gov/nepal/press-releases/oct-28-2015-united-states-increases-support-housing-reconstruction

Baliyo Ghar Efforts of Safer Reconstruction

Contribution in Reconstruction Process and Developing Policies

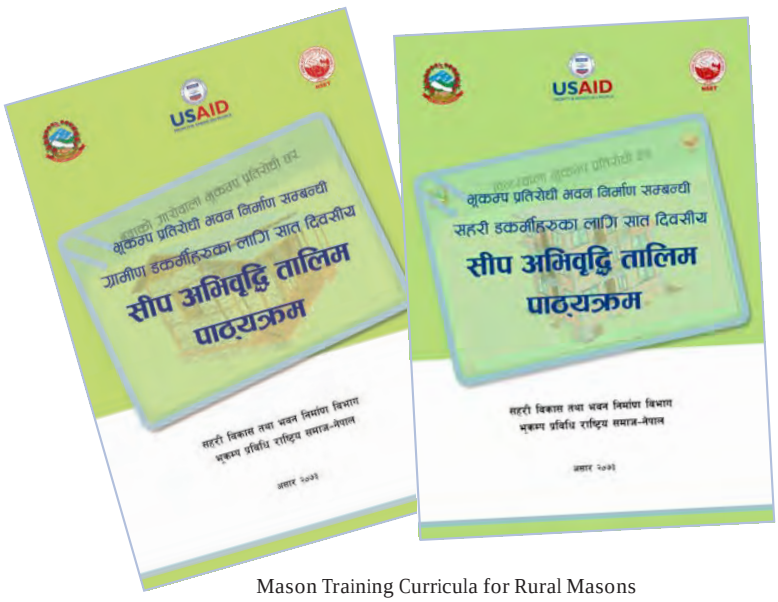
As the goal of Baliyo Ghar is measured with the improved government guidelines for housing reconstruction and multi-hazard resilient housing construction, BaliyoGhar has put-in its efforts in supporting Government of Nepal (GoN) in that direction. From its initial phase of implementation, Baliyo Ghar is working in close coordination with National Reconstruction Authority (NRA), Department of Urban Development and Building Construction (DUDBC), CLPIUs/DLPIUs and other departments involved in reconstruction. BaliyoGhar provided significant support to NRA in developing systems, policies and programs in regard to reconstruction process. Baliyo Ghar was assisted in development of Fund Disbursement Guidelines, developing Information Booklets, Posters and Pamphlets related to the grant distribution. BaliyoGhar contributed in preparing Standard Operating Procedure (SOP) for inspection, manual for inspection, Technical Posters incorporated 10 Tips for Earthquake Resistant Building Construction etc.

Surya Narayan Shrestha, Deputy Executive Director of NSET contributed as Technical Advisor to NRA during the period Jan-Sep 2016 to help systematizing the reconstruction process, standardizing the existing guidelines, develop new guidelines, manuals and other policy related documents.

Training Manuals for Rural and Urban Masons

Baliyo Ghar played a significant role in developing 2 separate Curricula for Mason Trainings, each for Rural Masons and Urban Masons. There are several training curricula related to earthquake safer construction in Nepal that have been developed and approved by Department of Urban Development and Building Construction (DUDBC). Further enhancement and revision of such already existing curricula and guidelines is necessary to address the current needs aftermath of the earthquake.

Earlier, Nepal Government had a single mason training curricula applied for both urban and rural masons, which was felt not sufficient considering the specific need of rural construction. Under the guidance of DUDBC, BaliyoGhar contributed to develop separate curricula for urban and rural masons with 7 days training course duration each.



Mason Training Curricula for Rural Masons

Mason Training Curricula for Urban Masons

Assisting NRA at Enrollment Process

Baliyo Ghar Program assisted National Reconstruction Authority (NRA) to launch the distribution of Housing Reconstruction Grant to eligible quake affected households which began from March 13, 2016 from Singati Dolakha. Grant distribution campaign begun with the first agreement between Jagat Bahadur Chettri, a local of Laduk-08, Dolakha and Secretary of the same VDC Urmila Karki. An enrollment camp was established to facilitate the grant agreement where BaliyoGhar took the lead and assisted government in its campaign. The enrollment process gradually expanded to the other quake affected districts. Like in Singati, BaliyoGhar team was mobilized in Nuwakot and Dhading to facilitate the process.

National and local level coordination through NRTC, DRTCs and LRTCs

Following the national and international standards and practices, Baliyo Ghar has supported to build on and strengthen government's structures and institutions for the successful implementation of reconstruction program. National Reconstruction Technology Center (NRTC) is a concept of working together by all concerned stakeholders, especially on technical matters to identify technical problems and draw consensus solutions. Baliyo Ghar is working with NRTCs concept at the central level from the beginining. And with the active involvement in Housing reconstruction and Recovery Platform (HRRP), BaliyoGhar is working closely with partner organizations.

Likewise, District Reconstruction Technology Centre (DRTC), established in Dolakha, Dhading and Nuwakot are serving as main hub for training and technical support activities.

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 standarize the training and technical support system. Second, DRTCs support BaliyoGhar districts team on effective implementation of the BaliyoGhar program.

Similarly, Local Reconstruction Technology Centre (LRTC) have been established in 6 places, 2 each in Dolakha, Dhading and Nuwakot covering a group of VDCs depending on the geographic situation and accessibility to the areas. LRTCs are supporting 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. Mobile clinics are carried out imparting knowledge, transferring technology and other technical assistance activities in every households to ensure safer reconstruction.

Capacity Building for Earthquake Resistant Construction

One of the major activities of BaliyoGhar is capacity building. BaliyoGhar is providing extensive trainings for Technical Professionals of Government, Partner Organizations and Freelancers deployed in post-quake reconstruction activities. For them, 7-Day Training of Trainers (TOT) courses are organized aiming of enhancing the technical knowledge and capacities to conduct mason trainings in the field. And for existing masons, 7-Day Mason Training courses are organized to enhance the knowledge and capacities of existing masons expected to contribute in earthquake resistant construction.

Training conducted for more than 2500 Technical Professionals Recruited by Government

To provide basic knowledge and information on policy and procedure related to Housing Reconstruction Program, the introductory training program was conducted for the technical professionals hired by the National Reconstruction Authority (NRA) and Department of Urban Development and Building Construction (DUDBC).The introductory training was organized by NRA, Central Level Program Implementation Unit (CLPIU) of Ministry of Urban Development (MoUD) and DUDBC where BaliyoGhar program provided technical support with funding from USAID Nepal.

Three such trainings trained more than 2500 technical professionals in April and June 2016. The training program was designed to address the urgent issues and ideas in regard to post Gorkha Earthquake reconstruction process and reconstruction technology required while dealing in their work areas. The participants were familiarized with the enrollment process, grant disbursement mechanisms, basic technical considerations for safer reconstruction and also administrative as well as procedural instruments.

Basic Training for Engineers, Sub and Assistant Sub engineers at Babarmahal

Mason Trainings conducted for producing large number of trained masons

As the pace of reconstruction increased, the activities of BaliyoGhar Program accelerated its activities on the same speed. BaliyoGhar teams in Dhading, Nuwakot, Dolakha and Kathmandu are busy in conducting various activities like; Mason Training for existing masons, Training of Trainers (TOT), Social Mobilizers Training, On the Job Training, Community Orientations and door-to-door technical support to ensure safer reconstruction and promote earthquake safety and preparedness.

The practicing masons have limited knowledge on integrating earthquake resistant elements in building construction practices. There is the acute need of imparting knowledge and skills on earthquake resistant construction into the regular practice of masons. Realizing this fact, Nepal government has endorsed mason training curricula separately for rural and urban context. BaliyoGhar program is following the same curricula to develop the capacity of practicing masons. 131 mason trainings have been accomplished till March 2017 where 4045 masons have been trained.

Tamang's changed perception after Mason Training

Bir Bahadur Tamang, one of the masons of Mahakali VDC, Nuwakot, lives with six family members. He is the head of the family. He participated in one of the mason trainings organized by Baliyo Ghar; currently he is working as trained mason in reconstruction process.

He shares, "After the earthquake, I am completely involved in reconstruction. I built more than 6\7 house in Mahakali VDC. During the period, I thought, what I knew and did was enough. I thought, it's not necessary to know about other techniques. When, NSET- Baliyo Ghar team provided mason trainings here, I was one of the participants. I learnt a lot, about the elements of earthquake resistant construction and proper placement. Now, I thought, before the training I knew nothing. Now I have become one of the demanded masons in our VDC and I am very happy to be engaged with this occupation. I am very busy these days. Hadn't I participated the mason training, I would be constructing very weak houses".

Similary by March 2017, altogether 36 mason TOTs have been accomplished enhancing the technical knowledge of 1118 Engineers/Sub-engineers of NRA, MOUD, DLPIUs of Dolakha, Nuwakot, Ramechhap, Dhading, Rasuwa and other partner organizations.

Female masons are highly encouraged to participate in mason trainings. Though, these are few existing masons, more than 110 female masons have enhanced their technical knowledge and capacities through BaliyoGhar Program and are contributing to safer reconstruction.

Training on Earthquake Reconstruction conducted for Social Mobilizers of Baliyo Ghar

Social Mobilizers are to play great roles in due course of reconstruction particularly in linking technology with communities. They are the agents to bridge grass-root people with technical minds. Realizing this fact, Baliyo Ghar program has mobilized large number of social mobilizers in the program areas and building their capacity on fundamentals of reconstruction process. BaliyoGhar program conducted series of training programs to social mobilizers working under the program and also from various government agencies and partner organizations who have been mobilizing their social mobilizers for reconstruction.

Till March 2017, 6 social mobilizers (SM) training has been accomplished at Dolakha, Nuwakot and Dhading getting 194 social mobilizers from government and non-governmental organizations trained. It's a 5 days intensive course for social mobilizers. The capacity building activities and number of community orientations carried out in districts are segregated in the chart:

BaliyoGhar Activities
As of March 30, 2017

Districts		MTOT	Mason Training	Orientation	SM Training
Dhading	Number of Event	8	49	590	1
	Participants	256	1549	16741	33
Dolakha	Number of Event	11	41	677	3
	Participants	354	1268	18592	95
Nuwakot	Number of Event	10	40	498	2
	Participants	298	1198	11724	66
Kathmandu	Number of Event	7	1	5	0
	Participants	210	30	166	0
Total	No. of Events	36	131	1770	6
	Total Beneficiaries	**1118**	**4045**	**47223**	**194**

"Thank You BaliyoGhar"

"I am Sambhu Ram Karki. I live at Bhimeshwor Municipality ward-6, Dharamghar. Due to lack of sound knowledge on building the earthquake resistant house, we started our construction based on some hearings. And right after time of plinth band construction, fortunately we met the mobile team of BaliyoGhar. The mobile team of BaliyoGhar briefed about the important components of earthquake resistant building to me and the masons. According to the technical suggestion we installed included vertical reinforcement at the wall corners. Similarly, we were unaware about the placement of door/window, importance of corner stitch, importance of vertical reinforcement, importance of double frame door and window. We are very glad to receive the technical assistance from BaliyoGhar at the right time. Now, we are aware about the important components use in building the earthquake resistant building. Likewise, we are also flowing the same messages to our neighbors, who are ready to build the earthquake resistant houses at Bhimeshwor Municipality."

Technical Officer Bikesh Kasula conducting hands on orientation to the house owner Mr. Sambhu Ram Karki and the constructing masons about the earthquake resistant elements on stone masonry building and suggesting to install vertical reinforcements in houses under construction.

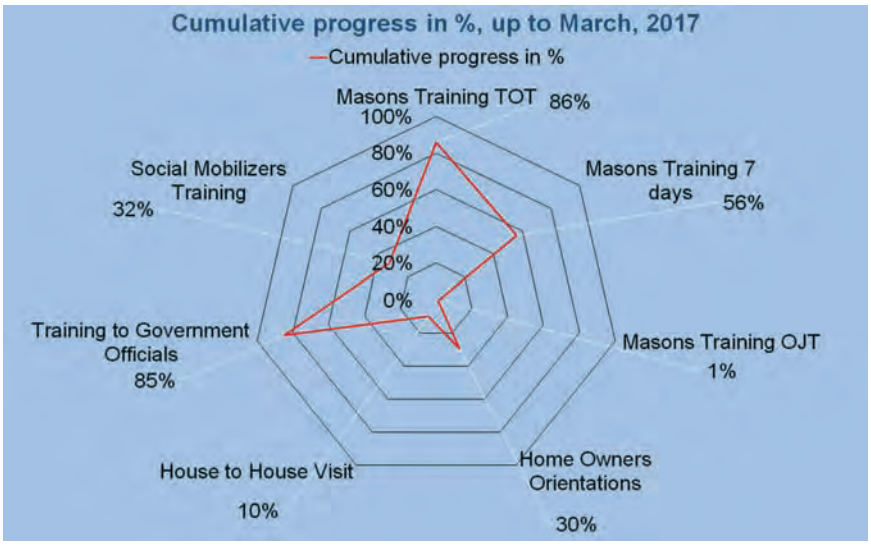
The reconstruction of houses has increased rapidly in the second year of reconstruction program. At the meantime, community people including the house owners and local masons are in need of technical assistance in building safe houses. Therefore, BaliyoGhar mobile teams are providing technical assistance at construction sites at different level. The mobile teams reaches most of the housing construction sites to provide the technical assistance through mobile clinic accordingly.

Developing New Masons through On the Job Training (OJT): Targeted 6400 new Masons

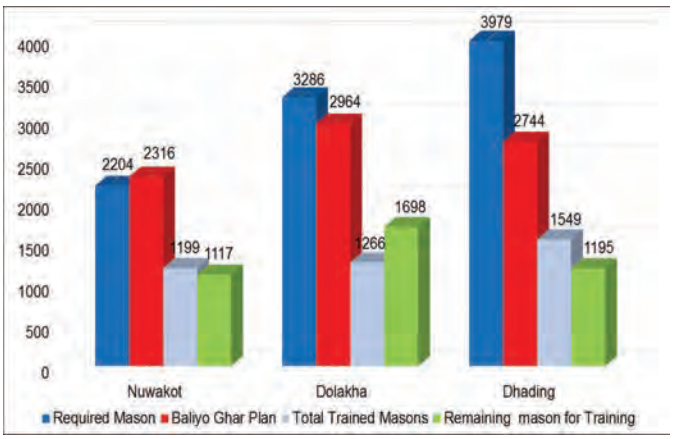
The existing number of practicing masons is not enough to address the massive reconstruction need in the earthquake affected areas. The only way is to engage and develop new masons in this business. The concept of On-the-Job training (OJT) serves to that purpose. BaliyoGhar has carried out the OJT concept in practice to fulfill the demand of masons needed to accomplish reconstruction. During this OJT course, potential new masons are involved in the construction of real houses under the supervision of a trained mason and a technician. Classroom lectures are also organized to give basic knowledge of construction. On The Job Training is a 50 days duration course to develop new mason for construction.

This system of On the Job Training is actually a transitional arrangement for the production of huge number of skilled masons. This ultimately transforms into a sustained regular training course for the development of masons as being done by CTEVT. NSET/BaliyoGhar is implementing OJT to develop approximately 54 new masons in each program implemented VDCs through the On-the-Job training process. And with the help from Training Service Providers, BaliyoGhar aims to develop 6 new masons in each existing Wards of Dolakha, Nuwakot and Dhading districts beyond Baliyo Ghar focused program areas targeting about 6400 new masons.

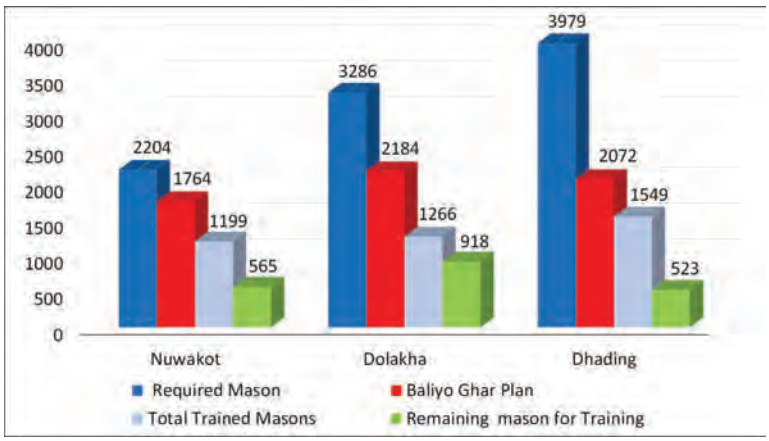
Achievements under BaliyoGhar



Masons Scenario in BaliyoGhar program District Including Masons from OJT



Data Source: Baliyo Ghar Training Activities and HRRP



Masons Scenario in program District Excluding Masons from OJT

Increasing Public Awareness on Safer Reconstruction

To increase awareness among the earthquake affected people on earthquake safety, preparedness and safer reconstruction, BaliyoGhar has been conducting massive awareness campaigns in the earthquake affected areas of Dolakha, Dhading, Nuwakot and Kathmandu. Communicating through publications, Community Orientations, Mobile Clinics through mobile teams, awareness raising through mass media are some activities being executed under BaliyoGhar.

Orientations to the house-owners to promote safer reconstruction

In promoting safer reconstruction and disseminating the information regarding earthquake safety, preparedness and the importance of earthquake resistant construction works, awareness raising program has become one of the important tool in the quake hit communities. The awareness raising program is carried out through orientation program, door to door visit, information hub and help desks etc.

BaliyoGhar has accomplished 1766 Community orientations in Dolakha, Dhading, Nuwakot and Kathmandu benefiting 47215 beneficiaries till the last days of March 2017. In order to make the house-owners aware on the need of earthquake resistant construction house to house awareness campaign is launched. A mobile team consisting a technical officer and a social mobilizer are deployed to work at VDC to convince homeowners on earthquake resistant construction techniques, choice of building typologies, and selection of construction materials in order to make their house earthquake resilient. Likewise, basic earthquake knowledge, safety of houses and earthquake preparedness are the subjects of orientations.

Awareness Raising Through Mass Media

Awareness raising through mass media has become a major component of the Baliyo Ghar program to help earthquake affected population promoting safer reconstruction by sharing and disseminating information, knowledge and ideas on safer construction technologies and also on various aspects of reconstruction process. BaliyoGhar is collaborating with media partners in program districts and also in Kathmandu for the central and national level media advocacies and campaigns. Media efforts under the program comprise the activities through radio and television stations. Social media is one aspect the program has been massively expediting. *(More details on Chapter 9)*

Apart from these, BaliyoGhar is coordinating with other independent mass media in raising social awareness on reconstruction. Coordinating with National Broadsheets, National Radio stations and organizations, local mass media and media personals has also been a regular activity of BaliyoGhar Communication helping them find cases, stories of the earthquake affected people and achievements in reconstruction.

Help Desk Established to Facilitate House-owners

To troubleshoot the problems and guide the house owners or beneficiaries on building permit process, BaliyoGhar team has established Help Desk at Bhimeshwor Municipality Office. The building permit is a mandatory rule to be followed by the house owner before the construction of houses in Municipality. Likewise, the Help Desk also provides the technical assistance to the house owners through orientations and distribution of IEC materials. The help desk concept is in the process to be implemented at Dhading and Nuwakot too.

DRTCs and LRTCs Serving as Information Hub

District Reconstruction Technology Centers and Local Reconstruction Technology Centers established in the BaliyoGhar program implemented districts have become the information hub and a resource center to the earthquake affected people, stake holders and others. Those centers provide information regarding the ideas and techniques of building earthquake resistant houses, collect the updates of reconstruction progress, collect and analyze the problems faced by beneficiaries and misunderstandings regarding the process. The technical professionals and social mobilizers provide the beneficiaries with necessary ideas, knowledge and share the information. The unsolved problems in local level are transferred to the NRTC and authorities concerned and again the solution is disseminated to the target audience. Hence, DRTCs and LRTCs are bridging the beneficiaries and concerned authorities involved in reconstruction. Also, those centers have become the source of information of mass media and other people in need.

BaliyoGhar adopting the principles and practices of Inclusion

Based on the GESI Guiding Principles, Strategies and scope of the program, GESI Strategy and Action Plan has been developed.

GESI strategy and action plan includes development of GESI friendly standards and guidelines, Capacity buildings for various levels with GESI considerations, Awareness raising at various levels through various means with GESI considerations and monitoring GESI tasks in conjunction with M&E plan of BaliyoGhar.

Continuous Monitoring and Evaluation (M&E) of BaliyoGhar Efforts

Monitoring and Evaluation Team of BaliyoGhar program is continuously engaged in data collection and analysis, monitoring and reporting, maintaining database, development of software/applications, development of required guidelines and check list. With the objectives of revealing the worth of project, robust Monitoring and Evaluation Plan has been developed. Till the mid-2nd year of BaliyoGhar implementation, monitoring and evaluation team in BaliyoGhar has accomplished Risk Perception Survey with KAP score data analysis completed and has been conducting compliance survey activities.

Likewise, activities like; Mid-term review and evaluation, retention survey, revision of M&E Plan, capacity building works, preparation of baseline VDC profile, and preparation of Data Quality Assessment (DQA) are under immediate plan of M&E.

Lessons learned

By the one and half years of implementation, there are some issues that are noted as important lessons for consideration in the coming years. Technical consultation and awareness activities at household level are key for safer construction as it helps sensitize house owners on need and importance of safer construction. Before the consultation, many people found thinking that earthquake resistant construction using local construction materials is not possible. Those who heard and had knowledge on earthquake resistant technologies are found believed that such construction require huge investments. Through door-to-door campaigns and orientation programs, it was possible to change the mind set up of community.

Demonstration models are found as proof of the concept of 'Seeing is believing'. The continuous discussion among the partner organizations is required.

Scarcity of construction material and escalation of price is taking place in some locations. For example: People are demanding and using more timbers for construction from the Community forest and Conservation offices/areas whereas conservation offices are controlling it. The alternative technologies need to be explored and promoted.

In remote villages where there is no access of road to transport construction materials, the local community has been facing technical challenges due to unavailability of construction materials for earthquake resistant component.

Challenges in Implementation

The GON has a history of frequent policy changes. If key policies such as the reconstruction grant policy gets changed frequently, people will not be interested to reconstruct their houses quickly and in line with earthquake disaster-resilient construction techniques, which will negatively affect the ability of the program to meet its goals.

Since the eligible households with different level of damage of their house i.e. severely cracked house, partially collapsed house, or fully collapsed houses are given the same amount of grant, some people with buildings only having cracks may not reconstruct their house. So, the number of reconstructed houses may ultimately reduce the number of compliance household.

Retaining trained human resource of Baliyo Ghar is found challenging. Though, the number of rolling is not so big so far, it is challenging to motivate all staff continuously working in remote areas.

Impact

BaliyoGhar Program is raising awareness among the earthquake affected communities to ensure safer reconstruction, enhancing the technical knowledge and capacities of masons through mason trainings by which the trained masons would help in building earthquake resilient societies, developing new masons through On the Job Training (OJT) to increase the number of trained masons which eventually help in building safe houses. The activities of BaliyoGhar has accelerated in the pace of reconstruction campaign going on. And the impacts of BaliyoGhar activities are being seen in the quake hit areas.

Ghale: A Desperate Man to Change

Sashiman Ghale, resident of Birutar VDC, Gorkha is currently dwelling in Sertung VDC of Dhading, which once was his birthplace. Some 30 years ago he ran from his birthplace in search of better opportunity and visited different parts of Nepal engaging himself in construction works.

This case study is about the same person Ghale, who now has returned to his birthplace and is contributing his skill for building earthquake resistant buildings. According to him, in search of works he has visited many places of Nepal and has strengthened his skills in masonry work. He has also worked in Saudi Arabia as a mason for 5 years. Though he is permanent resident of Gorkha, Birutar VDC, now he is helping his elder brother at Sertung-5 to build earthquake resistant house.

Desperate Learner

One can find how curious and keen observer Ghale is, when one sees him observing the earthquake resistant house model. He wasn't a trained mason to build earthquake resistant buildings and he had no knowledge about the earthquake resistant components. He regularly used to visit the training model and studied every components of that demonstration model before he met mobile team of Baliyo Ghar program. His thirst of learning the technologies could be seen in his activities and queries he enquired with Baliyo Ghar (BG) team.

Mr. Sashiman Ghale preparing the plinth band

In the beginning days of Feb 2017, Baliyo Ghar team met Ghale while mobile team was in door to door campaign, where he asked for the technical assistance in the house he was involved in. He was to build his brother's house in Sertung using the timber bands as Sertungees were deprived of road access so couldn't transport the cement and iron rods to use in bands. Baliyo Ghar team advised him about the foundation and the way to use timber bands according to government norms. When he started to build the house it wasn't a very easy task for him. After making foundation when he began to construct the plinth band and since, that was the first house in the ward which was being built beyond the old techniques, many people used to come to him to say it wasn't the proper technique to construct houses with wooden bands.

Change in perception and behavior

Though Ghale was convinced in using timber bands with proper techniques but his brother was not rather he got convinced with the rumors which eventually kept Ghale in confusion. In his confusion, Ghale again knocked Baliyo Ghar team and urged to convince his brother and neighbors. Indeed it was difficult to guide the persons in such area where the availability of hard timber was rare or say it was impossible though. Baliyo Ghar team met them and convinced to use black japan paint and construct the plinth band about 1ft above the ground level. But the next day Ghale informed, "My brother is reluctant to construct house further citing that he hadn't enough money and he is requesting Baliyo Ghar team to provide the second tranche of government grant."

Treated Timber used as plinth band

Ghale's brother not to worry about the second installment if house gets constructed in existing codes and regulations. At last, they convinced to resume the construction. Their perception of locals regarding the timbers changed ultimately though with no options.

Sashiman has his own house damaged at Gorkha but he says that he will first built his brother's house and some other people's house at Sertung and teach them to build earthquake resistant house and only he will begin his house at Gorkha. Not only Ghale, trained masons of Sertung and house-owners are provided technical knowledge and ideas in construction. Now the earthquake affected Sertungees are convinced to use timber bands with treatments. They seek regular observation of Baliyo Ghar team.

- With the help of Baliyo Ghar Field Team

Photo Stories

Mason dressing the stones to use in demonstration model likely to be built during practical exercise of Mason Training conducted at Tipling VDC of Dhading on 13th December 2016. Photo: BaliyoGhar

BaliyoGhar Mobile team Orienting the communities on earthquake risk, preparedness and safer housing reconstruction at Chilankha VDC, Dolakha. Such orientations are conducted in class, open spaces, gatherings and in junctions (Chowks). Photo: NSET/BaliyoGhar

Female masons testing the slab prepared during the Mason Training at Kageshwori Municipality, Kathmandu in December 2016. BaliyoGhar is providing technical assistance in Kageshwori Manohara Municipality of Kathmandu. Photo: NSET/BaliyoGhar

Theoretical Session of Social Mobilizers Training in Bidur Nuwakot. Social mobilizers deployed by Bidur Municipality, Citizen Awareness Centre and NSET-Baliyo Ghar participated the 5 days training in June 2016. Photo: NSET/BaliyoGhar

Mr. Yek Raj Adhikari, Chief of DLPIU Dolakha briefing about the components of RCC structured Eearthquake Resistant Building to the participants of Mason Training of Trainers (TOT) at Simpani Dolakha on 2nd September 2016. Photo:NSET/BaliyoGhar

NSET involvement in 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.

NSET has been providing Technical Coordination support on HRRP3 for earthquake-affected districts. The technical coordination is being provided to the Partner Organizations (POs) and Government line agencies; NRA, CLPIU/DLPIU of both MOUD and MOFALD. The Technical Coordination has provided support to the ongoing efforts of the Government of Nepal (GON), the National Reconstruction Authority (NRA) and other ministries and departments engaged in aspects of post-earthquake reconstruction and long-term economic development. The idea is to establish and institutionalize an organized and systematic approach for Nepal's earthquake reconstruction with built-in earthquake-resistance of buildings through better coordination among all the stakeholders.

NSET has a team of Technical staffs at Central level as well as district level in line with approved HRRP3 organogram. National technical team facilitates and contributes in standardization of technologies, standards, guidelines, curricula at central level through developing / adapting / reviewing for all technologies, and that would be recommended for approval. Continuous advocacy and support at central level is being 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 technologies developed at central level need dissemination at district level to ensure clear and common understanding amongst all stakeholders, particularly POs staff involved in technical assistance at VDC level and the Ministry of Urban Development (MoUD) District Level Programme Implementation Unit (DL-PIU). This can be done through formal / informal sharing and / or training by technical professionals through the district technical coordinators with the continuous support from national level and District Management Team (DMT). In addition, it is critical to conduct continuous research at local level on emerging technologies / problems for further research at central level which will be executed by district technical coordinators through continuous visit at field. Similarly, technical coordination will support all stakeholders to have a uniform understanding on the comprehensive package of technical assistance at centre as well as district level.

A Pilot work on Technical Support for Earthquake Safer Housing Reconstruction

NSET implemented the Technical Support for Earthquake Safer Housing Reconstruction (TSESHR) program with the funding support from US Office of Foreign Disaster Assistance (USAID/OFDA). TSESHR was a short term intervention planned for 3 months. It commenced on 1 July and was completed by the end of October 2015.

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 endeavour in developing a clear strategy for the reconstruction of the massive destruction by the 2015 Gorakha 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 constriction of houses by providing technical assistance through housing designs, traning 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.

Director from the Office of U.S. Foreign Assistance-Resources observed reconstruction efforts under BaliyoGhar in Dolakha

Director Mr. Hari Sastry from the Office of U.S. Foreign Assistance-Resources observed reconstruction efforts progressing under BaliyoGhar program on May 23, 2016 in Dolakha. USAID Mission Director for Nepal Mr. Peter Malnak and team of USAID officials also joined the visit.

The high level delegates observed "District Reconstruction Technology Center (DRTC). On the occasion, BaliyoGhar Program Director Dr. Ramesh Guragain briefed the visiting team about center's concept.

the high level delegates interacted with group of social mobilizers deployed under BaliyoGhar for mobile teams in earthquake hit areas of all program districts where participants shared their field experiences and highlighted the urgency of service delivery more in organized ways to help affected people. The high level delegates later travelled to Ukhubari village, one of the program areas and observed a new house now being re-built by Baliyo Ghar trained masons.

Appropriate Technology for Housing Reconstruction

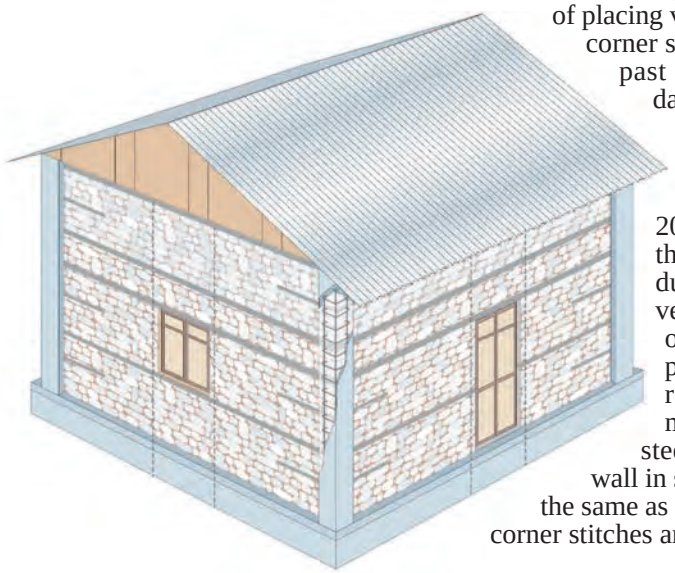
The SOP is housing inspection guidelines for the buildings that have been reconstructed delineates only the type of buildings that are covered in National Building Code (NBC), Nepal and there are some amendments made for minimum technical requirements. House Owners need to take approval from concern government authority, if s/he introduce different technology on inbuilt house which do not fall under the limitation of SOP for housing inspection. NSET has submitted proposals to DUDBC for the different options such as:

1) The proposal for Earthquake Resistant Building with Vertical Reinforcement Bars from Outside in Low Strength Stone Masonry as per NBC 105
2) The proposal for Earthquake Resistant Two Story Low Strength Stone Masonry Building with Timber Bands and Gabion Wire Meshing
3) The proposal for Earthquake Resistant Two Story Low Strength Stone Masonry Building with Gabion Bands and Gabion Wire Meshing

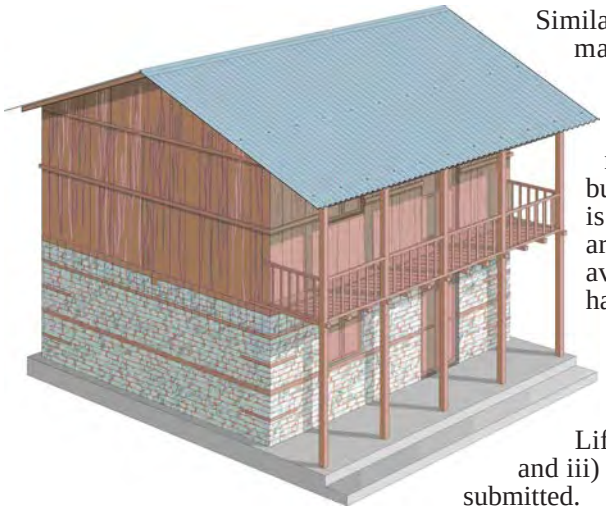
Low strength stone masonry buildings such as Stone in Mud or Dry Stone are widely used in the rural hilly part of Nepal. Most of the damaged buildings in Gorkha Earthquake 2015 that are now under reconstruction are of this type. NBC 203 suggests the use of vertical steel reinforcement bar at the center inside the wall.

For low strength masonry like stone in mud and dry stone, this provision of placing vertical steel reinforcement can cause difficulty in providing corner stones and subsequently weaken the corner. As observed in past earthquakes, low strength stone masonry buildings got damaged as a result of separation of corners and junctions of walls proving these to be the most vulnerable type of building.

The recent Gorkha earthquake 2015, Taplejung earthquake 2011, Pakistan earthquake(2005) demonstrated weakness of this type of buildings, one of the main causes of failure was due to lack of corner stones and through stones. Providing vertical reinforcement on outer face of wall is an alternative option. This method is not only remedies the difficulty in providing corner stones at corners of wall. But vertical reinforcement also strengthens the corner of low strength masonry. I) The proposal explains the rational of using vertical steel reinforcement from outside at corners and junctions of wall in stone in mud buildings while all other provisions remaining the same as in NBC 203 such as the use of plinth, sill, lintel roof bands, corner stitches and vertical bar at sides of door /window openings.



The Proposed Option of Using Vertical Splint from Outside as an alternate to Vertical Reinforcement at the Center inside the Wall



Similarly the options ii) and iii) are for two story low strength stone masonry buildings i.e. Stone in mud or dry stone. Minimum requirement in Standard Operating Procedure for housing inspection allows only one story building if timber bands are used as earthquake resistant elements. But the functional requirement of local people in most of the regions is two story building. In many northern parts of rural Nepal, cement and steel is not available due to lack of access road and remoteness of the area. So in such locations timber is the only option since locally available. In addition, gabion wire can be transport. Gabion wire has been widely used in Nepal for earth retaining and river training works. Based on its application and performance, it can be ensured that a good quality gabion wire can be made available in the rural areas of Nepal. So a combination of timber and gabion can significantly improve the response of the building achieving Life Safety of the occupants in the building. Hence the options ii) and iii) are proposed and analysis and designs and drawings have been submitted.

Trained Masons with Earthquake Resistant Construction Model in remote village of Sertung, Dhading

Chapter 2

Assisting Municipalities in Building Code Implementation

The Building Code Implementation Program in Municipalities of Nepal (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.

The Building Code Implementation Program in Municipalities of Nepal (BCIPN) being implemented by NSET with funding support from USAID/OFDA is a program to address the need to support municipalities mainly in their efforts to implement the National Building Code (NBC).

BCIPN aims to ensure implementation of the building code through a multi-faceted approach which targets enhancement in knowledge and skills of all stakeholders. The program focuses 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 construction. This entails, on one hand , helping the municipalities to develop an effective mechanism for building code implementation, and on the other hand, enhance earthquake awareness of the residents and technical knowledge of the municipal officials, technical professionals on aspects of earthquake risk management including earthquake-resistant design and construction. It supports to enhance earthquake resilience of urban settlements in Nepal.

Implementation Mechanism

BCIPN program is being implemented 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.

During the initial phase of program implementation, Memorandum of Understanding (MOU) was signed between DUDBC and NSET to facilitate the effective implementation of the program.

Tripartite Memorandum of Understanding is signed among the municipality, NSET and relevant Division Office of DUDBC for facilitating smooth functioning of program activities. Such MOUs are signed with all program municipalities.

The scope of MOU covers the joint work in the areas of raising public awareness on National Building Code (NBC) implementation, capacity building for the effective implementation of NBC and provide assistance to the municipalities in improving institutional system.

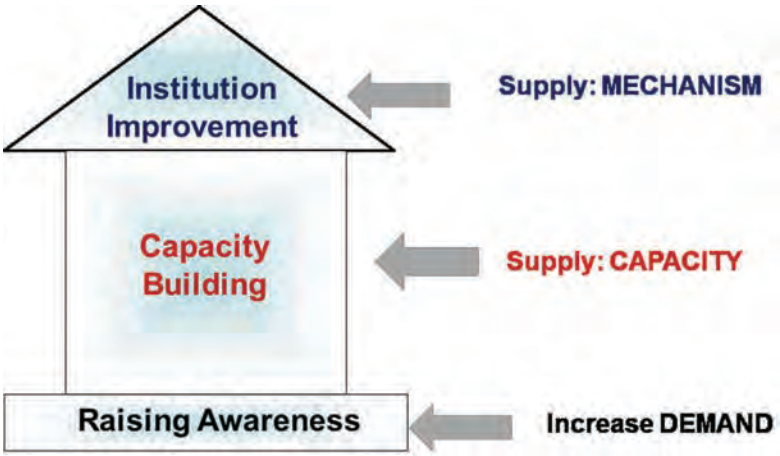
Signing of MOU between DUDBC and NSET for implementing BCIPN

Program Strategy

BCIPN has been founded on three main strategic components to implement from local to national level. The first component of the strategy is 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.

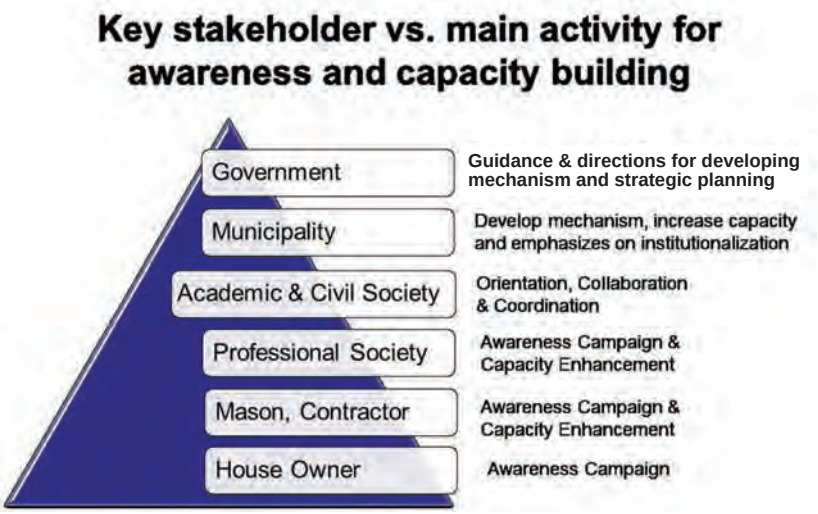
Secondly, building the capacities of construction workforce- local masons and contractors in earthquake-resistant construction technology; and building capacities of engineers and technical professionals to design and supervise construction of safer building is another major strategy. Thirdly building the institutional capacity of municipalities to effectively enforce building code and institutionalize the code compliance system.

BCIPN, is therefore 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.



Key Activities

The BCIPN program implemented in 30 municipalities of Nepal was helpful to demonstrate that technical support to municipalities is the key for successful implementation of building code. The technical support should consists 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.



Awareness and Capacity Enhancement

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 are conducted in the program municipalities. Such training and awareness program consists of:

- Training for masons on construction of earthquake resistant construction of building;
- Training for Contractors on Earthquake Resistant Construction of Buildings
- Training Course for Engineers on Basic Earthquake Resistant Construction of Buildings
- Training Course for Engineers on Advanced Earthquake Resistant Design of Buildings
- Training Course for Engineers on Retrofitting of Existing Buildings
- Training for Instructors (TFI) to develop effective trainers
- Training for social mobilizers on earthquake risk reduction
- Orientation sessions for various stakeholders (house owners, community volunteers, political and social leaders, members, from Tole Lane organization (TLO) and civil society organizations
- Free consultation programs for house owners
- Mobile Clinics to building construction sites

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.

Summary of Accomplishments, BCIPN, 2016

S.N.	Output Indicator	No. of Events Course	No. of Beneficiary
1	Number of engineers and junior engineers trained on earthquake resistant buildings construction	26	700
2	Number of masons trained on earthquake resistant building construction	150	4,600
3	Number of house owners that participated in earthquake safety awareness programs	-	100,000
4	Number of Social leader, TLO, social mobilizers trained on earthquake-resistant construction technology and mobilization of communities for safer construction practices	175	6300
5	Number of master instructors trained on safer construction practices (TFI+TOT)	1+3	103
6	Workshop on enhancement of earthquake safety	18	900
7	Detail Design Training	3	94
8	Building Inventory Database Survey (BIDS)	4	45000

Improving Institutional System and Process of the Municipalities

BCIPN is working towards assisting the municipalities in building their institutional capacities to effectively enforce building code and institutionalize the code compliance system. Various activities were conducted that will contribute towards improving the institutional system and process in the municipalities. Some of the major activities are as follows;

Development/Use of Building Permit System Software

Currently in all municipalities, the building permit records are stored in the paper form. There is no mechanism of digital database of constructed buildings. In order to help municipalities to reduce the volume of paper work and also to ease the process of monitoring and inspecting the construction of buildings, BCIPN has developed a GIS based building permit system software. The system database and GIS based reporting system software will help the municipality to:

- manage data of building permit system and constructed building
- store maps, drawings and documents
- print forms, certificates, documents etc. of respective house owner
- generate GIS based reports on time series, building typology, etc.
- track building permit system
- reduce the volume of paper work

Building permit software has been already installed in the system of some of the municipalities. The municipalities are now in the process to fully utilize the software during building permit process.

Development/Use of Building Code Compliance Checklist

Building Code Compliance Checklist is a document that will assist the building permit professionals to check the structural designs and drawings submitted by house-owner and the consultant for building permit process. It has different weightage and score for different factors. e.g. building shape, ductility, strength etc. The compliance checklist was prepared and finalized through series of discussion with the municipality professionals, study of various national/international1 technical documents and learnings from the experience in the past years.

Demonstration of Retrofitting of Existing Building in the Municipality

Significant proportion of existing buildings in all municipalities are highly vulnerable to earthquakes. Most of these existing buildings require retrofitting to enhance their performance during earthquakes. Due to the increased awareness, and due to the impact of recent Gorkha Earthquake of April 2015, people and professionals in the municipalities had requested NSET to support in conducting demonstration retrofitting so that people can replicate the technology for improving their buildings. Three program municipalities, Bharatpur Sub Metropolitan City, Damak Municipality and Dharan Sub-Metropolitan City have taken the initiation to retrofit their office buildings as demonstration of retrofitting and BCIPN has been providing technical support for the task.

The demonstration retrofitting is expected to make the communities familiar with the technology and in addition involvement in the process will also increase the technical capacity within the municipality. In the process, On the job training (OJT) for masons has been conducted in both Dharan and Bharatpur municipalities with an objective to make the technical persons understand the basic of retrofit and to develop the capacity of the professionals for the scaling up of the retrofitting process.

Building Inventory Data Survey

With the purpose to contribute in the development of Earthquake Scenario and help prepare action plan for earthquake risk management, and support risk sensitive land use planning Building Inventory Surveys were conducted in various municipalities. Detail data of all the buildings in different wards of the municipalities were collected and analyzed. Surveyors mobilized consisted of technical students comprising assistant sub-engineers and technical professionals from the local municipality.

Building Invetory Database Survey of four municipalities has been completed through this program which will be further used to develop the earthquake risk scenario of the municipalites.

Local Disaster Risk Management Plan

Municipalities are starting to take initiatives on building disaster-resilient communities by mainstreaming disaster risk reduction (DRR) issues into development plans. Upon request from Vyas Municipality, BCIPN assisted the municipality to prepare Local Disaster Risk Management Plan (LDRMP) of the municipality. The plan is being prepared following the LDRMP Guidelines developed by the Ministry of Federal Affairs and Local Development (MOFALD).

Participants using Voting Pad to give their opinion during a workshop

As a part of the LDRMP development process, training on Vulnerability and Capacity Assessment (VCA) was conducted followed by the survey to collect the data of each ward. The collected data were then used to prepare Local disaster risk management plan of the municipality. The prepared plan will be disseminated through the workshop for wider consultation and finalization.

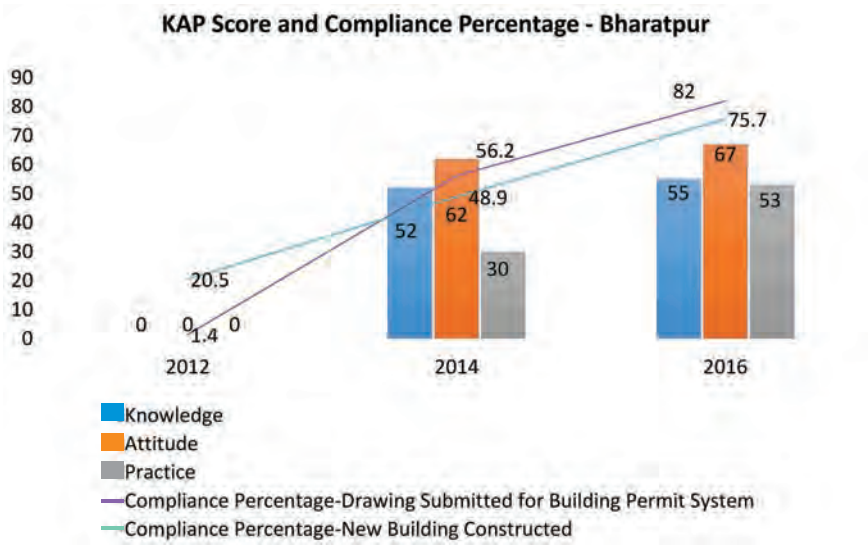
Model building drawings

People in most of urbanizing municipalities do not have access to qualified engineers for preparing design and drawings for new construction of houses. Most of the time they have to rely on the advices of local masons. Buildings in many places have similar plans and designs which can follow common designs and details. Therefore, NSET planned to prepare designs and drawings of few common model buildings to help people. The designs will follow earthquake resistant features, proper functional requirements, structurally sound and aesthetically pleasing characteristics, which most people can adopt with or without some minor modifications. BCIPN has developed few models taking example cases from Bharatpur Metropolitan City. The model buildings will incorporate structural design and drawings as well as the cost estimation of the typical residential buildings. These structural designs and drawings will comply the stipulations of national building code and the existing planning by-laws.

Major Achievements/ Impacts of BCIPN

The following are major achievements/impacts of BCIPN:

- 30 Municipalities (including 3 VDCs then) gained and consolidated confidence on the possibilities of building code compliance by optimally managing the existing financial and human resources under a comprehensive program that is targeted towards introducing a change in mind-set towards the long-term benefits of NBC implementation. In all municipalities where BCIPN was implemented, the compliance rate has increased significantly from 2012 to 2016 (Figure 1). The risk perception of population has also changed positively during the period (Figure).



Trend of increase in building code compliance and risk perception

- BCIPN has contributed to change in the perception of municipalities about building code implementation: Earlier, officials and staff at municipalities used to think that Building Code Implementation is a very difficult task, and they were very much reluctant to initiate the process. However, now most of the municipalities think BCI is possible and very much needed to ensure life safety of the population. BCI is possible with little additional efforts. There is a major change in perception of Municipal staff.
- BCIPN efforts have established a consensus on various small but critical issues and solutions among the various stakeholders in building production process such as:
  - Everyone agrees to the huge need of capacity enhancement, and there is a significantly increased demand for more training courses such training for engineers, masons, social mobilizers
  - Maintaining a uniform and standard National curricula is critically important to improve uniform system of BCI compliance

Local volunteer collecting information of the community

- Central and local level policy decisions on Institutional capacity enhancement of municipalities – there have been several policy decisions and practices established during the period, such as the initiation of allocation of budget for BCI, licensing system for local masons and contractors.
- BCIPN has created a platform to bridge the gap between central and local levels – BCIPN worked with both central and local level government authorities which helped to reduce the gap and enhance the understanding at both levels

- BCIPN contributed to develop plans, programs for reconstruction: Because of the M&E survey, Building Inventory Data Survey (BIDS), and experiences gained over the years made it possible to quickly develop the system for detail damage assessment which in turn was useful for national level policy decision for conducting Detail Damage Assessment (DDA) and several other reconstruction related programs.
- Lessons from the BCIPN activities have contributed and provided evidences to the formulation of National Plan of Action (NAPA) for scaling-up of building code enforcement throughout the country at national level
- The works done at the BCIPN municipalities have contributed to influence the nearby municipalities and VDCs.

House Owner Should be concerned for Safer Building Construction

"Experience of House owner from Birtamod"

Gopi Krishna Prasai is attentive house owner from Butabari 5, Birtamod. He constructed his house Earthquake Resistanant before the Earthquake of 2015. Before constructing his house, he consulted with many engineers, trained masons and qualified people of the construction field. He continuously visited municipality to keep updated with the Earthquake Resistanant Construction knowledge and also attended an orientation program in municipality which is conducted once in a week for the house owners. Now he is fully aware of constructing house safely from the earthquake.

His house was not damaged by the Earthquake 2072 either his neighbor's whose house was very poorly constructed. For a moment he regretted on spending extra money on building but later he understood the magnitude of the Gorkha Earthquake in the eastern regions put fewer damages them in the central region.

Prasai's own desire and willingness dragged him to scrutinize the knowledge about Earthquake Resistanant Building. He has studied all the handbooks related to it. He has been sharing his knowledge and request every house owners, colleagues, and relatives to read those handbooks to know and understand about Earthquake Resistance building. He put in front his voice for following the Building for safe and secure life. He is grateful to Municipality for providing service to answer every query related to the building construction.

Major Challenges and Lesson Learned

Major Lessons

- The need for introducing and consolidating the culture of safety was demonstrated by the casualty and loss of assets losses by the Gorkha Earthquake of 2015. A large proportion of existing building stock suffered various levels of damages; even recently built buildings that were not NBC compliant suffered major damage. Hence, there is still a lot to do towards improving construction of our buildings and making buildings safer by code compliance a way of life. Comprehensiveness of the program is necessary: building code should be looked at together with the processes pertaining to risk sensitive land use planning, planning by-laws, and overall disaster risk management.
- There is a need to consider related social aspects - Building code implementation is not only a technical issue but also a social issue
- A long-term perspective and persistent effort is necessary for the required change in the mind-set of all contributing actors in making the buildings safer.
- Need to work with wider stakeholders: mason, engineers, house-owners and municipalities, and those who can contribute in risk transfer such as insurance companies, banks.
- Coordination and collaboration with other organizations working in BCI and regular coordination with government is necessary.
- Acceptance and involvement of all municipal staff is necessary to get support of the whole municipal office –
- Formation of mason groups must be a systematic process – needs appropriate policies at national level
- Refresher Courses for masons and other key professionals need to be formulated and implemented.
- Guidelines and manuals on quality of materials, and standardization of construction process need to be developed and disseminated.
- IT tools, technologies such Mobile Apps, Social Media etc. should be strategically and massively used for awareness raising and advocacy.

Teej Festival Celebrated With Earthquake Songs

Tanka Maya Gyawali is devoted and passionate social worker residing in ward no. 10 of Bharatpur. She is engaged in social services as a Female Health Worker since 2057 B.S. and now serving as the president. Her work is supported, appreciated, by other female workers influencing them to work in the community. Ms. Gyanwali along with her group participated and won in the song contest related with earthquake on the occasion of Teej festival organized by the Bharatpur Municipality.

As Female Health Worker, they visit door-to-door in their communities to spread knowledge, increase awareness through different initiatives like rallies, dramas, symposiums, training, pamphlets, composing songs and various competitions. Bharatpur Municipality has also worked with Female Health Worker in different sectors like health, education and the rights of children. In 2070 B.S. orientation program on Earthquake Preparedness and National Buillding Code was organized for Female Health Worker with the aim of spreading awareness to the community.

Bharatpur Municipality organized a singing competition with the objective of spreading awareness relating with earthquake information and its impact where 14 wards and 90 female health workers participated. Ms. Gyanwali along with 6 group represented from their ward and composed song covering the previous earthquakes of 1990 B.S. and 2045 B.S. of Nepal, Chile and Haiti. It also covered earthquake mitigation measures, earthquake preparedness and the other important messages. The journalists, local newspapers and radio stations covered all the songs of the competition. The program was successful and community found the program very useful rasing the level of awareness related with the earthquake. It acted as an inspiration to other municipalities to initiate programs spreading positive messages in the community.

Main challenges observed

The identified main challenges are:

- A large proportion of buildings are constructed without any building permits in most municipalities: to bring them into the building permit system is a challenge
- As there exists a significant proportion of vulnerable buildings being in use, development of proper regulation for retrofitting of existing building stock is a huge need that demands a careful study and strategy formulated.
- Negative influence of other neighboring municipalities those without enforcement of building code
- Problems of municipal planning bye-laws in hilly areas of Nepal, for example a right of way of 30m in a ridge top settlement does not make much sense and hinders any efforts on BCI
- Lack of standard training curricula in the past has resulted in graduates of different skills and approaches. There is a need also of refresher courses.
- Unavailability of required manpower at local level
- Maintaining the quality and standards of the training courses such as of Mason training is another major challenge. There are several organizations

Regional Workshop on "Review of building permit system for effective building code implementation

Know the risk-No risk

Madan Paswan, a dedicated and enthusiastic youth of Bharatpur Municipality. He has been working as a mason since 25 years and constructed more than 100 house are constructed. He has a dream to build Bharatpur-Earthquake Safer City.

Before the training, he was working as a semi-skilled worker. After getting 5 days training on earthquake resistant building construction technology conducted by NSET and Bharatpur Municipality, he realizes that the need and importance of building code to build the safer society.

Since four years after the masons training, he has been involved to enhance the capacity of mason's worker and quality of work. For the sake of mason's worker, we had established a mason association and more than 216 masons received EQR training, said Paswan. He added, they are monitoring the work of construction whether they are following building code or not. Despite having all these activities they are working on safe house construction in the close coordination and supervision of municipality engineers as well as helping municipality to implement building code.

Nowadays, Paswan and his team are taking initiation with the slogan Know the risk-No risk to implement building codes and mitigate EQ risk in Bharatpur.

Chapter 3

Photo: Seiji Suwa

Building Schools Resilient to Disasters

Schools are the place where children spend much of their time. Children dwell in large numbers under single roofs during their school hours. School buildings in Nepal are highly vulnerable to multiple hazards such as an earthquake, high wind, floods and landslide. If any disaster event occur, there is a high possibility of potential losses of lives because they are the most vulnerable section of the population. Therefore, it is vital that we ensure the safety of our future generation while they are learning. Nepal is earthquake-prone country. Schools are highly vulnerable if they are not properly constructed and prepared for the earthquakes. In Nepal, very few school buildings are resilient to the earthquake and School children are at high earthquake risks. Despite the fact that earthquake risk is relatively high in Nepal, School buildings are highly vulnerable to Earthquakes and they are still being constructed ignoring issues of basic structural safety without following safety measures. Therefore, citing possible future disaster events, there is needed special attention on it.

Similarly, schools are considered the most effective hub to reach and disseminate knowledge and skills of community resiliency. The concept, knowledge and skills of earthquake safety can trickle down from students, teachers to the community so that it helps to prepare and educate school children and teachers for disasters. However, providing knowledge and skills of earthquake safety should be a continuous effort and it needed to be cover all the schools which are still inadequate in Nepal.

Retrofit of school building in progress, SESP, NSET

Realizing this situation, NSET has been implementing the School Earthquake Safety Program (SESP) throughout the country and the region aiming at mitigating this very problem of school safety and preparedness. Building earthquake-safe communities through intervention at schools are at the core of SESP. It is a holistic approach taken by NSET to improve the earthquake safety of communities by intervening in schools.

The main goal of the program 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 SESP basically has five objectives. Firstly, it aims to raise awareness among schools, community and education stakeholders on earthquake risk and measures to reduce risk. Secondly, protecting children from the impact of potential hazards and assists schools in continuation of education after hazard events. Thirdly, disseminating earthquake safety message to the community through schools to build earthquake safe community and develop and adapt best practices to reduce earthquake vulnerability. Likewise, it aims to enhance the capacity of local community, schools and education stakeholders on preparedness and responding to potential hazards. Lastly, it also aims to carry out advocacy for adequate policy formulation and support Government institutions to enforce the policies to safeguard children from natural hazards.

With the collaborative efforts and support from the Government, USAID/OFDA, UNICEF, ADB, World Bank and different national and international organizations, a critical foundation has been created and experimented various mechanisms for implementing seismic retrofitting of school buildings in Nepal and has become one of the top priority areas.

NSET pioneered the SESP in 1997 when it was included as a 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. Considering the high risk of an earthquake in Nepal, NSET initiated school retrofitting in 1997/98 in one of the schools of Bhaktapur for the first time in Nepal under KVERMP. Initially, it was very hard to convince the local people and even the authorities on the benefits of seismic retrofitting. It opened every one's eyes once the retrofitting completed along with training to local masons on retrofitting and earthquake safe construction, awareness building among students, teachers and community, risk management planning of schools and greater appreciation from the authorities.

Uninterrupted two decade time span of NSET's effort to build the resilient school has a significant contribution towards improving the safety of school structures, enhancing school disaster risk management capabilities and promotion of disaster safety education in Nepal. Beside this, the entire community has been benefited from the program on promoting safer construction technology through the learning from schools and trained human resources. It has demonstrated the technical, financial, political and social feasibilities of programs addressing the reduction of structural, non-structural, and functional vulnerabilities of schools in Nepal.

Overall Achievement and Impact

Since 1999, NSET has implemented SESP in several schools. NSET so far has retrofitted 300 school buildings along with training to over 200 engineers, 2,000 masons, 11,000 teachers and awareness building of over 500,000 students and 5,000 people during 1999 to 2017 through support from various local, regional and international agencies. Now, the Education sector has developed more capacity to implement school DRR activities. School safety and mason training on safe construction as one of the integral component of almost every agencies working in education sector in Nepal. Masons trained before the earthquake served the community to improve the construction quality and served affected people to build stronger houses. Rate of recovery of SESP program schools after earthquake was noticed faster than non-program schools. Besides this, awareness level among education stakeholders on disaster risk and school safety issues also increased.

SESP has been recognized in national and international level. NSET's SESP model, experiences and methodologies has been replicated in Pakistan after the earthquake and school disaster preparedness was replicated in Bangladesh. School safety identified as one of the high priority area as Flagship 1 of Nepal Risk Reduction Consortium. In 2010, Government of Nepal developed concept paper for school vulnerability

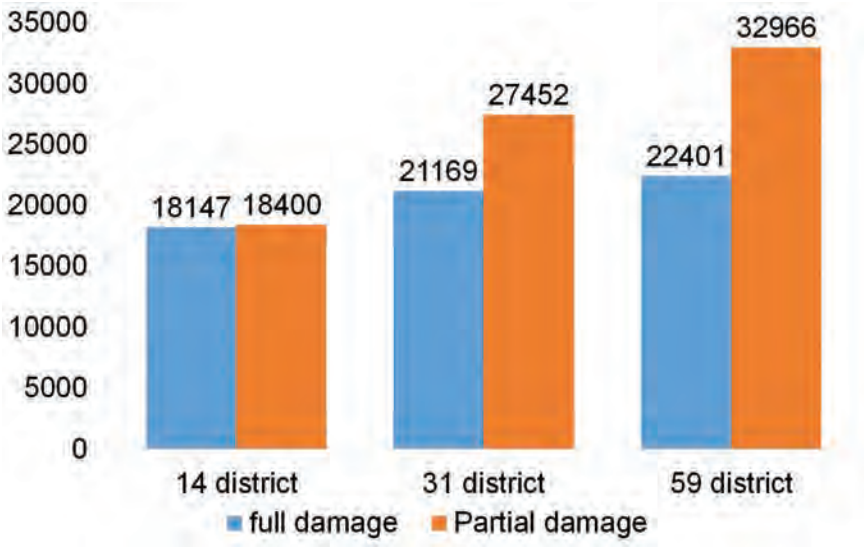
reduction and organized high level workshop of development partners to encourage them to invest on school vulnerability reduction. Likewise, Government developed school retrofitting pilot program in 2011 and retrofitted 15 school buildings on Kathmandu Valley. Government developed action plan to retrofit 260 school buildings of Kathmandu in 2012 and completed retrofitting of about 185 buildings of the Valley. Department of Education expanded the retrofitting program in 23 more districts beyond Kathmandu Valley from 2013. School retrofitting program continued by the Government. Government incorporated Comprehensive School Safety framework in School Sector Development Plan (SSDP) for 2017- 2023.

Outcome of SESP: overall and 2016/17

Impact of 25 April 2015 Gorkha Earthquake in Education Sector

The devastating 2015 Gorkha earthquake made adverse impact on the school education sector in Nepal. The PDNA report stated that the earthquake affected more over 9353 schools of 55 districts with the total loss of US$ 313 million which demands recovery/ rebuilding cost of US$ 397 million for the sector. Almost 1.2 million children of worst affected 14 districts were out of school for more than two months due to traumatic aftershocks, lack of class rooms and educational materials. According to Department of Education, a total of 22401 schools were damaged while 32966 schools suffered partial damage in 59 districts by the 2015 Gorkha earthquake. Similarly, in 31 districts, a total of 21169 schools were fully damaged while 27452 schools suffered partial damage. Likewise, in 14 districts where the earthquake had hit hard, 18147 schools suffered fully damage while 18400 schools suffered partial damage.

Schools damaged during 25 April 2015 Gorkha Earthquake



Source-Department of Education

Retrofitted schools didn't suffer structural damage by 2015 earthquake

After the earthquake, the initial rapid damage assessment of school buildings was carried out under the leadership of Department of Education. It was conducted to identify the status of schools building either to occupy the building or build temporary classrooms until detail damage assessment is accomplished. However, the country felt lucky as the earthquake occurred on Saturday while there were no children in the schools/classrooms. Had it occurred during school hours, the human loss and damage could have been unconceivable. The initial rapid damage assessment found that about 60% of the existing school buildings in earthquake affected districts were identified unsafe for immediate occupancy. However, the retrofitted schools didn't suffer any structural damage during the earthquake. Most of the retrofited schools were used as immediate community shelter, field hospital and relief centers. The findings have shown a clear direction for structural vulnerability reduction and enhancing disaster preparedness. It has demonstrated the feasibility and cost effectiveness for improving school safety through locally available resources.

Conclusion

1. SESP has shown a clear direction for structural vulnerability reduction and enhancing disaster preparedness. It has demonstrated the feasibility and cost effectiveness means of improving school safety through locally available resources. Since there is a need to strengthen more than 60,000 school buildings, develop risk management plan and capacity of 35,000 schools and to disseminate safety message among more than 8 million children, Comprehensive School Safety Framework is to be institutionalize to all the schools.
2. The evidence of safe behavior of retrofitted schools is to be disseminated to wider range so that there is good acceptance on the benefit. Working together with the Government and Civil Society Organization is the need for current time.

Challenges

1. School buildings in Nepal are highly vulnerable to multiple hazards such as earthquake, high wind, floods and landslide. Following are the main challenges faced during implementing SESP and to make all the schools safer.
2. Capacity at local level is very low to build safer buildings, due to which almost all the buildings including schools are built unsafe.
3. Due to lack of adequate capacity at local level, monitoring and supervision from central level is expensive.
4. Retrofitting is new technique to many stakeholders. Schools are reluctant to retrofit existing building, they believe more on new construction. This is due to lack of awareness on the benefit of retrofitting.
5. It is very difficult to get monitory contribution from the local community for retrofitting.

6 Survey shows that more than 75% of school buildings are vulnerable. It demands huge resources, trained human resources and time bound planning with strong monitoring system.

7 Schools are scattered. Majority of the schools are in remote area without transportation. This causes increase in cost for transportation and due to accessibility problem, supervision cost goes up.

8 Accountability of the concerned authority and stakeholders in promoting school safety is a big challenge.

Lessons learned

1 Commitment from the Government is very important. CSOs can assist and demonstrate proper way of implementation but unless it is led and owned by the Government, it is difficult to scale up.

2 Grant of school construction from the Government is not sufficient to build school building according to the approved design. Hence Government need to improve unit cost per class room construction so as to ensure quality construction.

3 To ensure quality of construction/ retrofitting, strong monitoring system is essential.

4 Strong technical team with sufficient number and skill is required in each district.

NSET, Plan Nepal working with Public Schools under DFAT supported program

The 2015 Gorkha earthquake adversely impacted lives and wellbeing of Nepali people. 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.

A project titled “Building Back Safer Schools for Nepal Earthquake Response 2015” begun as a consortium between PLAN Nepal and National Society for Earthquake technology- Nepal (NSET) in 6 districts; Kathmandu, Lalitpur, Sindhuli, Sindhupalchowk, Dolakha and Makawanpur with the financial support from Department of Foreign Affairs and Trade (DFAT) beginning October 2015 till December 2016.

A total of 12 schools site were selected for disaster resilient demonstration schools through new construction/ reconstruction/retrofitting and disaster preparedness and risk reduction activities.

Out of those 12 school buildings being constructed, 5 schools are Integrated Resource Schools which include disability considerations for children with hearing impairments and mental disabilities and were considered as model schools for Comprehensive School Safety. Within the consortium, NSET's role was mainly focused on providing technical assistance, monitoring, training, and support, whilst PLAN Nepal played the leading role in implementation, community and school outreach. Both PLAN Nepal and NSET were heavily engaged in national level coordination and advocacy, with a coherent, coordinated approach.

The program successfully completed its objectives to build Model and integrated resource schools and the process document for replication and strengthening accountability in the target districts, and strengthening district technical, financial and human resource capacity to implement, improve and monitor National policies and guidelines for ensuring safe, inclusive and resilient schools.

As part of the program, NSET provided technical support on the construction of damaged or destroyed primary schools based on safe schools building guidelines. Likewise, TOT has also been conducted for DEOs, Plan Nepal and partner staff for the training of masons on safe construction methodologies. Similarly, it also conducted training to School Management Committee and child clubs regarding DRR and contributed on capacity building of local stakeholders to improve and monitor National policies and guidelines for ensuring, inclusive and resilient schools. Also, a 5-Day Basic Technical Training on Earthquake Resistant Building Construction were provided to engineers and sub-engineers currently working under District Education Offices/District Level Project Implementation Unit (DLPIU) of 18 earthquake affected districts

This project has not only produced a large number of skilled manpower who can contribute in the construction of earthquake resistant buildings but also in the dissemination of the knowledge they have gained during trainings. It has been a model in building a safer school along with a safer community.

5 Combination of structural intervention and awareness, training and risk management planning works well for sustainability of the results.

6 Community led construction/ retrofitting is a better implementation modality in order to ensure ownership and technology dissemination.

7 Multi stakeholder collaboration is essential since the problem is very big to solve in time.

8 Retrofitting is the only option to reduce structural vulnerability. It should be scaled up to make schools safer and encourage community to replicate. Simple retrofitting of existing buildings can protect lives during hazard impact which was evidences during Gorkha Earthquake.

Disaster Education consortium commenced in Nuwakot district

With view to enhance capacity on Disaster Preparedness and Response Planning of schools, a joint consortium between Team Nepal led by National Society for Earthquake Technology Nepal and Team Hyogo led by Sakura-Net has been formed in 2016. The consortium is working closely with the central and district education offices to implement disaster risk reduction education at schools of Nuwakot district as demonstration project. The interventions has been focused in integrating disaster risk reduction into education sector including capacity building and disaster risk education for school children. The consortium also intends to collaborate with school reconstruction process wherever possible so as to incorporate soft components such as disaster education in those schools. A total of eight schools of Nuwakot are being developed as leader schools to spread the concept of disaster education to other schools.

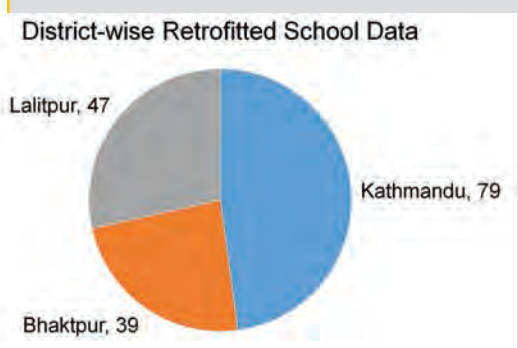
The main objectives of the consortium are to support schools of Nuwakot to enhance capacity on disaster preparedness and response planning through promoting sustainable disaster risk reduction/ management education, Develop and disseminate disaster safety education resource materials (awareness and education materials, guide books, text books) and provide educational logistic support to children and teachers from schools of Nuwakot that were affected by 25 April 2015 earthquake.

The project is being implemented since August 2016 and set to run until June 2018.

ADB's assistance for quality assurance, design verification and retrofitting of school buildings

NSET in coordination with the Asian Development Bank, Nepal Resident Mission Kathmandu initiated an assignment to provide technical assistance to the Department of Education for quality assurance, design verification and retrofitting of 260 school buildings of the Kathmandu valley along with capacity development of local masons and stakeholders.

The assignment under this project covered all components and cycles of the School Earthquake Safety Program (SESP). The work not only dealt with structural components but significant emphasis was paid to other components such as training to local masons, teachers and students, preparation of emergency plans of schools, and conducting drills on a regular basis. The overall objective of the TA was to provide technical assistance to the Department of Education for quality assurance and to provide supervision support in implementation of the SESP Action Plan 2012.



A total of 165 school buildings have been completed. Prior to the start of the construction work at site, general orientation to the school management committee and the masons was provided on quality of materials, specific details of works, material storage facility and workmanship required.

Most of the buildings were retrofitted by the schools and school management committee. However, some of the buildings which were complex in nature, required more technical skills and equipment, were retrofitted through formal contract process. Out of the 165 school buildings, 153 buildings were retrofitted by direct execution of the school management committee and 12 buildings were retrofitted employing professional contractors. NSET provided support in construction supervision throughout the process. In addition, rapid damage assessment of all the public schools of the Kathmandu valley was conducted by NSET in coordination with DOE and DEOs and the report was submitted to ADB.

UNICEF assistance for Disaster Risk Reduction and Climate Change Adaptation (DRR & CCA) in Education Sector

In February 2014, 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 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.

Working in 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. Similarly, in the district and local level, this program was able to sensitize 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 Improvement Plan (SIP) incorporate at least six components of DRR/CCA.

NSET's partnership with Shanti Volunteers Association

After the Gorkha Earthquake 2015, NSET carried out various activities including damage assessment of school buildings, construction of temporary learning centers in Kathmandu and Nuwakot, providing technical support to Government for design and planning of temporary schools, capacity building of engineers and education stakeholders among others.

NSET in partnership with Shanti Volunteers Association (SVA), Japan constructed 124 school blocks in Nuwakot district. A total of 100 Temporary Learning Centres (blocks with two rooms each) were constructed with bamboo and GI sheet. A total of 24 schools were constructed with steel truss and GI sheet.

Students' Summit on Earthquake Safety 2014

The Government of Nepal, Ministry of Education and Department of Education in association with NSET and the support from education cluster members including UNICEF, Plan International, World Vision, Save the Children, Nepal Red Cross Society, Mercy Corps, World Education, Handicap International, USAID and Maiko High School organized a 4-day Student Summit on Earthquake Safety (SES2014) during August 17-20, 2014 in Pokhara. This event provided a common platform to the national and international students on school earthquake safety issues. The Summit focused in a thematic discussion on the subjects of Disability and Disaster Risk Reduction, Climate Change Adaptation and Environment protection.

In the 9th edition of the Students' Summit, 120 participants including students and teachers of 60 schools from 30 districts of Nepal and 7 students and teachers from Maiko High School, Kobe, Japan participated in the programs while more than 300 local students joined to participate in the Pokhara Awareness Rally.

Students participating in an awareness rally during Student Summit-2014, Pokhara

The participants were selected to represent all regions of Nepal. The Summit was extensively covered by local media as well national media, including special coverage by Watchdog Media for Nepal Television.

SES2014 was able to achieve it is three objectives:

- Propagate earthquake awareness all over Nepal using students as role models
- Share good national and international practices of school disaster preparedness, and
- Enhance fraternity among students through common understanding on disaster risk reduction.

The highlights and specific outcomes of the summit include sensitization of students from Japan and Nepal on earthquake safety issues. Japanese students shared their rich knowledge and experience on earthquake risk reduction and preparedness. In addition, they also shared the experiences and lessons learned from Fukushima earthquake of 2011. Relationships were developed among school students from Nepal and Japan and this is an aspect that the students look forward to every year. Recommendations as a form of Summit Declaration from the students regarding their safety and rights in school was finalized and handed over to the Department of Education and concerned partners for further action and planning.

Maiko High School exchange visit 2015 and 2016

A total of eight high school students and two teachers from Maiko High School visited Nepal after the Gorkha earthquake 2015. They visited different schools from Kathmandu and Nuwakot district as part of the Kobe Nepal exchange program which has been continuing since 2005. However this time, the visit also incorporated the Japanese student's efforts to help Nepali schools recover from the earthquake. As their support, the students collected funds for nine schools located in Nuwakot and Kathmandu district. They provided the funds according to the requirement of each school. For instance, a lack of separate girl's toilet was seen in one particular school, hence they donated an amount for the construction of female toilet. In some of the schools, they provided funds for purchasing science lab equipment and laptop. After the devastating earthquake, many schools were conducting classes in TLCs, thus the students of Maiko High School also contributed for constructing windows and doors at a school in Nuwakot.

In December 2016, another group of students including some who had visited in the year 2015 visited Nepal with their teachers. The students were happy to see the progress with their contribution. The students from Nepal and Japan exchanged cultural boxes as well as message flags which included various messages to each other.

Maiko High School students performing a cultural dance at Balbikash School, Alapot

Chapter 4

Enhancing Emergency Response Capacity: Organized Efforts of Preparedness for Effective Response

The emergency response capacity of a community plays a strong part in their resilience in the face of a disasters. A disaster preparedness is set of behavior founded on the shared understanding on the future disasters to be prepared for and respond appropriately to these incidents. Preparedness helps to reduce human impact of disasters, and provides the emergency response professionals basic skills to perform critical tasks more effectively and carry out disaster recovery related tasks faster and more efficiently.

No community is earthquake safe unless everybody of them is aware of the consequences of earthquakes and is prepared. A massive awareness program can benefit all communities and a variety of stakeholders through imparting knowledge and skills. In a bid to create and enhance the culture of preparedness in Nepal and region, NSET has incorporated Disaster Preparedness and Emergency Response in its each and every program and activities. NSET is helping communities and institutions to develop and enhance their disaster preparedness and emergency response capacities. NSET has been assisting many institutions to enhance their earthquake preparedness by conducting earthquake orientation programs and evacuation drills.

In this context, NSET, with a team of committed professionals are working for developing strategies and imparting ideas/skills to enhance the capacity for disaster preparedness and emergency response. NSET's Disaster Preparedness and Emergency Response (DPER) Division has been designed to develop concepts, impart ideas and skills to enhance the capacity for disaster preparedness and emergency response in Nepal and potentially contribute at the international level as well. In case of big disasters, due to difficult terrain, adverse weather, and damaged/poor infrastructures, it takes time to reach the affected areas in remote villages. Therefore, there are no immediate options for Search and Rescue (SAR) operation other than the traditional skills and resources with the community people. This was also widely realized during the 25 April 2015 Gorkha Earthquake. More lives could have been saved, if community responders had basic skills of SAR and provided with minimum equipment. In Nepal, 83 percent of population live in villages and more than 83 percent land of the country is covered by hills or mountains causing difficulties in accessibility and are susceptible to landslides. Therefore, the country has to come up with a strategy for developing large number of responders with basic lifesaving skills and spread in all villages of the country. Ideally, each village should have minimum one squad (6 responders) of community responders, so that they can manage the emergencies until the professional responders arrive at the scene.

In this connection, NSET-DPER aims to raise people's awareness against disaster risks and develop responders with minimum lifesaving skills throughout the country and the region. DPER is broadly offering orientation programs on 'Earthquake Risk Reduction and Preparedness' at different levels. It has been providing trainings to different stakeholders in the country and in the region, mainly capacity building initiatives on search and rescue, medical response,

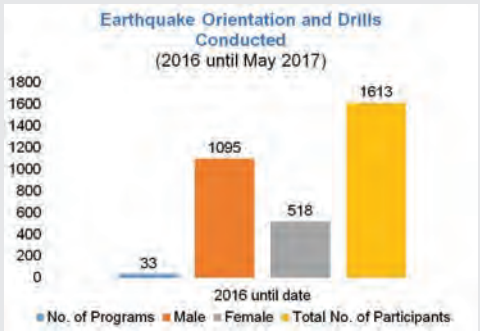
hospital preparedness and risk assessment. Regular updates on teaching and training course materials is done so as to make the training course at par with the current international standards on emergency preparedness and response. Community's responders, institutions, volunteers, laypersons, various socio-civic clubs, women's groups, orphanage homes, elderly homes are identified as the key target groups of the disaster preparedness and emergency response.

As part of the disaster preparedness and the emergency response activities, NSET has been basically carrying out two types of activities, namely, 1) supporting communities and institutions for enhancing disaster preparedness and 2) Program for Enhancement of Emergency Response (PEER). Various activities such as simulation exercises, national, city, family, community and institutional planning, capacity enhancement programs (DAT, CSAR, BEMR, FRT) and earthquake orientations to communities, organizations, schools, house owners, special groups among others are being carried out under the regular activities. As part of PEER, a regional training program being implemented in the four countries of the South Asia region, Medical First Responder (MFR), Collapsed Structure Search and Rescue (CSSR), Community Action for Disaster Response (CADRE), Hospital Preparedness for Emergency (HOPE) and Swift Water Rescue (SWR), Training for Instructors (TFI), Instructors' Workshop (IWs), Master Instructors' Workshop (MIW) training programs are being carried out.

Earthquake Risk Reduction and Preparedness Orientation Program

DPER offers earthquake risk reduction and preparedness orientation programs in different options (Earthquake orientation only: 2 hours; Orientation and evacuation drill: 3.5 hours; and Orientation and simulation exercise: 4.5 hours) for various stakeholders.

preparedness orientation program basically deals about the earthquake basics, earthquake risk of Nepal in general, and localities, risk reduction and preparedness measures, structural and nonstructural vulnerability and mitigation measures. From 2001-2015, DPER has conducted more than 300 orientations benefitting nearly 21,000 people from different communities. It has been recorded that more than 5000 males and nearly 3000 females have been benefitted during the period from 2010 to 2015 alone.



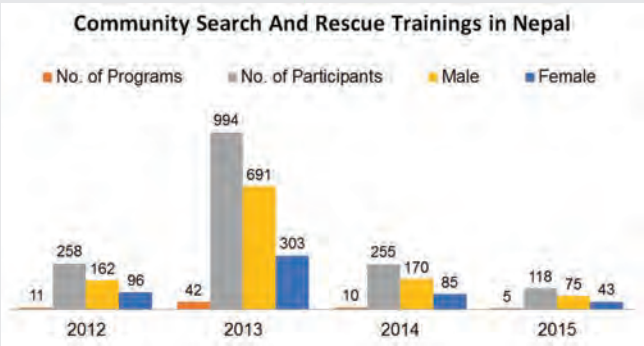
After the 2015 Nepal Gorkha Earthquake, NSET-DPER has received an increasing number of requests for Earthquake Orientation and Drills. As of May, 2017, a total of 33 orientations and drills have been conducted accommodating 1613 participants with 1095 males and 518 females.

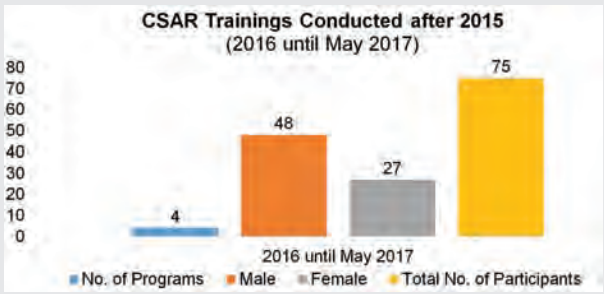
Trainings and Other Awareness Raising Programs

Community Search and Rescue (CSAR) Trainings

The course provides the vital training required to be best prepared for anyone who will be providing support in performing basic search and rescue in their community, organization and family during and after disaster using locally available resources.

Major skills that are taught to the participants during the CSAR training includes multiple room search techniques, lifting and moving heavy objects, victim extrication and fire response (Bucket brigade technique). From 2012-2015, DPER has completed a total of 68 CSAR trainings and 1625 graduates with 1098 males and 527 females trained in Nepal. There are two types of CSAR trainings provided by DPER: CSAR-1001 and CSAR 1002.

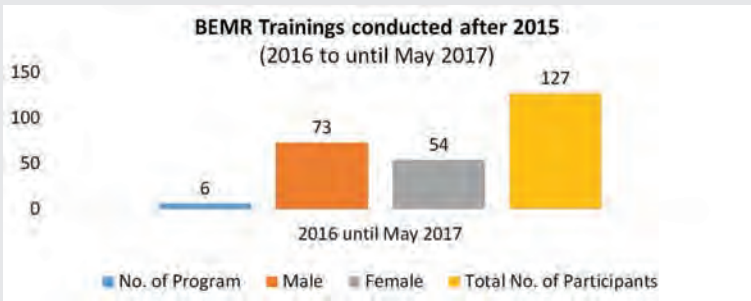




NSET conducting Community Search and Rescue (CSAR) trainings for various organizations in Nepal. From 2016 to May 2017, a total of 4 CSAR trainings have been completed where 75 participants with 48 males and 27 females got trained.

Basic Emergency Medical Response (BEMR) Training

BEMR training is all about the pre-hospital treatment using locally available resources. It aims to develop medical responders with basic lifesaving skills. Under the training, the major skills taught are bandaging and stabilization/splinting. From 2012-2015, NSET-DPER has produced more than 400 BEMR responders from more than 15 trainings. There are two (2) types of BEMR trainings provided by DPER: BEMR-1001 and BEMR 1002. From 2012-2015, a total of 19 BEMR trainings have been completed and 462 graduates with 288 males and 174 females have been trained. After the April 2015 Gorkha Earthquake, NSET resumed the conduct of BEMR trainings for various organizations in Nepal. As of May 2017 from 2016, a total of 6 BEMR Trainings have been completed and 127 with 73 male and 54 female participants have graduated.

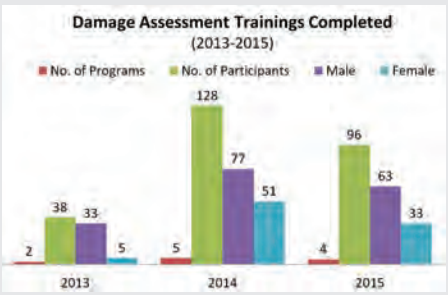


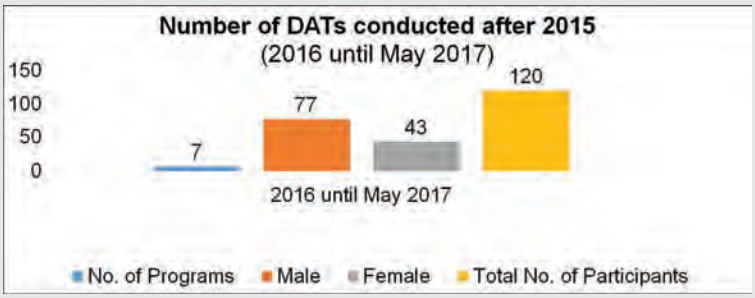
Damage Assessment Training (DAT)

DAT provides information and resources that will enable participants to conduct rapid and effective damage assessment in order to save lives, protect property and to determine where the building is safe to perform CSAR.

As part of DAT trainings, knowledge and skills taught are to distinguish structural and non-structural components of a building, understand damage patterns and identify damage grades. From 2013-2015, NSET-DPER has conducted 11 DATs and has produced 262 graduates with 173 males and 89 females.

After the April 2015 Gorkha Earthquake, NSET conducted DATs and has so far completed 7 for various organizations in Nepal. As of May 2017 from 2016, a total of 120 participants with 77 males and 43 females have graduated.



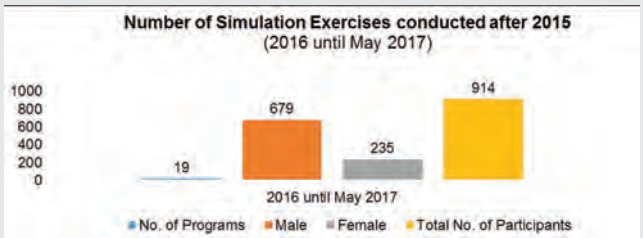


Developing Emergency Response Plan (ERP)

ERP is the most essential plan that every institution/community needs to have for carrying out the appropriate response activities in a defined manner. This is a guideline that orients the individual level to institution/community itself during an emergency. NSET has been assisting institutions for developing such plans, and has provided regular input for updating the plans in present context. From 2013 to 2014, two institutions were assisted by NSET in developing their Emergency Response Plans.

Simulation Exercises

Simply possessing response plans is not enough to ensure effective response in the aftermath of a disaster. Plans must be regularly exercised; gaps should be identified and addressed. NSET team executes scenario-based simulation exercise for different organizations and communities. From 2010-2015, NSET has conducted about 54 of such exercises where a total of 2344 participants with 1401 males and 943 females had graduated. After the April 2015 Gorkha Earthquake, NSET resumed the conduct of simulation exercises and has so far completed 19 for various organizations in Nepal where 914 participants with 679 males and 235 females had graduated.



Prepositioning Emergency Supplies

Earthquake Go-Bag for Individuals

NSET, through awareness programs, exhibitions, brochures and interview/ interactions, promotes a bag with emergency supplies, which serves as mobile emergency kit after disaster. Items are stocked in a quantity which is sufficient for an individual to survive for at least 3 days during an emergency. Ready-to-eat items, emergency medicines, water purifier, copies of identity documents, emergency contacts etc. are kept as per need. It is recommended to keep in accessible area at the house and the work station from where one can immediately grab while evacuating the building after an earthquake. It can also be placed in the vehicle. Earthquake Go-Bag includes the basic items as shown in the picture below. NSET has provided trainings to different community groups for preparing the Go Bags with items.

Household Emergency (HH) Kit for families/household

DPER also promotes HH Kit containing the basic tools, equipment and accessories (TEA), and some supplies to be used in a household level during and after disaster or emergencies. All the family members should be aware of it, and at least the adults should know how to operate the TEAs kept inside the emergency kit. The best location is within the building compound, in a safe location and accessible to all family members.

Community Search and Rescue (CSAR) Kit for Institutions or Small Community

CSAR kit is a container which holds basic tools, equipment and accessories (TEA) required to perform CSAR after disaster within small institutions. It includes the TEAs that can be operated without the use of any external source like electricity or fuel. The quantity of materials depends upon the size of the organization. It can be kept within the building compound, in a safe location and should be accessible to all staff members. CSAR kit includes the list of items as shown in photo below.

Pre-Positioned Emergency Rescue Store (PPERS)

PPERS is a container with larger quantity of rescue items similar to CSAR TEAs for a large organizati and community. This is placed with the institution's premises or communi accessible to every individual of th institution or community, in a safe a easy access place. Every skilled rescu can operate CSAR with these resc supplies. Until date, PPERS containe are located in 8 different locations Kathmandu Valley: 3 in Kathmandu in Lalitpur and 2 in Bhaktapur distric..

Program for Enhancement of Emergency Response (PEER)

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. The program was initiated in Asia in 1998 by the USAID/ (Office of U.S. Foreign Disaster Assistance (OFDA). Since the program's introduction in Asia in 1998, three stages of PEER have already been successfully implemented.

Through international competitive bidding, USAID/OFDA awarded NSET to implement the fourth stage of PEER in South Asia. PEER Stage 4 (2014-2019) is presently implemented by NSET in Bangladesh, India, Nepal and Pakistan. PEER Stage 4 is addressing the need to further strengthen emergency response capacities of people and governments of these countries.

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. PEER aims to enhance local and regional disaster preparedness and response capacities of vulnerable countries in South Asia. 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.

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, government-affiliated/non-government/private and volunteer response organizations.

PEER courses

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

S.N.	PEER Country	Nodal Agency	Partner Organizations / Training Institutes
1	Bangladesh	Department of Disaster Management – Ministry of Disaster Management and Relief (DDM-MoDMR)	• Directorate General of Health Services (DGHS) • Fire Service and Civil Defence of Bangladesh (FSCD) • Bangladesh Red Crescent Society (BDRCS)
2	India	Ministry of Home Affairs (MHA)	• National Disaster Management Authority (NDMA) • National Disaster Response Force (NDRF) • SEEDS • All India Institute of Medical Sciences (AIIMS)
3	Nepal	Ministry of Home Affairs (MoHA)	• Nepalese Army • Nepal Police / National Police Disaster Management Division • Armed Police Force / APF Disaster Management Training Center • Institute of Medicine (IoM) – Tribhuvan University • Nepal Red Cross Society (NRCS)
4	Pakistan	National Disaster Management Authority (NDMA)	• National Institute of Disaster Management (NIDM) • National Health Emergency Preparedness and Response (NHEPRN) • Punjab Emergency Services / Emergency Services Academy (PES / ESA) • Pakistan Red Crescent (PRC)

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. TFI and IWs are prerequisite to become a PEER course instructor.

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.

Program Countries	Training Activities for 5 years													Total Program
	MFR	CSSR	MFR EU	CSSR EU	TFI	MFRIW	CSSRIW	HOPE	HOPE-TFI	CADRE	CADRE-TFI	SWR	MIW	
Bangladesh	1	1	3	3	1	1	1	4	1	4	1			21
India	1	1	3	3	1	1	1	4	1	4	1			21
Nepal	1	1	3	3	1	1	1	4	1	4	1	1	1	23
Pakistan	2	2	4	4	2	2	2	5	1	4	1			29
Total	5	5	13	13	5	5	5	17	1	16	4	1	1	94
	3	3	3	3	2	2	2	4		2				24
Completed	1 each in Nepal, Pakistan and India	1 each in Nepal, Pakistan and India	Nepal: 1 each for Nepalese Army, Nepal Police and Armed Police	Nepal: 1 each for Nepalese Army, Nepal Police and Armed Police	1 each in Nepal and India	1 each in Nepal and India	1 each in Nepal and India	2 each in Nepal and Pakistan		2 in Pakistan				

Participants of Collapsed Structure Search and Rescue (CSSR) training in practical session

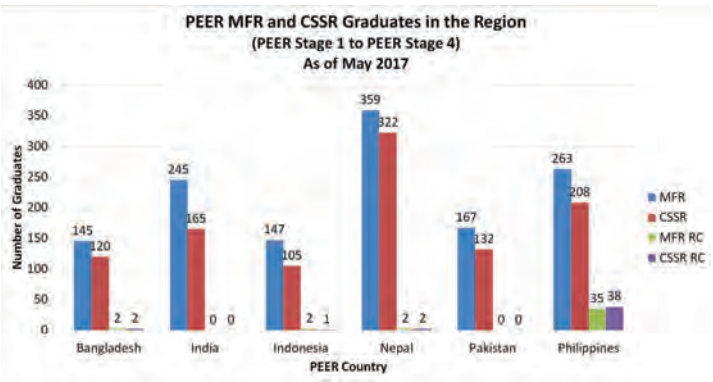
Program Outputs

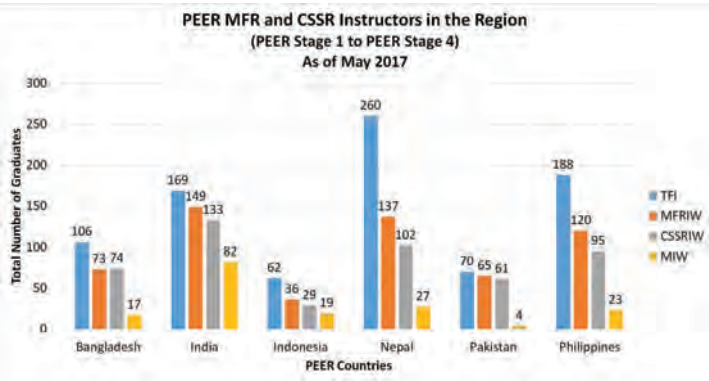
As of May 2017, NSET completed the following program events under PEER Stage 4:

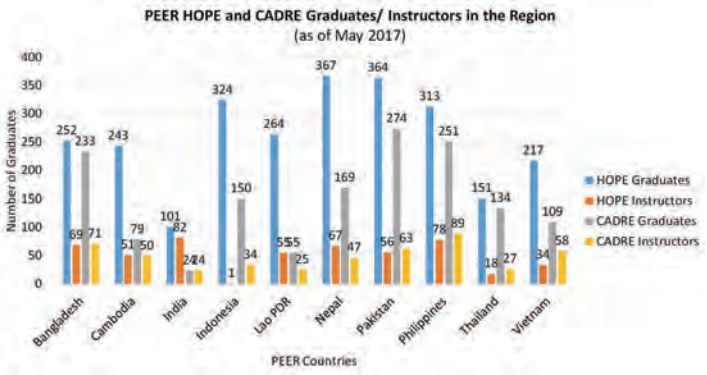
SN	Program Events	Date	PEER Country
1	MFR End Users Course	June 8-14, 2015	Nepal
2	CSSR End Users Course	June 18-22, 2015	Nepal
3	Regional Strategic Planning Workshop	July 21-23, 2015	Nepal
4	Regional Course Review Workshop	July 24-28, 2015	Nepal
5	Nepal Country Planning Meeting	September 18, 2015	Nepal
6	HOPE Course	October 2-5, 2015	Nepal
7	Stocktaking and Landscaping Study for Nepal	September 2015	Nepal
8	MFR Course	December 1-13, 2015	Nepal
9	CSSR Course	January 7-14, 2016	Nepal
10	Bangladesh Country Planning Meeting	January 20, 2016	Bangladesh
11	Stocktaking and Landscaping Study for Bangladesh	January 21-22, 2016	Bangladesh
12	Pakistan Country Planning Meeting	January 27, 2016	Pakistan
13	Stocktaking and Landscaping Study for Pakistan	January 28-29, 2016	Pakistan
14	India Country Planning Meeting	February 8, 2016	India
15	Stocktaking and Landscaping Study for India	February 9-10, 2017	India
16	TFI	February 8-12, 2016	Nepal
17	MFRIW	February 14-18, 2016	Nepal
18	CSSRIW	February 22-28, 2016	Nepal
19	MFR End Users Course	March 22-28, 2016	Nepal
20	CSSR End Users Course	March 31-April 4, 2016	Nepal
21	MFR End Users Course	April 8-14, 2016	Nepal
22	CSSR End Users Course	April 17-21, 2016	Nepal
23	HOPE Course	April 26-29, 2016	Nepal
24	SWR Brainstorming Workshop	June 28-30, 2016	Nepal
25	PEER Mid-Term Review Meeting	July 11-12, 2016	Organized by USAID/OFDA; NSET as participant
26	HOPE Course	October 17-20, 2016	Pakistan
27	HOPE Course	October 24-27, 2016	Pakistan
28	MFR Course	November 22-December 4, 2016	India
29	CSSR Course	December 8-15, 2016	India
30	CADRE Course Review (for Pakistan)	November 7-11, 2016	Pakistan
31	CADRE Course	November 14-17, 2016	Pakistan
32	CADRE Course	November 20-23, 2016	Pakistan
33	MFR Course	December 19-31, 2016	Pakistan
34	CSSR Course	January 4-12, 2017	Pakistan
35	Exploratory Visit to Bhutan	March 28-31, 2017	Bhutan
36	SWR Regional Course Development Workshop	April 10-12, 2017	Nepal
37	PEER Nepal Progress Review Meeting	April 12, 2017	Nepal
38	TFI	May 8-12, 2017	India
39	MFRIW	May 15-19, 2017	India
40	CSSRIW	May 25-31, 2017	India
41	PEER India Progress Review Meeting	May 31, 2017	India

Since the start of PEER Stage 4 in October 2014 until May 2017, NSET has completed 41 various program events in the four PEER beneficiary countries. 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.







PEER MFR and CSSR Graduates in Nepal (as of May 2017)

SN	Organization	MFR Grads	CSSR Grads	MFR-EU Grads	CSSR-EU Grads	MFR IW	CSSR IW	Course Coord/Monitors (MIW)
1	Nepal Police	96	84	30	30	62	51	10
2	Armed Police Force	60	58	24	24	36	30	5
3	Nepalese Army	32	27	48	48	12	8	5
4	Nepal Red Cross Society	26	16	8	4	17	5	4
5	NSET	12	11	6	5	12	9	3
6	Other organizations (e.g. World Bank, Nepal Scouts, MHA, TIA, some hospitals, municipalities)	13	6	4	9	3	2	0
	Total	239	202	120	120	142	105	27

Success Stories

PEER in 2015 Gorkha Nepal Earthquake

More than 15 years of PEER investment in Asia has been put to test during this most challenging episode in Nepal's history. Rescue organizations in Nepal mobilized several hundred emergency response personnel of which many were from among PEER trained rescuers.

Trained and skilled emergency response volunteers were also tapped to provide additional support to the already overwhelmed national search and rescue teams on ground zero. Regardless of the magnitude of an emergency, national responders are the country's first line of defense, the first ones to save their own before any external help arrives.

It is very much worthy to note that the skills applied in searching and safely extricating the trapped living and dead bodies, complemented by effectively using modern search and rescue equipment, are attributed to the years of embedding the MFR and CSSR skills in PEER partner organizations in Nepal. It was also evident that non-PEER certified responders followed the same lifesaving skills and procedures that are delivered in PEER courses as they have used same standards and curricula for their in-house regular training courses, facilitated by PEER-certified instructors.

It can be said that Nepal national responders acquired the basic search and rescue (SAR) skills through PEER; because of this foundation, national responders are able to assist and work side by side with international urban search and rescue (USAR) teams and understand the same guidelines and techniques in SAR operations, with the same goal of searching, rescuing victims using the safest techniques and eventually saving lives. However, the main difference among national and international SAR teams is the use of heavy-duty and more sophisticated SAR equipment by the international teams. Some national response teams worked independently on-site and also assisted the international USAR teams as the former had the local understanding.

Testimonials

Mr. Krishna Sapkota
Head Plumber

When the earthquake of April 25, 2015 left a number of hospitals paralyzed, Tribhuvan University Teaching Hospital in Kathmandu was operating in full swing. This was possible because of the disaster preparedness and non-structural mitigation works the hospital had implemented beforehand.

Nonstructural elements of the hospital such as furniture and oxygen cylinders were fastened to the walls, windows were laminated and cabinet contents and water tanks were secured as part of the hospital's Disaster Preparedness and Emergency Response Plan.

"In this hospital, we tried to implement all the recommended non-structural mitigation work. Because of this, there were no reported accidents and we could operate smoothly in the post disaster scenario. The oxygen cylinders, racks and cabinets didn't fall and no one was injured" says Mr. Krishna Sapkota, the Head Plumber of the hospital. "In the beginning it was really difficult to convince the hospital staff and start the mitigation works, but after continuous advocacy and technical assistance from NSET we could actually make this possible" added Mr. Sapkota.

Mr. Dhakendra Khatiwada
Inspector, CSSR Graduate

I am Inspector Dhakendra Khatiwada, a Collapsed Structure Search and Rescue graduate. None of us imagined the devastation of the Gorkha Earthquake would come so suddenly. When it happened we were dispatched within 10 minutes of the earthquake. In no time we planned for our safety and started our operation in Gongabu and Balaju, which were the most affected areas in the valley. As devastating it was, this was also a big opportunity for us to bring our Collapsed Structure Search and Rescue skills into use and we did it with a strong will and coordination.

It was a big success for us when we rescued Mrs Kumari Khadka from New Jana Sewa Guest House, Gongabu after 6 days of being trapped. Although the incident was very tragic, we are very content and proud that we could at least save a life after all the risks and pain we went through. This meant a lot to our teams.

Improving training strategies in Nepal

- Within the more than 15 years of PEER implementation in Nepal, PEER has contributed in giving shape to the national emergency response system and has improved the training strategies in Nepal.
- There has been a growing awareness on the need for developing qualified MFR and CSSR instructors to train the end users or responders in the PEER partner organizations, mainly the security organizations. The vision of establishing trained and equipped response teams led to a steady progress in Nepalese Army, Nepal Police and Armed Police Force. These organizations has taken initiatives in owning the PEER program, utilizing and adapting the PEER MFR and CSSR curricula in the capacity building of their emergency response teams.
- NSET has made the PEER Training for Instructors (TFI) mandatory for its professionals delivering various programs and projects. TFI has been acknowledged by the PEER countries as a very good medium in developing facilitators/trainers to manage and deliver programs and projects more effectively.

PEER's innovative Ideas

Online Database

Through PEER, NSET has developed the PEER online database containing relevant information on PEER partner organizations, trained graduates and instructors. The database serves as an important tool in planning and decision-making; accessing information on qualified and available instructors to be invited in facilitating courses and also for potential mobilization of trained graduates to respond to emergencies. The database system is also being institutionalized in NSET for other programs and projects.

PEER Online Self-Test System

This PEER online self-test system is still on its early stage of testing. It is being used as a tool to find out the retention of knowledge by PEER graduates. The participants to this test has to answer 50 objective-type of questions on the respective PEER courses, such as MFR, CSSR, CADRE and HOPE, within 30 minutes time. Upon the completion of the test, the participant's time will be acknowledged, will receive immediate feedback on the number of correct answers and will receive a certificate.

Ms. Sony Maharjan
Community Volunteer/
Thecho Community

"In April 2012, I had the opportunity to participate in PEER Medical First Responder (MFR) Course organized by National Society Earthquake Technology (NSET) and Nepal Police at National Police Academy, Maharajgunj, Kathmandu. I also completed Light Search and Rescue (LSAR) training by NSET and was eventually developed as trainer.

While working as a teacher in Kalyan Boarding English School, I was able to help one student of class KG when the student showed the initial signs and symptoms of shock. Confidently, I provided pre-hospital treatment by keeping her warm and elevated her lower extremities at around 20-30cm which helped improved her condition.

In my community, Thecho, Lalitpur, there were some people who completed First Aid and LSAR trainings. Together we worked and went in each ward of old and core settlements for the preparation of ambulance service after the April 25th 2015 earthquake. We helped in rescuing victims and provided simple treatments for those who were injured.

Through the knowledge and skills I gained from LSAR training and MFR course, I am encouraged and could help in accidents."

Dr. Pranab Man Karmacharya
Physiotherapist/Community Volunteer

"My passion has always been in serving the community in all possible ways. NSET trainings from DPER Department has planted seeds of various trainings within me which diversified my service branches to the needy by 360 degrees. Before taking CADRE and CSSR courses, I was only focused on medical-related training. But now I love instructing and learning all skills related with disasters.

Finally, I would like to add that, after CADRE-TFI, CSSR, MFR, HOPE, Basic and Advance First Aid, Dead body Management, Shelter Training and District Disaster Response Training (DDRT) courses from NSET and other institutions, I felt myself as a tool in community for response in field and also training other responders, for example - Scout Medical And Rescue Team (SMART) and Restless Organization Humanitarian Assistance Team (HAT)."

PEER and other NSET's initiatives on emergency preparedness and response presented in international fora

NSET professionals have submitted scientific papers related to NSET's programs on emergency preparedness and response and had the opportunity to participate in the following international fora:

1. 15th World Conference on Earthquake Engineering (WCEE), Lisbon, Portugal, September 24-28, 2012 (Title of Paper: Experiences on Implementing Program for Enhancement of Emergency Response (PEER) in Six Countries of South East Asia
2. 14th International Symposium on New Technology for Urban Safety of Mega Cities in Asia (USMCA 2015), Kathmandu, Nepal, October 29-31, 2015

Titles of Papers:

- Strategy for Developing Professional Emergency Responders in Nepal
- PEER Impact on Gorkha Earthquake National Response

Other Innovative Ideas

- In addition to training programs of NSET that were adapted from PEER, NSET has also taken the steps in training all its personnel on Cardio Pulmonary Resuscitation (CPR). This will help prepare the staff to respond appropriately when the need may arise.
- Developing NSET Capacity to communicate with persons with hearing impairment-sign language.
- Adding provisions to conventional wheelchair for earthquake Safety considering the need the needs of people with disability.
- Developing survival training in the context of Nepal in consultation with experts.

Search and Rescue (SAR) Operation by NSET during Gorkha Earthquake

Within the two hours of the 2015 April 25 earthquake, NSET formed a Search and Rescue (SAR) team with qualified responders (who had gone through Medical First Response Training and Collapsed Structure Search and Rescue Training and/or Community Action for Disaster Response) and led for SAR operation to Bungmati area of Bhainsepati with a complete set of Collapsed Structure Search and Rescue equipment.

Composition of SAR Team from NSET

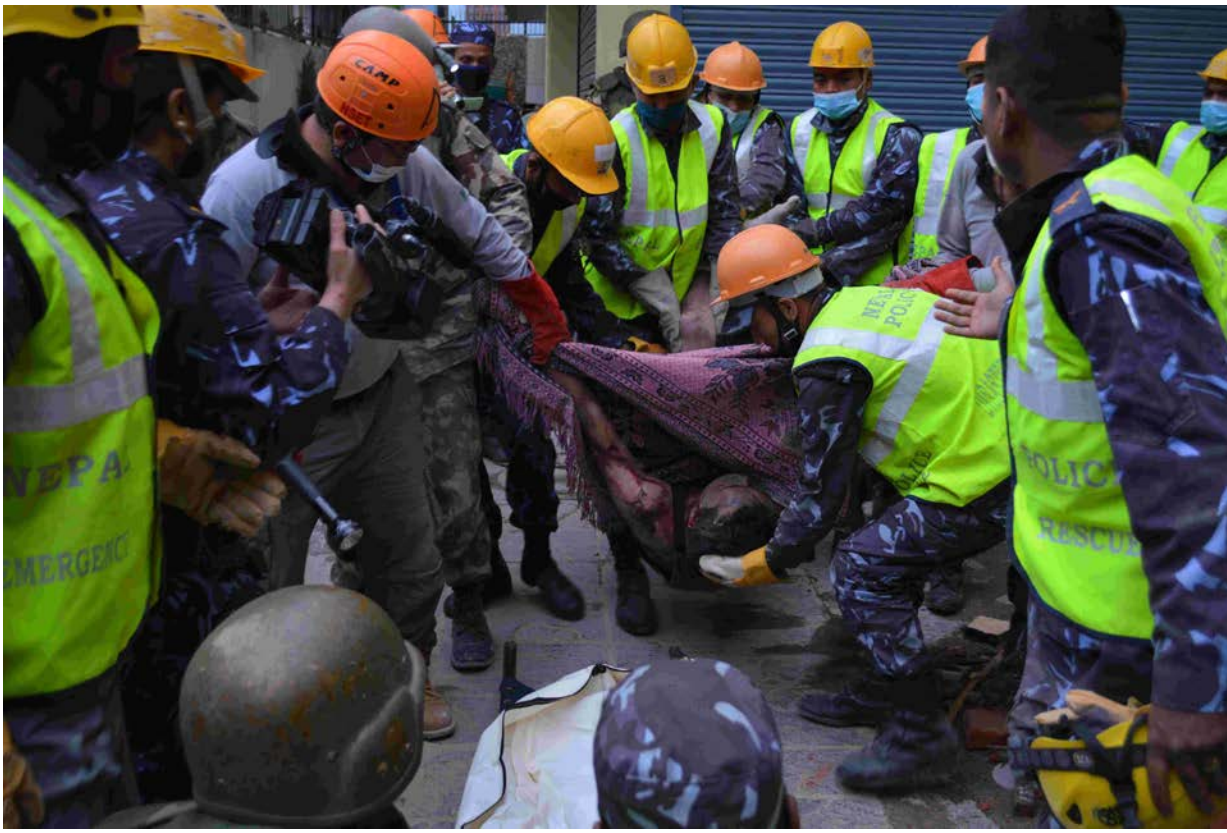
- Team Leader: Ganesh Kumar Jimee (CSSR, MFR, HOPE, CADRE, DBM, DAT, CSAR, BEMR, ICS, FRT)
- Responder: Gopi Basyal (CSSR, MFR, DAT, CSAR, BEMR)
- Responder: Nisha Shrestha (CSSR, MFR, DAT, CSAR, BEMR)
- Responder: Sarad Wagle (CSSR, MFR, HOPE, CADRE, DBM, DAT, CSAR, BEMR, ICS, FRT)
- Responder: Rajaram Shrestha (CSSR, MFR, CADRE, FA, DBM)
- Responder: Sanjeev Ram Vaidya (CSSR, DAT, CSAR, BEMR, FRT)
- Responder: Pabitra KC (CSAR, BEMR, FA)
- Responder: Bishal Gurung (CSAR)
- Responder: Sujan Adhikari (CSAR)
- Responder: Archana Pradhanang, Volunteer (BEMR, CSAR)

NSET SAR team mainly worked jointly with the response teams from Nepal Police, Armed Police Force and Nepalese Army. However, NSET also worked with international teams in many locations. NSET team worked in Bungmati and Khokana areas of Lalitpur and could successfully recover dead bodies, jointly with Nepal Police and community volunteers. NSET team worked also in Kaldhara and Sundhara (Dharahara) of Kathmandu until early hours (around 3:00 am) the next day. In Kaldhara, a 6-storied building had collapsed killing 3 people and two were still under the rubble. NSET team with some responders from Nepalese Army, Armed Police Force, local volunteers, Nepal Red Cross Society and a volunteer from China, worked in Kaldhara. However, due to unstable structure and rains, the team stopped working after 11:00 pm.

When NSET team reached, in Dharahara (Sundhara), it was already 11:30 pm. The scene was devastating, Dharahara was totally collapsed. Local people were trying to dig and remove the rubble with bare hands and with remaining iron bars. As NSET team had some TEAs, NSET team joined for rubble removal for an hour with TEAs. NSET team and local people worked for an hour, later a team from Nepalese Army also joined. It was difficult to work with limited number of responders and TEAs and since it was already midnight.

The NSET response team continued working in the field for extricating the victims and recovering dead bodies. Though all responders in NSET team were qualified responders and equipped with SAR equipment, the team was small in number. Therefore, it worked jointly with other teams from Nepalese Army, Nepal Police and Armed Police Force. Since almost all responders were trained with PEER SAR skills and/or led by PEER responders, it was very effective and comfortable working together.

NSET team along with Nepal Police, Nepalese Army and Armed Police Force, also worked in Balaju, Gongabu and Machhapokhari area for three days. Responders from National Disaster Reponse Force (NDRF) of India were also operating in the same area. It was good to know that most of the responders from NDRF also graduated with PEER skills and used same techniques and SAR equipment. Therefore, working jointly in the same site was more effective. However, since it was the highly affected area with lots of casualties and deaths as well as heavily damaged buildings, response operation was quite complex. Moreover, due to frequent aftershocks, it was more risky to work inside the damaged buildings.



Students of Mahendra Secodary School, Charghare, Nuwakot
Photo: Genta Nakano

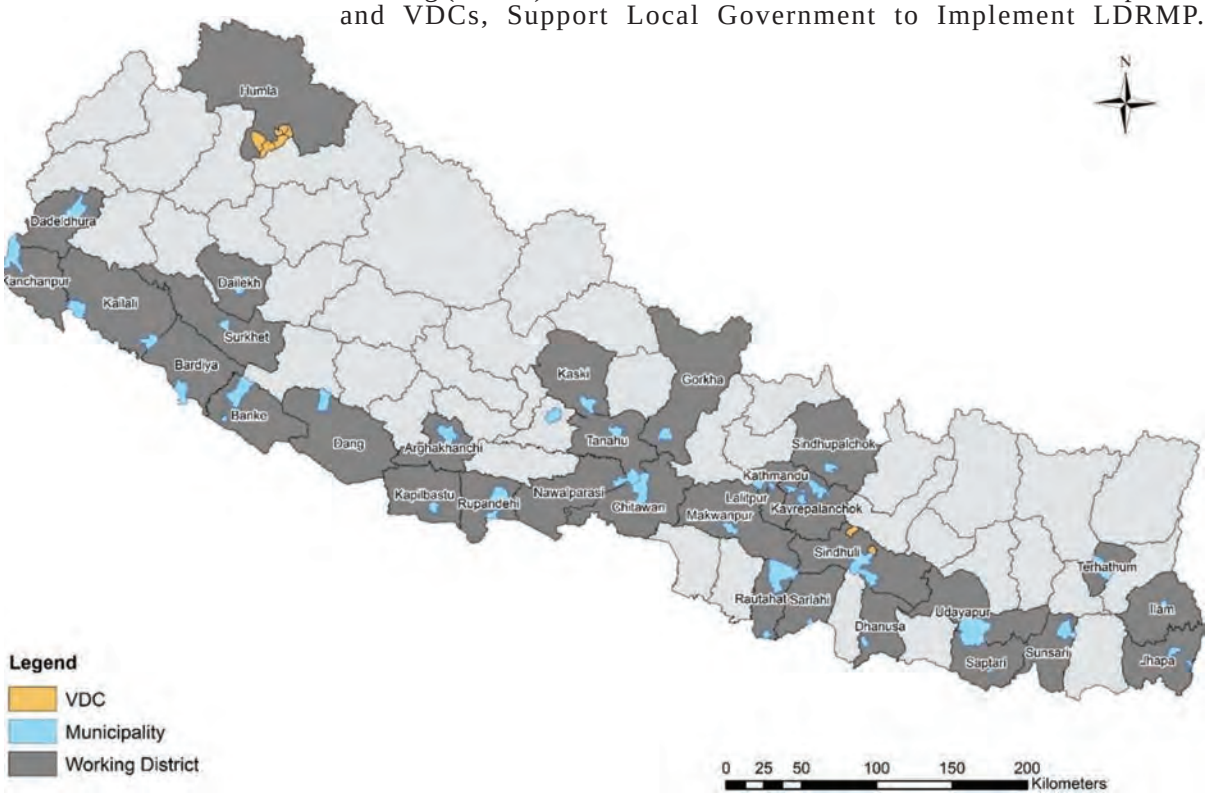
Chapter 5

Building up Capacities of Communities towards Disaster Risk Reduction

Community based disaster risk management (CBDRM) is a process, which leads to a locally appropriate and locally 'owned' strategy, plan and action for disaster preparedness and risk reduction. Community members are initial responders during any emergency situation including major disasters. Proper planning and implementation of Community Based Disaster Risk Management (CBDRM) programs is very much essential to make the disaster resilient community. National and regional level intervention in emergencies including those with the support from international agencies will be effective and beneficial only if the community is prepared to face any kind of disasters. NSET has been so far able to reach more than fifty urban and rural communities to support the communities in formulation planning and implementation of community based disaster risk management programs. NSET experience indicates that the institutional development within the Local government, Capacity Building, Pilot Programs and Networking are the major pillars of CBDRM that significantly contribute to risk reduction and enhances the capacity of a community to respond to any emergency.

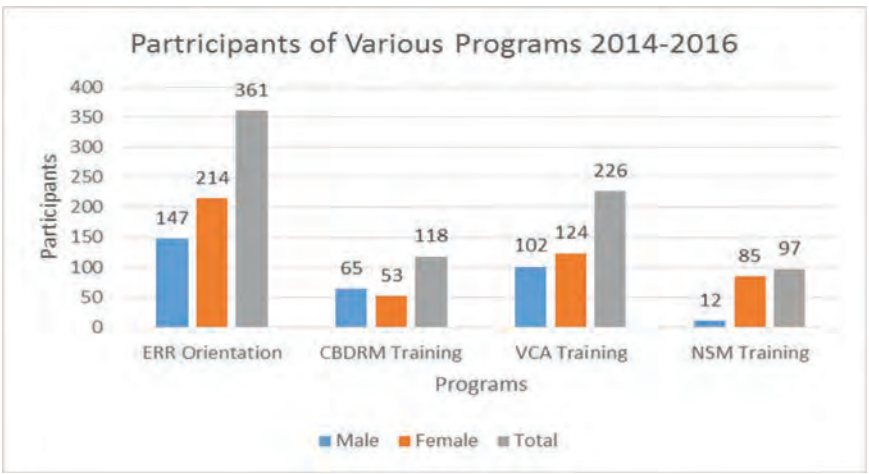
Activities

NSET is working with Ministry of Federal Affairs and Local Development (MOFALD) to support in implementation of Local Disaster Risk Management Planning (LDRM);Create Baseline on DRR and Governance in Municipalities and VDCs, Support Local Government to Implement LDRMP.



Local Disaster Risk Management Plan

NSET has been facilitating various Village Development Committees and Municipalities to prepare and implement Community Based Disaster Risk Reduction Plan. The plans were prepared in line with the Local Disaster Risk Management Planning Guideline 2068 (LDRMP) introduced by Ministry of Federal Affairs and Local Development. The LDRMP guideline has its own steps which starts from making the community aware about the LDRMP process, formation of Municipal/VDC/Ward level Disaster Risk Management Committees (DMC/DRMC), training to the committee members on Community Based Disaster Risk Management, training to volunteers on Vulnerability and Capacity Assessment (VCA), carry out VCA and prepare a Disaster Risk Management Plan.



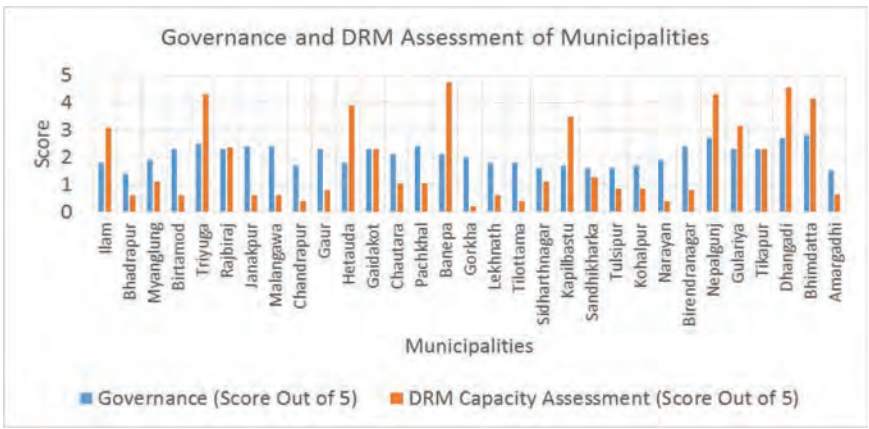
CBDRM-NSET facilitated Ratanchura, Jhangajholi, Katunjenbesi VDCs and Suryabinayak, Chandragiri, Ward no 4 and 10 of Lalitpur sub metropolitan city with the financial assistance from USAID /OFDA under NERMP II.

CBDRM facilitated Banepa Municipality to prepare LDRMP in collaboration with OXFAM Nepal. CBDRM NSET also facilitated Vyas municipality to prepare LDRMP. The number participants directly involved is shown in the following chart.

Baseline Survey on Disaster Risk Reduction and Governance in Municipalities

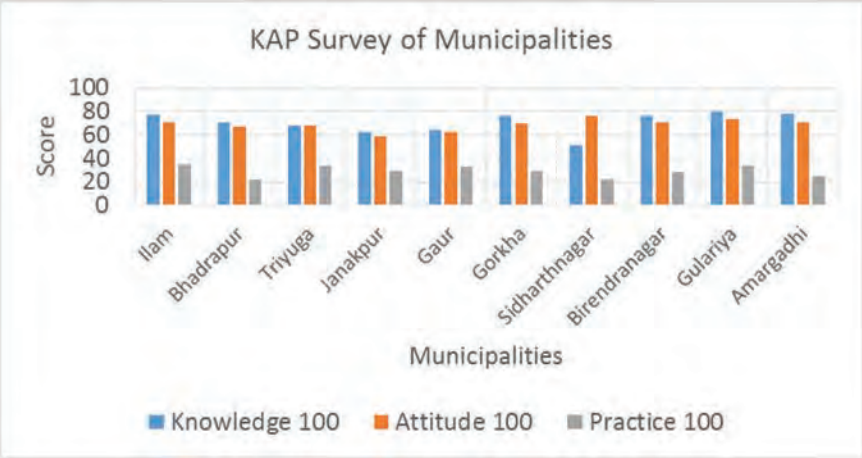
The "Baseline Survey on Disaster Risk Reduction and Governance in Municipalities" implemented by Oxfam GB (OXFAM) and National Society for Earthquake Technology–Nepal (NSET) during December 2014. This survey was intended to initiate producing baseline information on Disaster Risk Reduction (DRR) and the local governance issues related to DRR initiatives in the selected 31 municipalities.

Considering the recurrent events of disasters and growing risk of climate extremities, Government of Nepal (GoN) endorsed the Local Disaster Risk Management Plan (LDRMP), in November 2011. The plan aims to strengthen disaster preparedness and reduce the disaster risk with ultimate objective of mainstreaming Disaster Risk Reduction (DRR) and ultimately contribute to develop disaster resilient communities in Nepal. The Government of Nepal, Ministry of Federal Affairs and Local Development (MOFALD) has been working towards implementing the Local Disaster Risk Management Planning (LDRMP) Guideline in the municipalities since then. Most of the municipalities of Nepal do not have comprehensive information on existing hazards, vulnerabilities and risk associated and the internal capacities for DRR and Preparedness while implementation of LDRMP Guideline requires the assessment of Vulnerability and Capacity Assessment (VCA) to initiate planning for DRR at the local level.



disaster risk reduction and governance in the municipalities is therefore considered to be an entry point to support the implementation of LDRMP at the local level.

consolidated score on the level of Disaster Risk Management initiatives and local governance issues related to disaster risk reduction of the 31 municipalities surveyed by the project.



In order to measure the perception of the people towards disaster preparedness and disaster risk reduction KAP survey was conducted in the selected 10 municipalities.

KAP is an acronym that stands for Knowledge, Attitude and Practice. KAP stands for Knowledge, Attitude & Practice. It is used to investigate human behavior concerning a topic:

- What the respondents know about it (K)
- How the respondents feel about it (A)
- What the respondents do about it (P)

Research that measures KAP is based on the assumption that a person's knowledge influences their attitude, which in turn influences their behavior. It usually involves written, standardized questionnaires that are composed of yes/no questions and multiple choice questions. KAP surveys are useful for finding out what your target audience already knows and does.

Training and Campaign for Non Structural Mitigation

Women's participation in various DRR activities including earthquake non-structural mitigation measures have been very effective in the past experience Non-structural mitigation is one of the important strategies for reducing the earthquake risk that women can play a key role as they are highly involved with decision to place various non-structural elements in the house. "Training and Campaign on Earthquake Non-Structural Mitigation was implemented in 10, 34 wards of KMC, 12 and 22 of LSMC with special focus to housewives in association with Shapla Neer with the goal of earthquake risk reduction by increasing the understanding level of the general people particularly women on non-structural risk mitigation in Kathmandu and Lalitpur Metropolitan cities. Its specific objective to internalize the EQ Non-structural mitigation messages by targeted beneficiaries on their daily works at household level through implementation of mitigation measures.

Major Activities

Baseline Survey on NSM

BLS of the 300 Household was conducted to find out the most common nonstructural components prominent in the beneficiaries of the working area. The survey revealed the hidden facts of the risk that are; More than 90% of the HH have gas cylinder, television, picture frame and rack/cupboard. Similarly, about 33% of the HH had knowledge on the risk of non-structural elements. Likewise, about 15% of the HH had some non-structural mitigation measures. However, the non-structural items in more than 66% of the HH were either partially or fully damaged by the Gorkha Earthquake. Thus, he non-structural items in 13% HH had caused injury to the people.

Training of Trainers (ToT) on Non Structural Mitigation

The project concluded three numbers of three day Training of Trainers (ToT) Program on Non-structural Mitigation (NSM). The training aimed to build capacity of women volunteers in reducing the earthquake risk caused by the non-structural elements at household level.

Three TOT programs were conducted which produced 71 NSM volunteers as tabulated here under.

Table 1: Training Program and Participants

SN	Date	Participating Institutions	Male	Female	Total
1	28-30 Sep 2015	SOUP, CDMC ward 10,and 34 of KMC	4	20	24
2	10-12 Jan 2016	ACP, Mahaguthi. CDMC of LSMC 12 and 22 wards	1	23	24
3	16-18 Mar 2016	MoFALD, THP , LSMC	3	20	23
			Total ToT participants		71

The project had a concept of utilizing the knowledge and skill gained by the graduates of Training of Trainers in Non Structural mitigation to conduct various activities of the project. Orientation program at the community level was one of the major activities the training graduates performed The TOT graduates organized mass awareness programs in the form of community orientation, informal group discussion including video shows and distribution of IEC materials in their neighborhood. These programs were also organized in the institutions where the TOT graduates were working. This activity was able to reach to 1400 persons including 830 women.

After the orientation programs the graduates then carried out non structural mitigation works at the community level.

Emergency and Temporary Shelter

NSET had initiated to design a simple and easy to construct emergency shelter that would last for a couple of months and various options of temporary shelters that could be used as an alternative housing for 2- 5 years. In the meantime National Planning Commission requested NSET to come up with the designs of an emergency shelter and a temporary shelters. The joint team came up with the Dhungre Bas the temporary shelter that can be prepared within three hours using bamboo poles, bamboo straps, tarpaulin or plastic sheet and ropes was designed.

NSET and NPC team came up with Duinale Ghar the temporary shelter that could be used up to five years as an alternative housing as one of the options for a temporary shelters. The concept of Duinale Ghar was based on the temporary shelters that the affected people in all the areas had already started to build. The team then decided to come up with some value additions to the design that the affected had started to build in terms of stability, durability and resistance to the potential disasters. The main feature of Duinal Ghar is:

Awareness Program after Gorkha Earthquake April 25, 2015

Earthquake Orientation Program at Rajbiraj Municipality Program

An orientation program on Community Based Disaster Risk Reduction in order to initiate formulating Municipal Disaster Risk Management Committee in accordance with Local Disaster Risk Management Planning Guideline was planned for 27 April 2015. The program was then converted into an orientation program focused on Earthquake Response to a larger mass to satisfy their queries that the general public including the DRR key players had after the earthquake. About two hundred persons participated in the program. The program was very much interactive as everybody had a question on the Gorakha Earthquake. The program was very much effective in convincing the general public to enter and use their houses as normal as most of the people in Rajbiraj were spending their night outside in an open space due to the fear of the earthquake.

Orientation Program at Rajbiraj

Traditional form and size

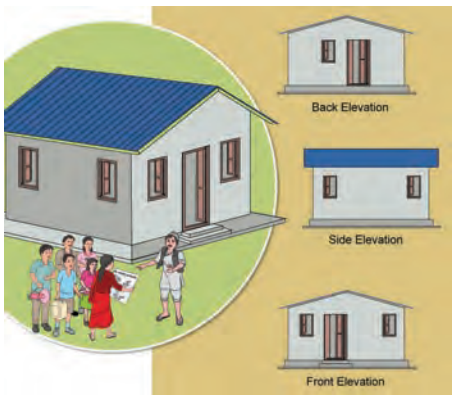
Duinale Ghar has the same shape and size that most of the rural houses in Nepal are made. It has two bays of roof with 8' span and the length is 16' with a living space of 256 square feet. It has two rooms but can be converted into a three room house if required.

Maximize the use of salvage materials

Stone or brick for foundation and plinth wall, timber or bamboo posts for the structural frame, CGI Sheets for roof. There are various options for walls like the CGI Sheets from the collapsed house, wattle and daub, bamboo mats and even the tarpaulin sheets from the emergency shelter.

Value add to the structures that the affected people have already started to build

The improvement suggested are horizontal bracings at plinth, sill and lintel level, at least one diagonal bracings in every wall, and use galvanized iron wires to tie up the joints so that they can be strong enough to withstand horizontal forces arising from strong wind and aftershocks.



Duinale Ghar, Temporary Emergency Shelter

Replicate and scale up efforts

The improvement suggested are horizontal bracings at plinth, sill and lintel level, at least one diagonal bracings in every wall, and use galvanized iron wires to tie up the joints so that they can be strong enough to withstand horizontal forces arising from strong wind and aftershocks.

Normally the committees sitting to prepare plans tend to make over ambitious plans which create a negative perception to the planners as well as the users as it is very difficult to implement larger activities in the local level. The disaster risk assessment and action planning for disaster risk reduction at the local level only really work if the committees are facilitated to make specific, measurable, achievable, rational and time bound (SMART) objectives and action Plans.

The strategy adopted and project procedures for Disaster Risk Reduction Initiatives by NSET has ever been improving and showing better results. This has been possible because of the cooperation from the local government and the local community. Further the cooperation extended by various national and international agencies in implementing these programs is also equally important.

The procedures developed by NSET have been adapted and used by other organizations working in disaster risk reduction. It is very much clear that all the Villages should be facilitated to form Village level Disaster Risk Management Committees and implement the Disaster Risk Reduction Activities in each village to make the Nepali community resilient to disasters.

Lessons Learned

The major lessons learned from implementing Disaster Risk Management initiatives in various part of Nepal in close coordination with local government are listed here under.

Make Provisions for "Frequent Mass Awareness Campaign"

The awareness level of urban communities regarding the importance and effectiveness of disaster risk reduction is rapidly increasing as compared to that of the rural areas. But the increased awareness is not yet enough to motivate them to act for disaster risk reduction.

Involve Local Government

The implementation strategy adopted by NSET has well recognized the importance of local government in making disaster risk reduction initiatives sustainable. All the concerned leaders and officials of the local government will take the ownership of the programs if they are explained well about the importance and effectiveness of the activities.

NSET activities have boosted local efforts towards multi hazard risk reduction with special emphasis to building code implementation. Although implementation of the national building code has been declared as mandatory for municipalities of Nepal, the municipalities do not have much idea about the modus operandi of building code implementation. They do not have proper strategy, and hence confidence, of conforming to the central government's decree. More and more municipalities are requesting NSET for the technical input to initiate building code Implementation. Although full impact of the building code implementation would be seen and felt in years to come, there has been a significant change in the mind set of people as well as of the authorities and the technicians on the need and possibility of code compliance.

Be Transparent

Implementation of the project under condition of a lack of elected representatives to the municipal and ward councils could be achieved due to the transparent and all-inclusive approaches adopted in all activities of the project including its financial aspects. Everybody involved in the process were given opportunities for voicing their concerns at any time of the field works including during the awareness raising, training and workshop programs. Presence of representatives of all political parties and government offices together with those of the academia and civil society and private businesses could help propagate the message that disaster risk reduction is a task that transgresses all political of social difference.

Cost Effective and Replicable

NSET experience from completed projects resulting in the approaches and methodology employed was appreciated in both the local authority and general public of all walks of life. For NSET, the biggest achievement was that all stakeholders in the municipalities have been exposed to new methods of DRR, their awareness level heightened, and interest generated to the extent that the municipalities started visualizing more roles for themselves and lesser with time role for NSET. While NSET needs to continue providing technical support to the municipalities at their request, all the technical agencies, especially the government and local non-government organizations have been empowered with knowledge and methods of risk identification and mitigation.

CBDRM Should be "Community Paced"

Three year project period has been found to be optimum in carrying out all the necessary project activities related to Disaster Risk Reduction so that the community can take it in every aspect of process documents and technology transfer.

Use Simple Language

Usually, people do not know what to ask for with the disaster managers and the disaster managers do not know what and how to advice the people because of low level of knowledge and awareness with both. NSET Projects, apart from conducting hazard and risk assessment, also provided opportunities for everyone to learn things in simple language. Every day of the field work in the municipalities was a learning day for all: the municipal officials and technicians earned the complicated processes of disaster risk reduction while the project team members learned on the best method of approaching and transmitting and internalization of the knowledge.

Use Simple Language

PVA process helped identify the existing situation on hazards and vulnerability, and also several possible counter-measures for disaster reduction. This helped much in identification of the level and types of risks and the corresponding mitigation measures. That provided the required foundation not only for effective action planning but also ownership of the risk assessment and action planning process and results by the communities and residents. While disaster risk reduction is a long-term and challenging task, however, respect of local wisdom and local indigenous technologies creates better psychological environment for DRR.

Develop Simple risk assessment Tool

Rapid risk assessment tools are very much effective in convincing the community as well as the local authority to initiate risk reduction activities. Tools to assess the risk associated with epidemic, fire, flood, and landslide disasters could be developed like the RADIUS which is widely used for estimating losses from earthquakes.

Promotion of Retrofitting Technology

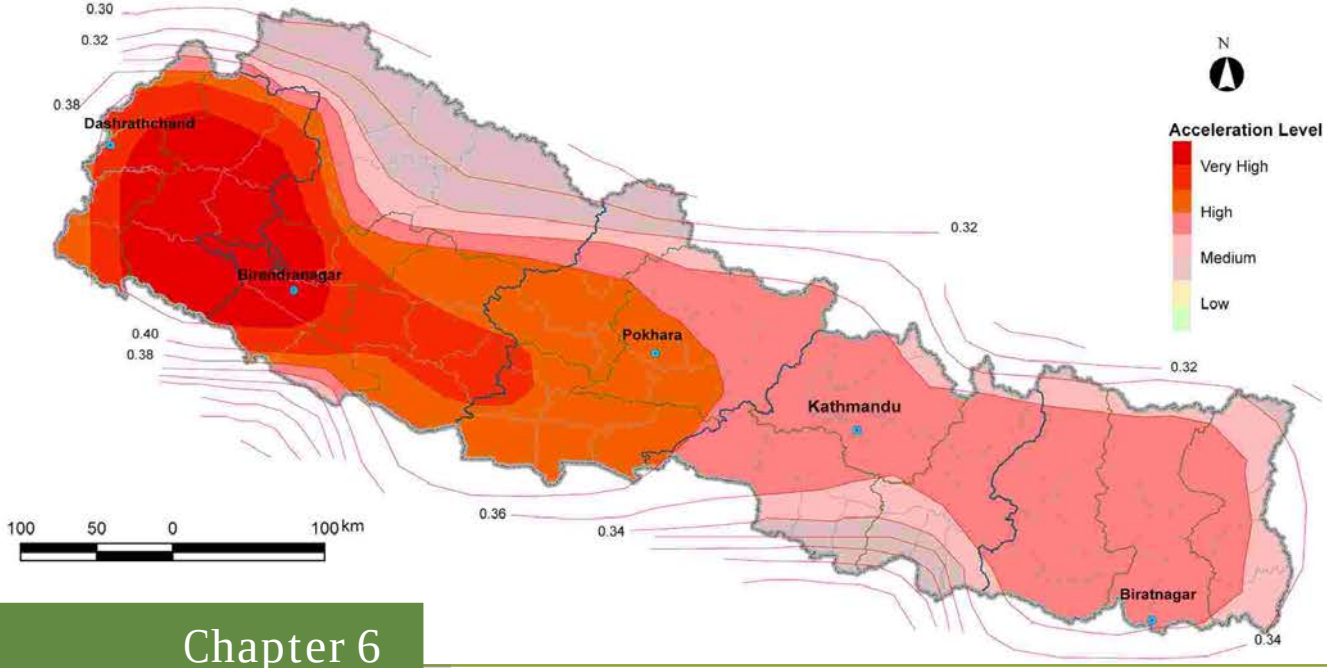
The seismic vulnerability of the existing housing stock in the urban core city areas of Nepal has considerably increased due to the low maintenance of old buildings and weak implementation of National Building Code. Further the buildings constructed before 40 years (1970) have brick masonry walls and timber for floor and roof structures making them equally vulnerable to fires.

Orientation Program at Rajbiraj Municipality

An orientation Program organized in Kathmandu for volunteer engineers to be diployed at earthquake affected districts, May 2015

Senior Citiznes participating in Emergency Response Drill conducted at Old Age Home in Pashupati Nath Area, Gaushala, Kathmandu

Glimps of rapidly urbanizing Kathmandu City



Chapter 6

Know the Risk: Efforts on Hazard Mapping and Risk Assessment

Maintaining Disaster Database for Nepal: DesInventar contributing for Risk Mapping and DRR planning

An effort was initiated in 2008 by NSET to establish a systematic inventory of disaster data for Nepal, with the financial support of UNDP/BCPR for the period of 1971- 2003. Since 2004, NSET has continued the effort for the subsequent years.

The database system has focused on collection, computer-entry, and analysis of natural disaster data for the period after 1971 to the current date. The data is ready for the period of 1971-2016. The sources of information for this is media, government reports and other relevant sources of information on disaster events records and associated loss. The database system uses "DesInventar System", a methodological tool developed by Latin American Network of Social Studies on Disaster Prevention (LARED).

The methodology used for the DesInventar database is a standard data collection format to collect information on identified hazard types. The format allows recording of date, location, magnitude and other details of the events as well as the human and property losses. Different media sources like national daily newspapers and periodicals were identified as the main source of information. Among the newspapers, Gorkhapatra National Daily, the oldest daily newspaper in Nepal, has been taken as the most authentic source of information for present data collection purpose. Other relevant sources identified were also taken as sources of information. This work is done on a daily basis.

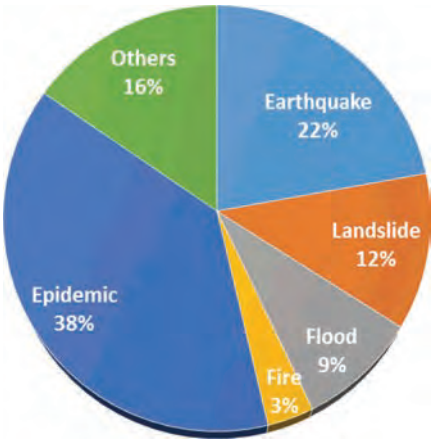
During the last 45 years, around 26,665events with an average of 593 disaster events per year have been recorded into DesInventar System. In early years, reports on disasters were not frequent. There is a gradual increase in the number of reports, especially for recent years. While looking these analysis and data for this period of 45 years, one can specify the following losses:

The overall death toll recorded is 43,868 people accounting three fatalities per day. The number is seen on affected population totaling of more than 799964 (average of about 177,770 people per year).

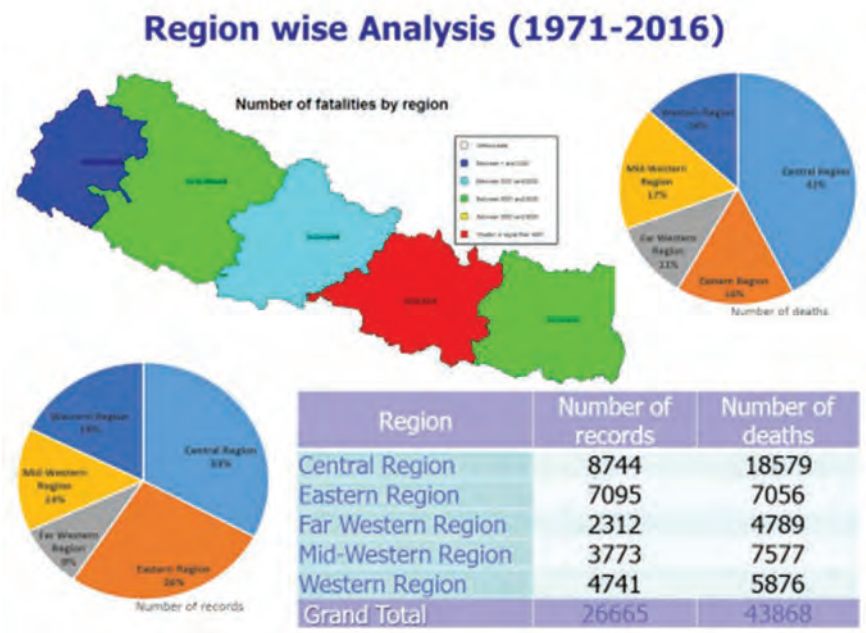
Besides the high number of human losses, about 847,304 houses were destroyed and nearly 510,711 damaged. Moreover, almost 1,123,541 (Ha) of farming & forest land and more than 1,294,005 livestock were lost. Concerning public property, nearly 30,755 educational facilities, 938 medical centers and 867 km roads were damaged. The total loss reported by disasters during this 45 years period is seven trillion, one hundred four billion, five hundred eighty-four million, six hundred thirty-six thousand, and four hundred three and five tenths. Distribution of the most frequent disasters in Nepal shows that fire accounts the highest proportion of the total events as recorded, followed by flood and epidemics and landslide. In terms of loss of human lives and properties, epidemics is the most lethal events which accounts highest amount of loss of lives followed by earthquake and landslides and floods.

Disaster impact on human life and houses between 1971-2016

Events	Number of reports	Death	Destroyed Houses	Affected Houses
Earthquake	310	9718	639817	343647
Landslide	3421	5190	19272	34367
Flood	4166	3902	99113	114091
Fire	6766	1491	80804	2453
Epidemic	3573	16795	-	-
Others	8429	6772	8298	16153
Grand Total	**26665**	**43868**	**847304**	**510711**



Disaster impact on human life (1971-2016)



Region	Number of records	Number of deaths
Central Region	8744	18579
Eastern Region	7095	7056
Far Western Region	2312	4789
Mid-Western Region	3773	7577
Western Region	4741	5876
Grand Total	26665	43868

The main achievement of this process is the establishment of a system of consistent and sound database on historical disasters of Nepal. Events caused by natural phenomena are recorded into the DesInventar System with available details. It is expected to serve as a tool for disaster risk mitigation for the country. Such analysis of natural disasters from a different perspective is expected to be useful in: general developmental planning, planning and programming for disaster risk mitigation and in raising disaster awareness, especially at the policy and decision making levels. This will serve as a 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. This will assist in further detailing the methodology so that disasters are inventoried from a local governance level and thereby using the information in local level planning.

Understanding Building Damage and Building Behaviour

As the M 7.8 Gorkha Earthquake struck the central Nepal on April 25 2015, National Society for Earthquake Technology-Nepal (NSET) instantly took action for Rapid Visual Assessment of critical facilities like hospitals, offices, hotels, apartments, schools and residential buildings based upon the request. Also, NSET worked together with the Department of Urban Development and Building Construction (DUDBC) for the Rapid Visual Assessment of Government Buildings such as Government Office buildings, Government hospitals, Government Schools and Commercial buildings and apartments in the early days of assessment to maintain the consistency in methodology and evaluation results. As the visual assessment was carried out, people were very much scared to enter the damaged buildings since there were many aftershocks following after the main shock on 25th April 2015.

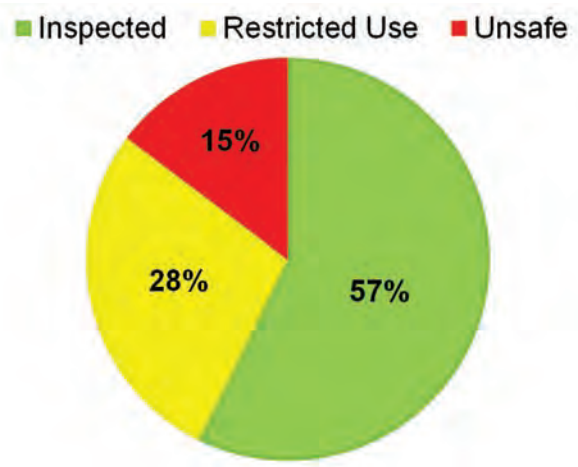


Fig: The status of all buildings in terms of usability

The major purpose of this assessment was to check the usability of the building so that the buildings can be re occupied and re-used and the life returns back to normal. The guideline "Post Earthquake Damage Assessment" produced by Department of Urban Development and Building Construction (DUDBC) was used as the basis for the damage assessment.

As per the guideline, assessed buildings were categorized into three categories: inspected (green), Restricted use/ Limited Use (Yellow) and unsafe (red). However, a total of 667 buildings were assessed before the major aftershock on 12th May among which 380 were Residential Buildings, 123 were Office Buildings, 72 were Hospitals, 41 were Banks, 31 were School Buildings and 20 were Hotels and Apartment Buildings. The post-earthquake rapid damage assessment was also conducted by NSET again after the major after shock of M7.3 on 12th May 2015. Altogether 115 building of different office, banks, schools and residential buildings were assessed. Most of the buildings were found safe to occupy. The status of assessed buildings in terms of usability was as follows:

The government deployed several the damage assessment team, organizations, engineering institutions and civil societies to carry out the assessment after they were given a short and brief training on “Damage Assessment” right after the earthquake.

There were also some reports of differences in evaluation results conducted by different teams according to some house owners who again sought NSET opinion in such cases.Tagging of buildings created some social issues. In case of residential buildings, the necessity of Damage Assessment was solely the usability purpose. But for the Hospitals and Schools, they wanted to continue their works/their businesses inside the damaged buildings, hence wanted the “inspected (green)” triaging even when they got “Restricted use/ Limited Use (Yellow)” or “unsafe (red)”. Whereas in case of some commercial buildings and hotels, they wanted “unsafe (red)” so that they can claim the insurance amount even though their buildings were safe to use.

One day orientation and sharing workshop on DesInventar held

In order to share the status of disaster database management system of Nepal and Nepal DesInventar database with its usability in different level of planning, as well as provide hands-on training on DesInventar Methodology/Software system for data extraction and analysis, one-day orientation and sharing workshop on Disaster Inventory/Information Management System in Nepal (DIMS) have been held in Sunsari and Kathmandu in 2014.

The orientation workshop held at Sunsari on September 18, 2014 was jointly organized by District Development Committee, Sunsari and National Society for Earthquake Technology-Nepal (NSET). The DIMS was supported by USAID/OFDA under Nepal Earthquake Risk Management Program (NERMP II) being implemented by National Society for Earthquake Technology- Nepal (NSET).

Similarly, another orientation and sharing workshop was organized by NSET in Kathmandu on September 23, 2014 in Kathmandu. In the workshops, representatives from both Governmental and Non-governmental organizations working in local levels had participated.

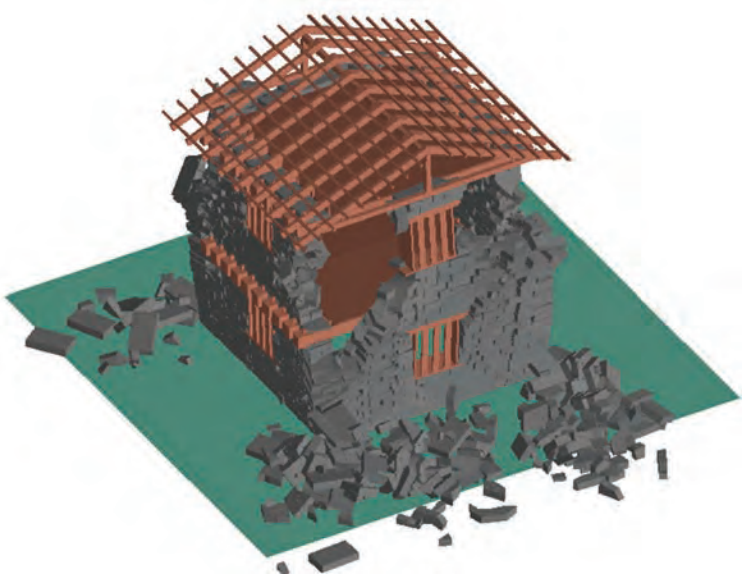
The sharing and training of DesInventar Methodology/Database was felt extremely useful by all participants that it has huge resources that could be useful in local level disaster preparedness/ management planning as well as for different research purposes. Since the module was designed to cover focused on data extraction from the DesInventar database as available online (www.desinventar.net). Hands on practice on the system gave opportunity to participants to be able to extract different levels of data as available in this achieves.

Glimpses of Rapid Visual Assessment




Use of Applied Element Method and Analysis and Model Verification model for tracking the structural collapse behavior

NSET has been highly prioritizing and emphasizing the research activities. As part of a research under "Baliyo Ghar" Reconstruction Program of NSET, Analysis and Model Verification numerical simulation has been carried for different types of low strength stone masonry buildings. AEM is a computer simulation tool to determine the performance of structures in extreme loading conditions. Analysis and Model Verification can predict the behavior of failure of structures that other commercial software like SAP and ETABS cannot do. Since a decade of continuous development, the Applied Element Method (AEM) was proven to be the method that can track the structural collapse behavior passing through all stages of the application of loads: elastic stage, crack initiation and propagation in tension-weak materials, reinforcement yielding, element separation, element collision (contact), and collision with the ground and with adjacent structures.



Unreinforced Masonry: AEM result @ 0.4 g

Unreinforced Masonry: Damage in Shake Table Test @ 0.4 g

In low strength masonry buildings such as stone in mud or dry stone masonry buildings, the connection of every single stone units with another units play very important role to predict the behavior of masonry buildings in nonlinear range. This can be achieved through AEM. Masonry which is composite of masonry units and mortar and discrete in nature can easily be modelled in the AEM by a set of elements connected at their contact edges either by "Element springs" or "Joint springs" according to their positions and the progressive failure of masonry i.e. cracks initiation, propagation and their distribution can be simulated well in AEM. ELS (Extreme Loading for Structures) has been used for the AEM simulation. The comparison of some of the simulation has been done with the similar buildings shake table tested at the laboratory of Kunming University of Science and Technology. This kind of research is very useful in determining and verifying the behavior of buildings in earthquake.

Detail Damage Assessment (DDA) of 2015 Earthquake

The devastating April 25, 2015 earthquake impacted huge loss of life and property in Nepal. It took nearly 9000 lives and more than 7, 50,000 buildings were severely damaged. The devastating earthquake hit and made adversely impact on the residential and government buildings along with the heritage sites, schools, health posts, and many other infrastructure and facilities.

With the view to identify the damage scenario of April 25 earthquake, a "Detail Damage Assessment (DDA)" of Kathmandu Metropolitan city, along with thirteen municipalities including one VDC was designed and implemented in close technical collaboration with National Society for Earthquake Technology-Nepal (NSET) under the organizing program of Public Private Partnership for Earthquake Risk Management (3PERM) with core funding support for USAID/ OFDA. The DDA of earthquake helped to calculate the extent of damage in order to further planning on regards to post disaster activities.

Beside this, in order to provide information on overall building damage scenario, the post- earthquake detail building damage assessment of municipalities was also conducted. It benefited to the municipality to identify hazard mitigation projects or activities thus that facilitating to reduce the impact of disasters in future. Similarly, detail damage assessment was intended to ease to determine the actions associated with response and recovery primarily for decision makers. After this, it also helped to facilitate the municipalities to coordinate with central government for any sort of assistance and support associated with the disaster.

Kathmandu Valley

S.N.	Municipalities/Metropolitan City	Total Surveyed Buildings (Nos.)
1		15954
2		7487
3	Kathmandu Metropolitan City	89031

Outside Kathmandu Valley

S.N.	Municipalities	Total Surveyed Buildings (Nos.)
1	Bidur	6792
2	Besishahar	5603
3	Bhimeshwor	6256
4	Chautara	4308
5	Gorkha	9594
6	Jiri	3694
7	Kamalamai	8575
8	Manthali	8295
9	Melamchi	8106
10	Nilkantha	6867
11	Panauti	7114
12	Thosey	754

The assessment was carried out to evaluate the extent of building damage in a systematic way. It covered the buildings within the territory of 13 municipalities, 1 VDC and 23 wards of Kathmandu Metropolitan City were assessed which were affected by the Gorkha earthquake. The VDCs and municipalities were; Budhanilkantha, Bhimeshwor, Besishahar, Bidur, Chautara, Gorkha, Jiri, Kamalamai, Karyabinayak, Manthali, Melamchi, Panauti, and Nilkantha.

The damage assessment specifically collected and analyzed building information such as building construction practice, building typology, building footprint, building age profile, building storey profile, damage grade and so on. Furthermore, the assessment not only includes preparation of detail database of each building in GIS system but also serves as a reference for reconstruction/rehabilitation plans taking place in municipalities in future. Correspondingly, the measures were intended to improve or upgrade the existing condition has been offered as recommendation.

This study was carried out in systematic manner using the tools such as questionnaire, base map of assessment, formed survey team, gathered data of damage using android application and data validation methods to make study more relevant.

In the study, only the private buildings was assessed the damage and rest of other buildings like the governmental and institutional building of municipal territory was left. The Statistical Package for Social Sciences (SPSS) was used for data analysis and Quantum GIS (QGIS) to generate maps. Though the 471 volunteers along with 25 experts were intensively worked for covered 188430 building survey and approximately 20000 man were consulted in a day.

The reports were developed to interpret the survey data for each municipality and the overall result of the survey demonstrates that the maximum number of buildings (about 80%) were of Stone in Mud type while about 14% of the buildings were of reinforced concrete cement (RCC) type. The proportion of buildings that needed to be demolished was about 67% and about 14% of the buildings required retrofitting. This was found to have due to the presence of large population of stone masonry in mud mortar buildings. Most of the buildings were graded as damage grade 4 and 5 during the assessment. The estimated damage cost for Stone in Mud typology was approximately 206.6 million US Dollar which is about 59% of the total estimated damage cost. This is due to the fact that majority of the buildings in affected areas were Stone in Mud typology and their replacement rate is also the highest of all. RC frame type buildings had about 31.8 million US Dollar estimated damage cost which is about 9% of the total estimated damage cost. The total estimated damage cost for surveyed areas was approximately 350.7 million US Dollar ($350,740,996.38).

Building Typology	Area of building Damage= Foot print area x Storey No. x Estimate Building Damage (sq.ft.)	Current (2016) construction Rate (US$/sq.ft.)	Estimated Building Damage Cost (US$) = Area of Building damage x construction rate	Estimated Building Damage Cost (%)
Adobe	2,288,056	$8	$18,304,449.60	5.22%
Bamboo	6,030	$5	$30,150.00	0.01%
Brick Block in Cement	1,425,748	$15	$21,386,217.30	6.10%
Brick Block in Mud	3,873,000	$12	$46,475,999.28	13.25%
Mix	491,436	$15	$7,371,544.20	2.10%
Others	10,782	$15	$161,730.00	0.05%
RC Frame	1,591,683	$20	$31,833,668.00	9.08%
Stone in Cement	134,959	$15	$2,024,380.50	0.58%
Stone in Mud	20,668,969	$10	$206,689,690.00	58.93%
Timber Frame	1,097,545	$15	$16,463,167.50	4.69%
Total	31,588,208		$350,740,996.38	100.00%

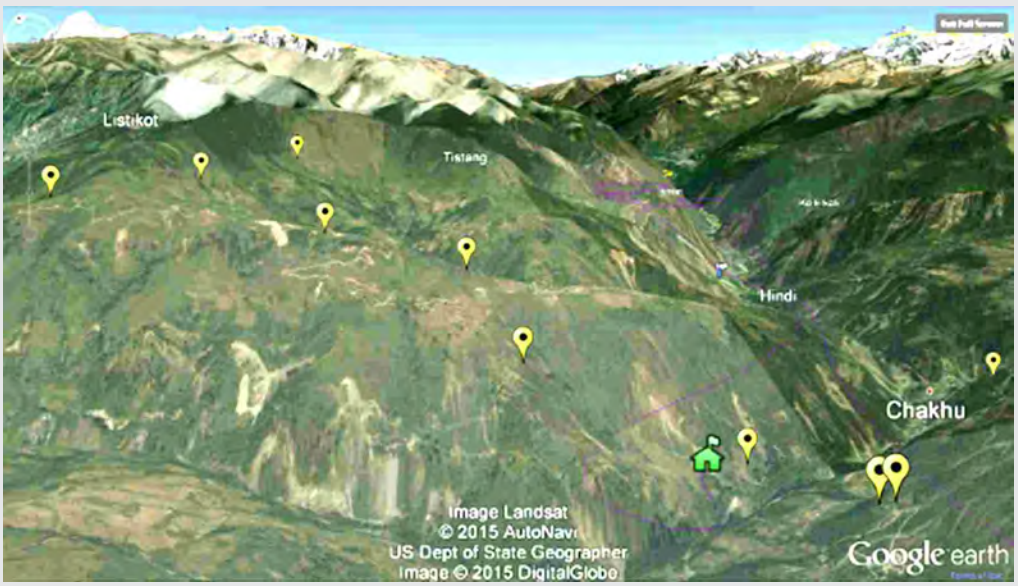
Note: The estimated building damage cost is calculated for recommended 'retrofit' and 'Demolish' buildings only.

The Findings of the study showed that reinforced concrete (RC) frame buildings were found to be the most dominant building typology within Kathmandu valley with 72.5%. Correspondingly, stone in mud was found to be the most prevalent building typology outside Kathmandu valley with 58.4% and “others” represent timber frame, bamboo, brick block in mud, mixed, adobe, and stone in cement buildings. It has been observed that most of the buildings, i.e. about 83% were constructed in past two decades within Kathmandu valley. The study shows the increasing trend of construction over the recent years and around 68.4% of buildings outside Kathmandu valley were constructed within two decades.

The study shows that 75.7% buildings of Kathmandu valley and 96.6% of the buildings were found three stroyed building. However, 4% building in Kathmandu and 42 % of outside Kathmandu were recommended to demolish. It specifies that RC Frame is the most prevalent building typology inside Kathmandu Valley followed by Brick block in cement and others include timber frame bamboo, mixed, brick in mud, adobe and stone in cement buildings. It has also reveals that 3 decades ago, the most common construction practice was Brick block in cement and building typology marked under “others” and most of the RCC buildings are 3 storeyed and stone in mud buildings are 2 storeyed, Similarly, brick block in cement buildings stand between 2-3 storey whereas building typology under “others” are mostly 2 storeyed. The 'building age’ showed that most of the stone masonry buildings were constructed within 21-30 years, i.e 34% similarly, majority of stone in mud buildings are 2 storey i.e. 66% as well as the condition of retrofit buildings exemplifies that majority of the houses had gone through moderate corner separation, i.e. 56% followed by moderate Diagonal cracks with 44%.

Characterizing the post-seismic behavior of damaged slopes in Listikot, Sindhupalchok

The 2015 Gorkha Earthquake Sequence (the Gorkha EQ, Mw 7.8 [25/04/15]; the Kodari EQ, Mw 6.7 [26/05/15]; and Dolakha EQ, Mw 7.3 [12/05/15], plus associated aftershocks) triggered widespread landslides were strongly evident in satellite imagery. In addition to the observed failures, pervasive ground cracking has also been widely reported. This was indicative of hillslope ‘damage’ (weakening) and, hence, the onset of shear surface development in as-yet unfiled slopes – a phenomenon previously observed in areas subjected to high-magnitude earthquake ground shaking and subsequent ongoing land-sliding, notably Chi-Chi (Taiwan, 1999; Mw 7.6) and Wenchuan (China, 2008; Mw 7.6).



Field site locations

Monitoring of environmental hazards like landslides are the major issue of concern to the concerned/responsible authorities. There are many efforts being carried out all over the world in order to mitigate the effects of natural hazards. Advancement in information and communication technology has an advantage in order to deal with such phenomena. With the support from Powerful web-based access of HOBO Data Loggers, having sensors like extensometer, GPS, rain gauge, and accelerometer, NSET is currently running landslide monitoring application in 10 locations (figure 1) of Listikot VDC which were selected based on Aerial photography and field survey. These 10 automatic slope monitoring instruments are now streaming live data to this website which is free to view.

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. The UBK was damaged during Gorkha Earthquake and the satellite and aerial imagery shows considerable widespread damage to the slopes. The critical Arniko Highway which links to Tibet, several major HEP plants, plus extensive roadside settlements, are all within the UBK. 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. Figure: 2 shows the full evidence of one of the locations. The monitoring all these 10 stations during the period of 1.5 years can be concluded that there has been no big movement in area.

Outcome/Impact

After the implementation of the project, it 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.

Challenges

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 quite 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. Despite this, NSET has successfully running the project.

Chapter 7

Enhancing involvement of Private Sector Businesses in DRM

Disaster Risk Management (DRM) is a collaborative and collective effort of various stakeholders and private sector has also important role to play in it. Although, it is a relatively new concept in Nepal, the involvement of the private sector in DRM is a well-practiced concept globally. Private sector has important role to play in 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. Besides contribution on the post-disaster assistance, relief distribution and building understanding, it has been felt that the private sector has also important role to play in pre-disaster efforts.

Realizing this very situation, Program on Public Private Partnership for Earthquake Risk Management (3PERM) was implemented by NSET with the funding support from USAID/OFDA and the objective to increase disaster awareness and promote public private partnership for earthquake risk management in Nepal. This is the first ever program in Nepal that targeted the national private sector businesses for enhancing their involvement in the mainstream of earthquake risk management activities in the country. The main aim of the program was to tap the vast potential of private sector for contribution to earthquake risk reduction in Kathmandu Valley as well as throughout the country. It also aimed at increasing disaster awareness and promote public-private partnerships and investment in disaster risk management in Nepal. Capacity development of the stakeholders is also a focus of the program.

This program provided an organized approach towards mobilizing the private sector businesses in enhancing their earthquake disaster awareness, disaster preparedness, and implementing the first steps towards propagating the concept of Business Continuing Planning (BCP) and that of urban

regeneration in the historic city core areas and the potentials of private sector involvement in urban regeneration. The program covered the whole territory of Nepal; however, its main focus was in Kathmandu and other urban as well as urbanizing areas of Nepal.

This program was designed 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, enhance the level of commitments and potential energy and leadership of private sector 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.

This program basically had 3 main components, namely, conducting Massive Awareness Campaign on ERM, Enhancement of Public Private Partnership for Earthquake Risk Reduction and Feasibility Study of Urban Regeneration of a Part of Kathmandu Core City Area as a DRM activity.

Under first component 'Conducting Massive Awareness Campaign on ERM', various activities were carried out such as production and broadcast of weekly radio program through 20FM Radio Stations and Radio PSAs from all over the country, production and broadcast of weekly TV programs, TV PSAs and Telefilms , conducting print media campaign through PSAs, Articles/Columns, Reports, publicising hand Books, Guideline on earthquake safety construction methods, Posters & Fliers, conducting internet campaign/E-bulletin (Monthly), arrangement of display boards (hording boards or electronic boards) with earthquake safety messages in at least 3 locations in all of the 58 municipalities and 75 district headquarters of Nepal and carrying out door-to-door campaign (mobile clinics) to building construction sites and organizing street drama and

3PERM Program Outputs

Production and broadcast of Radio Program/Audio PSA

- A well-equipped Audio-Visual studio has been established at NSET. The studio was used for the recordings of several of the audio and video production.
- 200 episodes weekly radio program produced and broadcasted, 91episodes through 20 radios and 109 episodes through 28 radios. DVDs with records of the radio episodes are available for copy at NSET.
- 28 audio PSAs (Public Service Announcement (PSA) produced and broadcasted through 28 radios 10 times daily. DVDs with records of the audio PSAs are available for copy at NSET.

Production and broadcast of Television Program/Video PSA

- 30 Video PSAs produced and broadcasted from 3 TV channels for a total of 3526 airing times. These video PSAs were later broadcasted a total of 49,140 times via cable television network channels, 409,500 times displayed via electronic screens in in supermarkets; and a total of 660,744 times in electronic screens in public transports (bus, bus terminals etc). DVDs with these video PSAs are available for copy at NSET.
- One Telefilm titled "Ghar" meaning "home or house" of 60 minutes duration produced. 900 copies of the telefilm was distributed among stakeholders during the pertinent awareness and orientation programs. Different TV stations broadcasted the telefilm a total of 8 times. A copy of the telefilm can be obtained for public use at NSET
- Two TV channels broadcasted a total of 320 episodes of weekly TV Talk shows and 193 episodes of TV Magazine of 10 minutes duration. These episodes can be viewed in YouTube channel.
- 8 videos of 5 minute duration, 9 videos of 10 minute duration, 4 of 15 minute duration on ERR produced, and aired through TV and cable TV channels.

Publication, Workshops/ Trainings and Miscellaneous Programs

- The PSAs were also published 85 times in print media (newspapers) and 14 times on online media. Cutting of the PSAs in print media are available in scan form at NSET.
- The program arranged 48 street drama performances on earthquake safety using local young artists in 26 urban areas.
- 15,000 copies of 2 handbooks: Earthquake preparedness Handbook & Safe Building Construction Handbook published and distributed among stakeholders during pertinent training or awareness programs.

other demonstrations, production and distribution of Short Thematic Video films, development and distribution of CDs/DVDs on Earthquake Preparedness. As part of 'Enhancement of Public Private Partnership for Earthquake Risk Reduction' component, various activities were carried out including one-on-one meeting with the top twenty private sector businesses in Nepal, consultative Meetings, Invited lectures in Rotary Clubs , Jointly design, develop and implement of DRR Programs and Promotion of Urban Regeneration. Likewise, the activities carried out under the component 'Feasibility Study of Urban Regeneration of a Part of Kathmandu Core City Area as a DRM' were collection and analysis of relevant data and information, earthquake Risk Perception survey, Survey and Analysis for Tourism potential, identification of alternatives for Urban regeneration: Technical alternatives, Cost Benefit analysis, Consensus-building meetings with different target groups such as a) local residents, b) social leaders, c) local and central level government agencies and others, Sharing workshops, Production and distribution of Information, Educational and Communication (IEC) materials production.

Key achievements of 3PERM

The 3PERM program has significant impact on people and Nepali society in terms of ERR and ERM. The program has sensitized and stimulated private sectors to work hand in hand with public sector and government. The information has reached the nook and corner of Nepal, yet the knowledge and skills have not been fully applied to real life situation. The program has made approximately 6.4 million population of Nepal aware on earthquake risk faced and in aspects of earthquake safety and a total of 16, 610 population of historic core city and 4 settlements of the pilot urban regeneration program encouraged. Likewise, Commercial Banks and insurances companies have started profitable business pertaining to earthquake risk reduction activities and some private businesses have shown interest on emergency preparedness and response planning.

- Draft of a "Handbook on Urban Regeneration in Nepal"has been prepared and submitted to government for perusal and endorsement as a national guideline. The draft can be accessed at Google drive upon request to NSET. The final version will be posted at NSET website upon clearance by the government.
- 1000 copies of a Guideline on Emergency Preparedness and Response Planning for Business is published in collaboration with Nepal Business Initiative (NBI) – a not-for-profit arm of the Nepalese business community.
- 1 Tips on Earthquake Safety (10,000 copies), 2 Advisories (10,000 copies), 4 types Posters (32,000 copies), booklets (32,000 copies), 4 types brochures (26,000 copies) published and distributed to public on different occasions of training and awareness programs.
- Designed, prepared, and placed 18 display hoarding boards on promoting Earthquake Safety and safe construction practices in five cities.
- 20,000 copies of NSET orientation slides in DVD format reproduced. A total of 7,606 copies of these slides have been distributed to schools, Village Development Committees (VDC), and community organizations
- Eighty one (81) Consultative meeting on public private partnership on earthquake risk reduction and preparedness were organized involving a total of 69 corporate private sector business organizations and 12 government institutions.
- 6 Media Workshop organized;
- 2 High Level seminars, one with Nepal Banker's Association and another with the Federation of Nepalese Chamber Commerce and Industries (FNCCI) were organized on the concept of Business Continuity Planning (BCP).
- The program could help prepare a consolidated concept proposal for a comprehensive BCP for a leading steel manufacturing company of Nepal;
- Organized 6 workshops on public private partnership (PPP) in disaster risk reduction (DRR).
- Organized 3 strategic workshops on aspects of Urban Regeneration after conducting a feasibility study on urban regeneration.
- The program could organize a total of 75 orientation programs on earthquake risk reduction (ERR) and disaster risk reduction (DRR).

Knowledge, ideas, skills and practices on earthquake safety could be massively produced and propagated throughout the country most extensively and intensively for the first time in the history of Nepal. Engagement of local radios, television and print media remained tremendously impacting in disseminating the safety messages, educating people on disaster resilience and creating public concerns and discourses on disaster/earthquake issues. Massive number of IEC materials on disaster/earthquake resilience including audio matters, education videos, short films, messages (PSAs), publication products produced and disseminated which are the key resources for public awareness raising in Nepal. Massive media engagement in Earthquake Risk Management, local FM radios taking lead at local level and also sharing/contributing appreciable resources for the cause, collaboration made for television programs for education and policy advocacies. Many journalists could participate in workshops and interactions. Many got trained on disaster reporting and preparedness. The result that the accuracy and comprehensiveness of disaster reporting has been much enhanced. Most of the radios, televisions and print media have established disaster reporting desk. Program Public Private Partnership for ERM functions as the trail-blazer for the government policies and actions. Central Bank of Nepal (Nepal Rastra Bank) has come up with the directives that guide to all commercial banks to disburse the house loan to the clients based on the earthquake resistant design only. NRB directives have strictly been following by the Commercial banks in Nepal these days. This initiative has greatly influenced the bankers, house owners and builders to adhere to the building codes for earthquake resistant construction.

Some private sector Telecom service providers, ISP providers have started taking initiatives in awareness raising as well as applying risk reduction activities such as structural and non-structural safety of the buildings. Review of DRR policies being prepared by Nepal Telecommunications Authority (NEA) is being done by NSET, Government's upcoming policy on telecommunications towers erection on safe buildings is ensured, NSET did structural vulnerability assessment of tower buildings of private sector telecommunications providers.

- Organized 40 advocacy meetings on the needs and possibility of implementing urban regeneration in the historic core city areas of Kathmandu. The meetings saw participation and involvement of municipal officials, local urban residents, and representatives of the private sector businesses such as the builders and contractors. ;
- NSET signed memorandums of understanding (MOU) for putting up joint efforts in aspects of implementing urban regeneration including conducting awareness with 15 different agencies including government, municipal governments, professional societies, manufacturing industries, media agencies, corporate bodies etc.
- Completed 1 Media Training for 25 journalists on earthquake risk management (ERM) and urban regeneration (UR)
- Conducted Earthquake preparedness training programs separately for hotel employees and media personnel in collaboration with the Hotel Association of Nepal and the Journalist association respectively.
    - Immediately after the Nepal Gorkha earthquake sequence of April and May 2015, the 3PERM program allowed the following additional works to be undertaken as technical assistance to the private sector community and the government:
    - Earthquake impact assessment of buildings and other physical assets.
    - Training of local volunteer-technicians who were mobilized later for situation survey, damage data collection and analysis of three historic settlements.
    - Later, the program organized three mini workshops, five consultative meetings, and 16 consensus-building advocacy meetings involving major stakeholders. Ultimately, reports with concepts of urban regeneration of damaged 3 historic settlements were prepared.
    - 13 Orientation programs and 2 pilot demonstration programs were arranged for builders, and 16 training conducted to train 455 engineers who were subsequently mobilized to conduct damage assessment of about 200,000 buildings damaged due to the earthquake in 14 affected municipalities and 1 village Development Committee (VDC).

Due to 3PERM, Nepal Business Initiative (NBI) promoting Disaster Preparedness and Emergency response planning within private business circle. Insurance Board (IB- Regulatory Body) has come up with the directives that guide to all Insurance companies to ensure mandatory earthquake insurance of a building while doing fire insurance. Likewise, Urban Regeneration in historic core city and settlements have been included in Kathmandu Valley Long-term Development Plan 2015-2035 Strategy. Beside these, 2 pilot demonstration temporary shelter constructed, 455 engineers trained and mobilized for building damage assessment and 170,767 buildings surveyed in 14 affected municipalities and 1 Village Development Committee.

Impacts

The Program has contributed in various aspects of Earthquake Risk Management (ERM) in Nepal. It has enhanced the public awareness on earthquake safety and overall disaster literacy. It has also helped to sensitize and educate policy makers, decision makers as well as implementers on aspects of Disaster Risk Reduction and helped to increase commitment of policy-makers and decision makers towards better disaster risk management systems. The program enhanced participation and contribution of local FM Radio stations on promoting earthquake / disaster awareness. With the effort of the program, the public concerns and inquiries on earthquake safety and disaster resilience are on an increase at public forums and mass media.

The credit goes to the 3PERM that perception of the private sector towards the ERM has changed positively significantly as the private sector business today recognizes the need for disaster preparedness as a routine in-house job and ERM as an inevitable component of the whole industry / business investment. Due to the program, the Urban Regeneration in historic core city and settlements have been included in Kathmandu Valley Long-term Development Plan 2015-2035 Strategy, KMC incorporated Urban Regeneration program in its Annual program and Budget of 2016/2017. The program has also constituted a bench-mark for guiding post-emergency-management of shelters and temporary houses for homeless people and conceptualizing the strategy to explore fund for repair and reconstruction. It also produced a scientifically reliable base for vulnerability-studies such as fragility curves and damage probability distributions and contributed to mapping seismic vulnerability of city on the basis of structural characteristics of buildings. This Program has also played role on enhancement of engineers' skills in temporary shelter design and structuring of demonstration model along with designing temporary shelter for earthquake victim.

Training on Emergency Response for Hotel Personnel

To sensitize private sector businesses to a preliminary level, and enhance and reinforce with some sector-specific demonstration of activities, NSET conducted specific training courses such as Light Search and Rescue (LSAR), Basic Emergency Medical Response (BEMR), Damage Assessment Training (DAT) and Non-Structural Mitigation (NSM) for different private sector businesses all as a part of the "Demonstration Training on Earthquake Preparedness for Private Sector Businesses" component of 'Promoting Public Private Partnership for Earthquake Risk Management in Nepal (3PERM)' .

To help develop capacities of key business actors from different sectors, help understand the concept and methodologies and also encourage scaling up the efforts, NSET with the auspices of USAID/OFDA conducted such training courses.

A total of 4 such trainings on earthquake preparedness and emergency response for hotel sector stakeholders have been held in Kathmandu. The program was one of the components of 3PERM program activities and first of its kind to have private sector stakeholders participate in a four-day long emergency response and earthquake preparedness training program at NSET premises. A total of 25 participants representing different hotels took part in the program held in Kathmandu during October 14 – 17, 2014.

Lesson Learned

Massive Awareness Campaign on Earthquake Risk Management

- Investing in community radios for awareness raising has yielded more worth in terms of generating/ Ensuring more investment/contribution from radios
- Establishing closer connectivity with community people
- Raising awareness on safety knowledge and skills
- Enhancing local actions on risk reduction
- Contributing build local capacity, develop ownership and promote multi stakeholders' engagement
- Investing in TV programs has been found very impacting for policy advocacies and education at large scales.
- Massive awareness raising activities work more effectively with enhanced engagement and contribution of many stakeholders.

Enhancement of Public Private Partnership for Earthquake Risk Reduction

- Engagement of Private sector businesses in DRR enhanced, acceptability is there but yet more efforts required to make them take real actions. DRR is not yet considered to be an attractive & profitable business for them.
- Not only to disseminate the information about ERR but also to translate the learned information in the life of the people, for, as the third party impact study shows, substantial number of people know about ERR but do not use in reality
- Lack of proper acts on Disaster Risk Reduction (DRR) and the guidelines on private sector's involvement of private sector has greatly hindered the DRR initiation of private sector in Nepal.

Feasibility of Urban Regeneration Sites in Kathmandu Valley

- For urban regeneration process, there is a need to have a Community discussion Forum. Local Authorities should plan to establish such forum.
- There is a need felt for formulating Urban Regeneration Law essential to ensure private property of individuals and preserve ancient heritage.
- A clear understanding of institutional responsibilities along with supportive legal provisions is crucial for the effective implementation of urban regeneration activities.

Earthquake Risk Reduction and Business Continuity Planning for Private Sector in Nepal

In order to share the ideas and raise awareness on earthquake risk management, Federation of Nepalese Chamber of Commerce and Industries (FNCCI) and NSET (Under 3PERM Program supported by USAID) organized an Interactive Presentation Session was organized on Earthquake Risk Reduction and Business Continuity Planning on 1st February 2015 in Kathmandu.

On the occasion, in his welcome speech, Mr. Om Rajbhandari, Chairman of Urban Development Committee of FNCCI stressed the need of state to come up with policies and strategies to involve Private Sector in overall disaster risk reduction processes. Dr. Amod Mani Dixit, Executive Director of NSET in his remarks highlighted on the earthquake risk of Nepal and the need and potentials of earthquake risk management in Nepali private sector. Dr. Dixit also pointed out the need to set an example in Nepalese private sector so that Business Continuity Planning (BCP) could flourish in every crucial organization and the critical services would not be interrupted. He further emphasized the need of private sectors' cooperation to take the country out of the catastrophic earthquake quickly.

Mr. Surya Narayan Shrestha, Deputy Executive Director in his presentation briefed about the potential risk that we may have to bear if a big earthquake was to occur in the future. He pointed out how BCP would affect the business relating to different real life examples Gujarat 2001, Pakistan 2005, Japan 2011.

Er. Dhruba Thapa, President of Nepal Cement Manufacturing Association/ Nepal Engineers' Association, emphasized the need of massive awareness campaign on safer building construction in compliance to the national building code.

Mr. Sekhar Golcha, then Associate Vice President of FNCCI expressed his happiness to know the significance of business continuity planning needed for every organization and especially to the private sector. On behalf of FNCCI, he offered necessary cooperation to work with NSET on earthquake preparedness of the private sector.

Emergency Shelter Design, Training and Dissemination

- Various options of emergency shelters for different geographical regions should have been prepared in advance that is before the disasters. If the designs of Emergency and Transition Shelters suitable for the different geographical conditions were prepared earlier then the response to Gorkha earthquake would have been much more effective and efficient.
- Design of Emergency and transition shelters had to be done as fast as possible and had to work on training and dissemination which restricted time and resources to explore the impact assessment and success stories.

Damage Assessment of Buildings

- Need to involve local authorities to facilitate the survey.
- Objective of survey should be disseminated to community through the municipality.
- Should develop quick reporting system of assessment result to central and local authorities and community.

Regional meeting with partner radios under 3PERM held at Sunsari

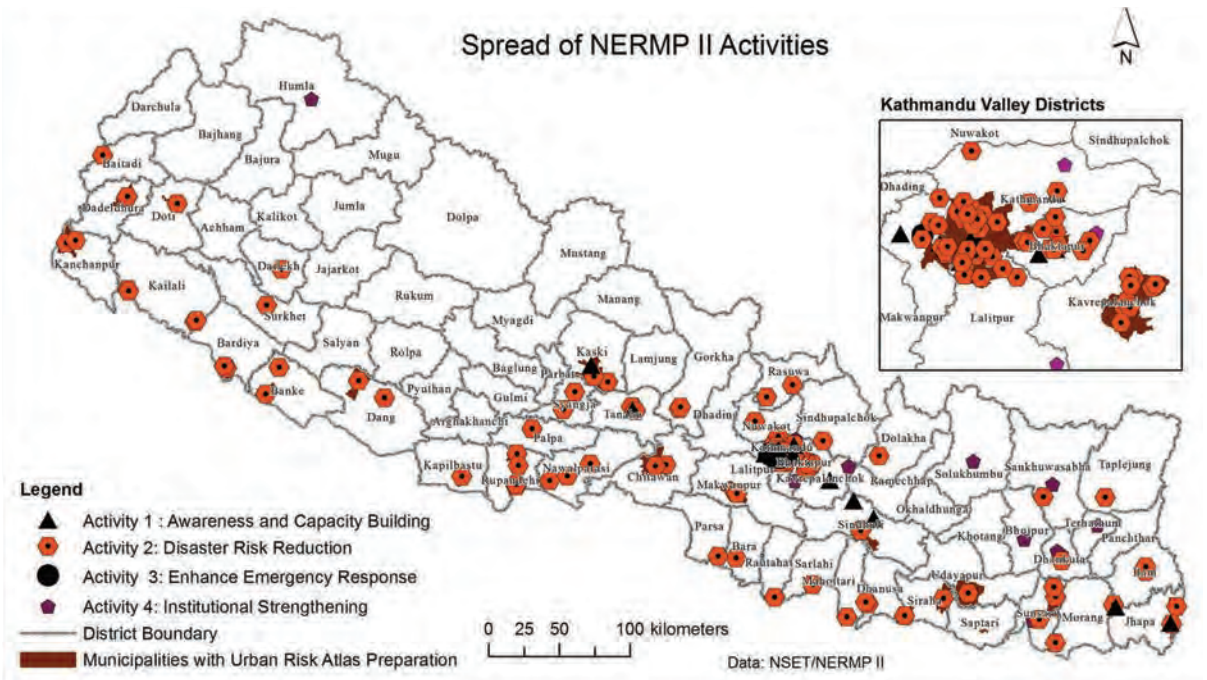
Women Group from Thankot Community, Kathmandu working on "Go Bag" and Non-structural items to conduct orientation to local people.

Chapter 8

Laying Foundation of Earthquake Risk Management through NERMP and Follow up Efforts

With the aims to contribute 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 implemented the Nepal Earthquake Risk Management Program, Stage II (NERMP II) with funding support from U.S. Office of Foreign Disaster Assistance USAID/OFDA.

NERMP-II is a part a follow up and continuation of the earthquake risk management efforts that were initiated in 1997 in the form of the Kathmandu Valley Earthquake Risk Management Project (KVERMP). NERMP-II was introduced after the successes of the earlier programs of the KVERMP (1997-1999), Action Plan Implementation Project (APIP, 2001-2006) and NERMP I (2007-2011). The NERMP-II has focused on some key objectives. Firstly, raising awareness of people and all stakeholders on root cause of earthquake risk in Nepal and possible ways of mitigating the risks. Secondly, implementing activities using existing local capacity with active participation of the local communities and local leaders. Thirdly, promotion of international standards and collaboration coordination with other stakeholders. Finally, emphasizing institutionalization of the methodology, processes and successes for the long-term sustainability of DRR.



The program helped to reduce this risk through a variety of activities such as awareness-raising, capacity building, preparedness, mitigation, and institutionalization initiatives and allows NSET to provide technical support to the efforts of other agencies wishing to invest in ERM in different parts of the country. Enhancing emergency response capacity and institutionalization are the areas the program and has been working on. Beside this, it emphasizes on 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.

The first stage of the project has been implemented with the proliferation of earthquake disaster risk reduction (EDRR) in Nepal by scaling up of the successes achieved under NERMP first stage, and similarly, it focused on institutionalization of the successful approaches, methodologies, policy

NERMP Achievements

Most of the envisioned activities under NERMP-II have been completed successfully. In most cases, the accomplished target is significantly higher than the target envisioned for most activities and outputs.

NERMP and NERMP-II has together formed the backbone of earthquake risk management in Nepal. It is because, these program has developed and implemented several innovative initiatives such as, a sound approach towards building code implementation, development of methodology and conduction of researches for urban regeneration in the city core areas of Kathmandu, development of methodologies and preparation of disaster preparedness plans at district, municipal and village levels in the country etc.

Beneficiary reached vs beneficiary targeted for each of the four activities

Key Activity	Beneficiaries Targeted		Beneficiaries Reached		Data collection method / Source of Verification
	Direct	Indirect	Direct	Indirect	
Key Area 1: Disaster awareness and capacity building	157,400	1,574,000	1,159,763	2,226,015	Published AV materials broadcast in TV and uploaded in You Tube; program evaluation reports, sample surveys in districts; published materials; attendance & registration sheets in conferences, workshops/ seminars; request letters, email messages, agreements; MOU, office records; meeting minutes, etc.
Key Area2: Reduce disaster risk	15900	159000	39750	175240	
Key Activity 3: Enhance emergency response capacity	5400	54000	4745	31290	
Key Activity 4: Institutional strengthening of NSET	616	4080	728	6100	
Total	179,316	1,781,080	1,204,986	2,438,645	

The impact has also been reflected in the increased ownership of the methodologies by the government and enunciation of government level decision towards institutionalization of these nuances in the governance system. The other impacts are making the Building Code implementation mandatory, addition of disaster risk management elements in the minimum criteria for performance measurement (MCPM), addition in the MOU with municipality CEOs of clauses of mandatory implementation of DRM, budgetary allocation by Municipalities for training, and Budgets for Risk reduction.

The program NERM-II, and its predecessor NERMP, were very successful in terms of its impact. The program influenced, to varying degrees, all main stakeholders in Nepal. It has incorporate the government body at central and local levels to donors, private sector, the UN agencies the NGOs and CBOs. This shorts of program is in need to each local level to capacitate the local body and community to mitigate the risks.

advancement, training curricula and courses, and programs by working closely with government agencies at central, district and local levels and also with other stakeholders and communities by proposing and implementing innovative program concepts such as building code implementation, urban regeneration, etc. It has made a long-lasting impact in Nepal and the region because of the successful and replicable approaches, methodologies, and demonstrated earthquake risk reduction in least economy developing country such as Nepal, and hence an important project with rich lessons and success stories useful for Nepal and also other developing countries of Asia. This program was focused on Disaster Preparedness, Mitigation and Management in developing countries. It covered the following areas; Enhancing disaster awareness and capacity, Disaster risk reduction, Enhancing emergency response capacity, and Institutional strengthening for sustainability.

It sought successfully to build upon and consolidate the gains of partnership with OFDA, and improve it by designing and implementing new innovative activities directed towards assisting and supporting relevant government agencies at central and local levels (ministries, departments, district and municipal authorities), either as a standalone effort under this project or in collaboration with other international organizations that have started supporting government agencies in building capacities in aspects of earthquake disaster risk management. Thus, it want to help Nepal to shift emphasis from achieving "Islands of successes" to "Proliferation of DRR by institutionalization".

Lessons Learned

Disaster awareness and capacity building

Standardization of Mason training curricula was found very effective and it is widely accepted and now many institutions are following the same. NERMP engagement with mass media and key actors of policy making and program implementation in Nepal through partnership and advocacy activities helped much to opinion making and creating impetus toward bring in effective DRR initiatives. There is also felt the need to expand the building vulnerability assessment buildings and gone for retrofitting. Standardization of CBDRM is also felt essential as many institutions are conducting this activity with diverse activities. Trainings given to professionals engineers and architects from private consulting forms were found more effective as compared to engineers from other organizations. More trainings on damage assessment and retrofit needed as the previous trainings were more focus on earthquake resistant new construction. The involvement of women group and network in DRR was found very effective and need to scale up. Likewise, enhanced earthquake awareness found to have created more demands for technical and financial assistance for risk reduction. While enhancing awareness remains a task to be implemented for a long period, it's necessary to institutionalize the process with appropriate policy and legislative backing for scaling up the positive gains.

Reduce Disaster Risk

Awareness to community through school student is found effective. It is also felt that more support to Government required is in scaling up school safety. Government funding mechanism to school construction is found inadequate resulting in poor quality construction. Multi-stakeholder collaboration is found effective and essential for scaling up. Implementation of non-structural mitigation measures in an operating hospital is possible though it's a challenging task. Involvement of hospital staff/maintenance staff in planning and implementation of non-structural mitigation measures was effective albeit very difficult. The greatest challenge in building code implementation is the change in mind-set of people to develop a culture of safety. Efforts in awareness raising should be targeted towards enhancing risk perception by collective assessment and understanding of risks augmented by demonstration of risk reduction and being done with affordable expenses. A well organized and implemented demonstrated program can introduce a big change can be achieved with little investment. Building code implementation is more of changing the attitude by providing information rather than talking only the technical matters. Prepositioning of basic emergency response equipment in the communities is urgent need. Every communities and local authorities should have preparedness and response plans.

Disaster awareness and capacity building is one of the key activities carried out as part of Safe Home Campaign. Under this, various sub tasks were accomplished including orientation to various construction stakeholders, training Programs for different target groups on earthquake-resistant construction technology, Technical assistance to municipalities in building code implementation (BCI), Publications and media campaign, Earthquake Mobile clinics (EMC) , Free Earthquake Clinics (FEC), Building Vulnerability Assessment, Reduce non-structural vulnerability, Conduct "Vulnerability Tour" to core city areas of Kathmandu Valley and other cities, Implement Community Based Disaster Risk Management (CBDRM) Programs , Annual Earthquake Safety Day, Orientation programs and earthquake drills and Policy Advocacy

Reduce disaster risk of urban areas, public infrastructures, and critical facilities through risk assessment, risk reduction planning and implementation is another key activity. This activity is being implemented under School Earthquake Safety Program (SESP) and various tasks accomplished so far. They are; structural improvement, training and awareness , revisit past schools and improve if necessary, disaster preparedness activities in schools, Earthquake awareness contests Inter-school sharing, study visits and student summit, assist institutionalization, SES Advisory Committee meetings, Training programs for senior officials, professionals ,Publish guidelines, manuals and awareness materials on school safety. Beside this, the additional activities are; initiating Hospital Earthquake Safety Program (HESP), assess seismic vulnerability of infrastructures and critical facilities, Urban / disaster risk atlas of Nepal, disaster risk assessment, formulation of risk reduction and preparedness plans and implementation, DesInventar at district level, Develop urban renewal plan and earthquake reconstruction plan for core city areas of Kathmandu Valley.

As part of key activity: Enhance emergency response capacity, NERMP-II has been conducting or participating coordination meetings for discussion/formulation of ER plans, SOPs for assisting in enhancing ER capacities and to organize training courses for enhancement of emergency response capacity, similarly assist households and families for earthquake preparedness and Enhance Emergency Communication by promoting Amateur (HAM) Radio.

Under key activity: Institutional strengthening of NSET, various sub tasks has been carried out including enhancing physical facilities and capacity of Community Earthquake Learning Center (CELC), revisit and update NSET's vision, mission, objectives and business plan, Training for NSET Staff Participate in regional or international workshop, seminar and conferences Conduct joint research or studies or networking, and Workshops or Seminars with International, regional organizations.

Enhance Emergency Response Capacity

Community responders trained with at least basic lifesaving skills for more organized and effective response in future earthquakes. Prepositioning of basic emergency response equipment in the communities are found in urgent need. Woman are the change makers and Earthquake Preparedness of Communities becomes highly effective through Women's Network. Changing the perspective has been found. There has been is a paradigm shift in mitigating the risk eventually leading to community resilience as 'Women are not only the vulnerable group but are also the capacity of the communities.'

Enhancing NSET's Institutional Capacity and Credibility

NSET conducted an assessment of the human resources capabilities employing the services of a credible consultant. Additionally, NSET also employed the professional services of a management consultant to review its mission, vision, strategic objectives and value systems as well as the operational policies. Both these exercise were extremely important for NSET and its key staff to understand the value of the institution and its delivery, and to look confidently into the future.

The exercise also has enhanced credibility of NSET in the eyes of our partners and donors and also the key national and international stakeholders in disaster risk management scenario of Asia.

NERMP II Success Stories

Go BAG (Emergency Kit) become the Bag for Survival

Sita Shrestha
Thankot, KTM

When the earthquake struck, I was with my small daughter (5 Month) in the top floor. My 6 years old son was downstairs. He started to cry but didn't came up and asked "which one is the inner wall (safe place)?" and I said that the place where you are is the inner wall and he stayed there. I also stayed in the inner wall with my small daughter until the shaking stopped. As soon as the shaking stopped, I took my son and daughter out of the house along with our "Go Bag" (Emergency Kit named as Go Bag). We went out in courtyard, the nearby open space.

Since I had received training on earthquake preparedness and emergency response organized by NSET a couple of years ago, I told my children and other family member not to panic or use the staircase but stay at the safe place and go outside once the shaking stops. This worked for us. I had also learned about the need to store the emergency items in a kit from the training. I knew that the Go Bag was important and so kept one myself but I had not imagined that our GO-Bag could be so much useful under such chaotic circumstances.

All the items of my Go Bag like Dettol, "Piyush" (water purifier), tarpaulin, head lamp, toothpaste, and soap, etc. came to use. We used the tarpaulin for emergency shelter and stayed there. Dettol was used in cleaning the wounds of the children. Due to earthquake many people had headache and indigestion so I gave them the Cetamol and Digene from the Go Bag. We all were using the soap and toothpaste from the Bag. I had also kept Playing Cards in the Bag. The young boys who stayed awake during the nights, played cards to keep awake and keep the area safe as well.

So many houses had been destroyed due to the April 25 Earthquake. The single Go Bag I had stored had been so useful to many of us. I thought what if everyone had their own Go Bag? It would have been a lot easier in such devastating emergency situation. I strongly request everyone to learn and follow the safe behavior during earthquake and store an emergency kit- Go Bag in their house as well."

Sita Shrestha from Thankot, Chadragiri Municipality got training on Disaster Risk Management from NSET in 2012 under Nepal Earthquake Risk Management Project (NERMP II). Thankot, Chandragiri Municipality is one the municipalities where NSET is implementing its Community Based Disaster Risk Management Program.

19th Earthquake Safety Day, 2017

Nepal marked 19th Annual National Earthquake Safety Day (ESD) with the main slogan: Earthquake Resistant Buildings and Infrastructures for Community Resilience on January 15, 2017. National Earthquake Safety Day is held every year since 1999 to raise awareness and share information and experiences on disaster and earthquake risk reduction. ESD is the culmination of earthquake risk management works implemented in the country in the preceding 12 months, and thus allows the taking stock of the achievements and shortcomings.

With main objective to help raise public awareness and public engagements on various facets of Earthquake Risk Management and consequently contribute to build Nepali Communities resilient to Earthquakes, the Earthquake Safety Day (ESD) is marked annually. This is also an occasion to affirm national commitment to plan and implement Risk Reduction and Preparedness actions at the community level so that potential losses are reduced in future earthquakes. Specifically, it also aims at making the general public aware about the Earthquake Risk, available Risk Reduction measures and Preparedness programs, sharing experiences and exchange good practices and create common platform for the stakeholders to join hands in improving seismic safety in Nepal, and affirming national commitment to lessen the potential losses ure earthquakes through mainstreaming risk reduction and ness in regular development process.

n of Earthquake Safety Day is endorsed by Earthquake Safety Committee that is led by Ministry of Home Affairs (MoHA) nied with representatives from various government and non-nt agencies related to Disaster Risk Reduction, Emergency se and Critical Facility Management. Nepal Government has d Earthquake Safety Day Guidelines, 2014 that guides plan d execute Earthquake Safety Day program activities more in organized and purposive ways. Two subcommittees are formed separately, one Chaired by Department of Urban Development and Building Construction (DUDBC) for Publicity Campaigns and another Chaired by the Host Municipality for Event Management. The National Society for Earthquake Technology- Nepal (NSET) serves as the Member Secretary in the committees. The major activities of the 19th ESD were:

Earthquake Safety Day National Meeting

The 19th edition of earthquake safety day National Program hosted by Shankharapur Municipality, Kathmandu, a traditional city of Sankhu, north-east Kathmandu that was devastated by Gorkha Earthquake 2015. Acting Prime Minister and Home Minister Mr. Bimalendra Nidhi inaugurated and addressed National Meeting. On the occasion, Nidhi reaffirmed the commitment of Nepal Government and urged people of Nepal to work together to reduce the vulnerabilities and save lives in future earthquakes. Addressing the ceremony, Mr. Hitaraj Pandey, Minister for Federal Affairs and Local Development stressed to effectively implement Building Code in local bodies. Dr. Govinda Pokhrel, CEO of National Reconstruction Authority (NRA) committed to speed up reconstruction through massive mason trainings arrangements in collaboration with academia, technical institutes and other training facilities, and also addressing grievances at first stand. Mr. Daniel Leaf, UN Disaster Resilience Advisor emphasized on the importance of strong policies and robust institutions for Disaster Resilience. He further stressed to continue investing in DRR education and preparedness. Mr. Varun Prasad Shrestha, Chairperson of NSET emphasized on incorporating the learning of Gorkha Earthquake 2015 at the core of our future strategies.

Earthquake Memorial Meeting

Earlier in the morning, Earthquake Memorial Meeting was held at historical Earthquake Monument at Bhugol Park, Kathmandu in memory of those who lost their lives during the past earthquakes of 1934, 1988, 2015 and many others. Addressing the meeting, participated by various people including from Nepal Government, Civil Society and Community people and paid tributes with one minute silence and also offered flowers to the departed ones, Deputy Prime Minister and Home Minister Bimalendra Nidhi stressed to work together to lessen potential losses in the future earthquakes. On the occasion, Minister for Federal Affairs and Local Development (MoFALD) Mr. Hitaraj Pandey expressed commitment for effective implementation of safety promotion programs at local level.

Earthquake Safety Day Rally

With view to elevate the level of public awareness, perception and attitude towards earthquake risks as well as preparedness and to promote and encourage safer reconstruction, Earthquake Safety Rally was organized. The Safety Rally, jointly inaugurated by Mr. Krishna Raut, Joint Secretary and Head of Disaster Management Division, Ministry of Home Affairs and Mr. Sanjeev Thapa Chairperson, Nepal Red Cross Society (NRCS) by cutting the ribbon, walked along inner city core areas of Sankhu with the messages of earthquake safety and safer reconstruction. Walkers from various Government Offices, Community Groups, Police Forces, Army, NGOs, INGOs, Scouts, Students, Volunteers, Participants, and Businesses, Local Community people, CBOs and many joined the rally.

Earthquake Safety Drill

On the occasion of 19th Earthquake Safety Day, a nationwide Earthquake Safety Drill was conducted at 2:24 PM. A special siren was aired from Radio Nepal and other FM stations across the country as a notification of an earthquake. The safe behavior demonstration was done by a team including wheel chair user. The idea was briefed on how people with disability can stay safe during ground shakings. "Drop Cover and Hold on" exercise was done for one minute to represent the time of 1934 Great Earthquake. It followed the event in which people joined into a Human Chain by holding hands as a symbol to express commitment.

Earthquake Safety Exhibition

Earthquake Safety Exhibition is an integral part of the ESD and it was organized at Sankhu, at the premises of Bhagyodaya Secondary School with view to disseminate information regarding Earthquake Risk Reduction measures and Safer Reconstruction among the public. Altogether 23 stalls including Nepal Army, Armed Police Force, Nepal Police, Red Cross, IOM, NSET, DUDBC, HomeNet, HECAF Nepal, InfoTech Sakwo/Sakwo Reconstruction, ADRA Nepal and DPNet were placed in the exhibition inaugurated by Minister for Home Affairs, Mr. Bimalendra Nidhi. Full Scale Model Demonstration of earthquake resistant components in RCC structured building and stone and brick masonry building were attractions of the exhibition. More than 600 visitors; especially earthquake affected ones from Sankhu and nearby visited the exhibition where visitors were given information and ideas in regard to emergency risk management and disaster risk management efforts.

Disability Inclusive Earthquake Safety Walkathon

As part of marking the ESD, a Disability Inclusive Earthquake Safety Walkathon was held at the he historic city of Mangal Bazar, Lalitpur Sub-Metropolitan City on 23rd January 2017. At the event, more than 500 people including 300 persons with disabilities participated the event which was jointly organized by the Government of Nepal (GoN), Lalitpur Sub-Metropolitan City (LSMC), National Association of Physically Disabled (NAPD), National Federation of the Disabled-Nepal (NFD-N) and National Society for Earthquake Technology-Nepal (NSET).

The Walkathon, started from the Patan Durbar Square, Lalitpur and advanced across Mahapal – office of the Lalitpur Sub-Metropolitan City, Pulchowk – Jawalakhel and finally assembled at Lalit Mandap, Jawalakhel, Lalitpur covering a distance of around 1.5 Km and concluded at Lalit Mandap, Jawalakhel by a brief closing ceremony. While making the closing remarks, Dr. Amod Mani Dixit, Executive Director, NSET, emphasized the necessity and importance of disable friendly physical construction and disaster risk reduction programs in the present context of Nepal.

On the occasion, the 5 Lucky Winners via random picking of coupon got awarded by the chief guest and other guests with the prize of "Earthquake Go Bag" for their participation.

Shake Table Demonstration

With the view to show amongst locals and many outsiders then visiting Shalinadi for Swasthani mela how safe and unsafe houses behave during shakings, a Shake Table Demonstration held on January 18, 2017 jointly with Government of Nepal, Department of Urban Development and Building Construction (DUDBC), USAID and NSET.

Two identical building models made up of the same construction materials were placed on a table and both the models were vibrated through mechanical arrangements and response was observed. Team of NSET Professionals executed the demonstration with brief explanations at every step noting changes occurred in the houses and technical reasons for the same.

Media interaction on impact of Gorkha earthquake and current status

As part of ESD activities, a media interaction program was held on January 15, 2017 with the view to share and discuss the impacts of Gorkha Earthquake 2015.On the occasion, Mr. Bir Bahadur Rai, Director General of Department of Information encouraged journalists to make additional efforts to help people in critical situations and highlighted the ways to help in building better understanding for disaster resilience. Mr. Shankar Hari Acharya, Chief of National Emergency Operation Center (NEOC) at Ministry of Home Affairs (MoHA) stressed on the coordination efforts made for effective communications during disaster situations. Senior Journalist and Media Expert Mr. Shree Ram Singh Basnet shared various facets of media efforts during Gorkha Earthquake emergencies.

National Symposium on "Learning from Gorkha Earthquake: Reconstruction, Risk Reduction and Preparedness"

As a regular event of Earthquake Safety Day, National Symposium on "Learning from Gorkha Earthquake: Reconstruction, Risk Reduction and Preparedness" has been held in Kathmandu during Jan 26-27, 2017. The symposium organized at BougainVilla Banquet, Teku discoursed intensively on the set agenda of reviewing the efforts on reconstruction, risk reduction and preparedness. One Plenary and seven Thematic Sessions held.The followings are the seven themes discussed in this year's symposium:

1. Lessons from Gorkha Earthquake and Status, Issues and Challenges for Reconstruction: School
2. Lessons from Gorkha Earthquake and Status, Issues and Challenges for Reconstruction: Building Code Implementation Nepal
3. Lessons from Gorkha Earthquake and Status, Issues and Challenges for Reconstruction: Cultural Heritage
4. Lessons from Gorkha Earthquake and Status, Issues and Challenges for Reconstruction: Rural and Urban Housing
5. Lessons on Response and Preparedness for better Response in Future
6. Disability Inclusion for Disaster Risk Reduction DIDRR
7. Lessons from Gorkha Earthquake and Status, Issues and Challenges for Communicating in Disaster Emergencies Risk Communications and Awareness

There was the active participation of 200 more professionals from different organizations namely; NRA, MoHA, MoUd, DUDBC, Nepal Army, APF, Nepal Police, NSET, Handicapped Associations, Consultancies, Freelancers, Media and representatives of different NGOs and INGOs.

18th Earthquake Safety Day 2016

Commemorating Great Nepal-Bihar Earthquake of 1934, Nepal marked 18th Earthquake Safety Day on January 16, 2016, nine months after the devastating Gorkha Earthquake struck the country leaving nearly 9000 people dead and nearly 1 million houses damaged. In a bid to address the current urgent need of massive reconstruction in Post Gorkha Earthquake situations in Nepal, President Vidya Devi Bhandari amidst an august gathering at Shanti Vatika, Ratnapark launched National Reconstruction Mega Campaign.

On the occasion, President Bhandari unveiled Reconstruction Plan of historical Ranipokhari site and also laid foundation brick to commence the reconstruction. The launching ceremony was graced by Vice President of Nepal Nanda Kishor Pun. Addressing the 18th Earthquake Safety Day National Meeting and Launching of National Reconstruction Mega Campaign, then Prime Minister KP Sharma Oli appealed for the committed and organized participation of affected and not-affected people, political parties and government and non-government sectors. He expressed government commitment to execute this Mega Campaign with more transparent, accountable, corruption-free and result oriented actions.

At the program, then opposition Leader and former Prime Minister late Sushil Koirala expressed full solidarity of his party to back up speeding national reconstruction process up. At the program, former Minister Pushpa Kamal Dahal highlighted the very need of multi stakeholders' efforts on reconstruction to help earthquake affected families and individuals with safe housings rebuilt. He also thanked international communities for the supports in earthquake emergencies and also for their commitments to support in post-earthquake reconstruction. Then Deputy Prime Minister duo Bijay Kumar Gachhadar and Kamal Thapa also addressed the program.

The ceremony was chaired by Home Minister Shakti Bahadur Basnet and also addressed by then CEO of National Reconstruction Authority Sushil Gyewali, UNDP Country Director Renaud Meyer and NSET Executive Director Dr. Amod Mani Dixit. Chief and Executive Officer of Kathmandu Metropolitan City Rudra Singh Tamang had welcomed all the distinguished guests and participants to the national event.

Later in the afternoon, Prime Minister launched "Bungmati Area Reconstruction" as one very first activities of National Reconstruction Mega Campaign in Bungmati, Lalitpur.

Earlier, Memorial Meeting held in Bhugol Park, New Road, Kathmandu where Home Minister Shakti Bahadur Basnet, high level government officials, security officials and representatives from DRR stakeholders paid tributes to those who lost lives in past earthquakes in Nepal. Many such memorial meetings and #18th ESD events have been reported from other many cities and districts.

17th Earthquake Safety Day 2015

Raising awareness among people and authorities on impending earthquake risk and on ways to mitigating the risks is a key for reducing the risk. Realizing this very fact, Nepal has been observing every year on 2nd day of the Nepali Month Magh and the ESD was marked amidst various events. The year 2015 was the Eighty one year of the Great Bihar- Nepal Earthquake (Magh 2 1990 BS, 1934AD) as the ESD is observed in commemoration of the devastation caused by the same earthquake. As in the previous years, various events were held to observe ESD throughout country and main event, national programs, of the ESD was hosted by Kirtipur Municipality in the year 2015.

On the occasion, a national public commemoration led by the Ministry of Home Affairs (MoHA) was held beside the historical earthquake monument at Bhugol Park, New Road, in memory of those who lost their lives during the past earthquakes.

Likewise, as part of the 17th Earthquake Safety Day, Earthquake Safety Rally starting from Panga Dobato was organized in Kirtipur. The rally walked passed through Sundar Bazar, Krishna Cinema Hall,Chikhu, Nagaun, Nagaun Dobato, Nayabazar, Loktantrik Chowk and finally gathered at Kirtipur Football Ground for the National Earthquake Safety Day Meeting.

The National Meeting of the 17th National Earthquake Safety Day function was held at Kirtipur Football Ground by freeing the colorful balloons into the sky amidst a huge public gathering. Addressing the meeting, Deputy Prime Minister Mr. Gautam emphasized that Nepal stands as one of the most earthquake vulnerable countries in the world hence the immediate urgency of reducing risks and also enhance preparedness at personal, family and community level.

As part of observing ESD, a nationwide earthquake safety drill was conducted at 2:24 PM. The program was also attended by then Home Minister Bamdev Gautam. A special siren was aired from Radio Nepal and other FM stations across the country as a notification of an earthquake. The Drop Cover and Hold exercise was done for one minute to represent the time of 1934 Great Earthquake.

Similarly, an Earthquake Safety Exhibition was also organized at Kritipur sport ground near buspark to disseminate information regarding earthquake risk reduction measures among the public.

As a regular event prior to main day programs of Earthquake Safety Day, National Symposium on “Experience on Earthquake Risk Reduction and Response" was also held in Kathmandu. The symposium took place at Hotel Himalaya, Lalitpur on 12th January 2015.

The Symposium discoursed intensively on the set agenda of reviewing year-long efforts on Earthquake Risk Reduction and Response; and also consolidating ideas for the way forward.

The major objective of the symposium on “Experience on Earthquake Risk Reduction and Response" has remained to share the experiences and generate new ideas towards Earthquake risk reduction and response among all stakeholders mainly among policymakers, decision makers, central and local government authorities and professionals.

In order to inform the general people through mass media about the planned and scheduled activities as part of the 17th ESD, the Department of Urban Development and Building Construction (DUDBC) together with other Co-organizers organized a Press Meet on 8th January, 2015 in Kathmandu. Mr. Shambhu KC, Director General of DUDBC released a Press Note on ESD activities, while NSET Deputy Executive Director Mr. Ramesh Guragain briefed the national program Schedule.

As part of the 17th National Earthquake Safety Day (ESD) Celebration, an interaction program on "Key issues of earthquake Safety" was organized on 31 December 2014 at Entrance Café, Bakhundol, Lalitpur with main objective of the program was to sensitize the media on the importance of earthquake risk reduction, preparedness and the role of media in disseminating the message to wider audience. The program further aimed to encourage the media to cover the ESD programs and spread the message extensively to the general public and thus be part of the national Earthquake Risk Reduction campaign. More than 35 different media personnel from various media (television, radio, print, online) participated in the interaction program.

Likewise, an Earthquake resistant school building handover ceremony was organized on 11th January 2015 in Nhyokha, Kathmandu on the auspicious occasion of coming up 17th Earthquake Safety Day.

As part of the 17th Earthquake Safety Day National Program, an Earthquake Safety Cycle Rally was organized by the Government of Nepal, Ministry of Home Affairs (MoHA), Lalitpur Sub-Metropolitan City and National Society for Earthquake Technology-Nepal (NSET) in association with USAID, ONUS Nepal, Maruti Cement, ENFO, Microtech and various other organizations. With the slogan: "I Cycle for EARTHQUAKE SAFETY" slogan, heartfelt by nearly 400 cyclists of the Earthquake Safety Cycle Rally, reverberated through the intricacies of the capital valley on 10th January 2015.

Also, an Earthquake Vulnerability Walk program was organized in order to intimately perceive the earthquake risks posed by the surrounding constructions and infrastructures in the heart of Kathmandu city which lasted for around a couple of hours. In the event, around 50 enthusiastic participants from various social circles took part.

On the occasion, Dabali Natya Samuha performed six shows of street dramas including Kritipur where Earthquake Safety Exhibition and different other places in Valley entitled “Hami Banchaou” conveying the message of promoting Earthquake Safety.

One of the major attractions of the Earthquake Safety Day, the Shake Table Demonstration was organized on January 18, 2015 amidst a huge mass at the Kritipur sports ground, near buspark. It was jointly organized by Government of Nepal, Department of Urban Development and Building Construction (DUDBC), Plan Nepal, Nepal Red Cross Society, OXFAM, USAID and NSET.

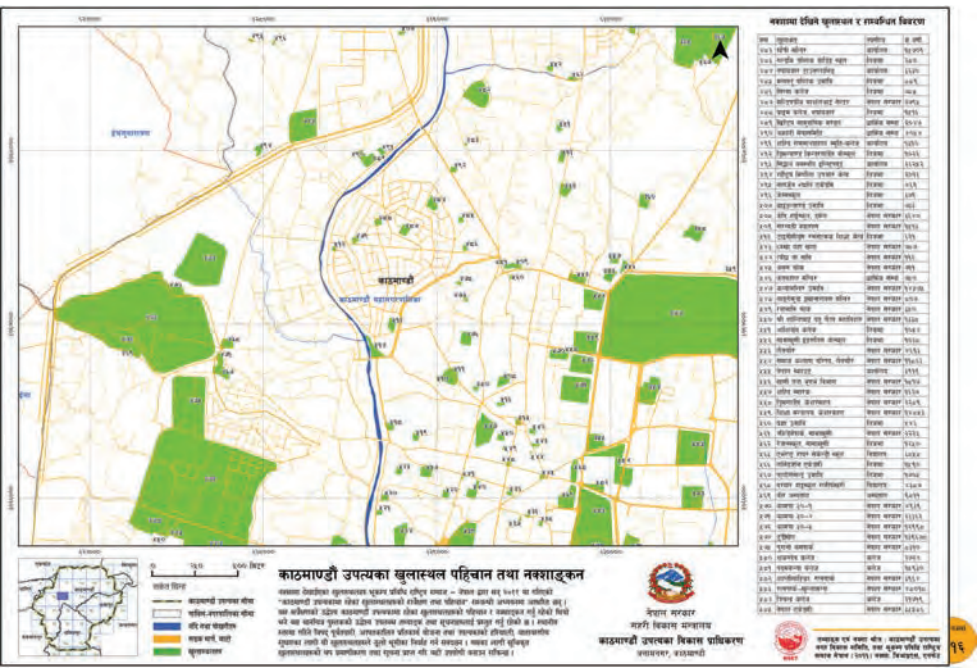
Apart from the National program various other programs were organized all over the country on the occasion of 17th Earthquake Safety Day. Government of Nepal along with various other organizations working in the field of Disaster Risk Reduction took the lead in organizing the events.

Publication of Atlas of open space in Kathmandu Valley

Kathmandu Valley is the most populated region in the country. Numbers of houses are on the rise, but the amount of land is limited. Hence, the open spaces are being decreased. Open spaces refers to the areas or free space that can be used for humanitarian response (camps for displaced persons, logistics centers, distribution centers, security and incoming military coordination sites, etc.). With the growth in the population and construction practices, the open spaces in the Kathmandu valley are decreasing very rapidly. It has been feared that if this trend is continues, we will barely be able to find an open space in the valley.

Kathmandu is considered at high risk of a major earthquake. Vulnerability situation of Kathmandu Valley is further compounded largely by the poor building practice including infrastructure that is densely constructed and without reference to resilient materials or technique. The estimated population of 3.5 million living in the confines of the Kathmandu Valley along with the high number of sub-standard buildings means that a major earthquake will have disastrous consequences for Kathmandu residents. Because this poses significant challenges for an immediate and effective response.

An essential part of earthquake preparedness is ensuring safe and accessible open spaces for emergency response. The concept of open space came in in 2009 following the Koshi Flood Response. During the disaster incidents like earthquake, demand of open spaces is also critical aspect during the emergency situation particularly in cities for emergency shelter, food, water, sanitation/ WASH services as well as emergency evacuation sites. Therefore, pre-identification of sites and safeguarding it is essential for any emergency management – at local level. For this, the government and community groups' effort, is crucial to preserve the remaining open spaces in Kathmandu Valley. For this, an effort, by the government and community groups, is crucial to preserve the remaining open spaces in Kathmandu Valley. In this connection, to identify open spaces within Kathmandu which could be used for humanitarian purposes in the event an earthquake occurred, a study was carried under the leadership of Ministry of Home Affairs (MoHA) and it identified and published the 83 major Open Spaces were in the Government of Nepal Gazette detailing the location and rules set forth around the application of the open space program. The 83 open spaces identified were locations relatively big which can accommodate large number of population during emergency period. Realizing the importance of preserving available open spaces and complementing the study carried out by the MoHA, the Kathmandu Valley Development Authority (KVDA) and NSET had carried out a separate study focusing on the all possible open spaces within the Kathmandu valley during three months period (in November 2010 – March 2011). The study identified significant numbers of Open Spaces including large and small in term of size and KVDA and NSET has also published an Atlas of Open Spaces in Kathmandu Valley based on an inventory.



The study was carried out with the view to document and describe public open spaces available within the Kathmandu Valley. The main purpose of the project was assessing available open spaces for shelter requirement in emergencies. With the objective to assist in the development of emergency response plans for large earthquakes; and helping to preserve the public open spaces, this inventory was carried out as a part of Risk Mapping for Shelter Response Project implemented with the support from UN Habitat, Global Risk Identification Program of UNDP/BCPR, IFRC and Prevention Consortium and under the Global Emergency Shelter Cluster of the UN/IASC context in 2011.

This study focused on mapping and analysis of available public open space in Kathmandu valley for possible use of temporary shelter and other facilities. The study was carried out with site visit and field verification including several attributes as observed and discussed with local authorities and people including use as parking, playground for children community use, drying food grains, fruit and vegetable vendors etc. Hence, preserving such public open spaces is essentially protecting the culture also.

Collected information were checked again after the field visit. The collected data was verified with the pre-field visit data. Based on the defined boundary of the sites, each site was digitized using Google Earth, because of the quality of map. After digitization of each site in Google Earth, this data was exported into GIS for further processing and analysis. The location (coordinates – obtained from a handheld GPS device) of each site was also recorded on survey forms. All the information of open spaces were presented in the form of maps. These maps are overlaid on the topographic maps prepared and produced by Department of Survey/Government of Nepal (DoS/GoN). Since the open space database has been stored in GIS formats, the maps thus prepared can be shared and it can be used with other databases compatible with the most common databases.

During the study, various types of open spaces including playgrounds, road right-of-ways, community courtyards, temple areas, schoolyards, parks, river banks, pond margins, parking grounds, historic sites, gardens, and government office premises were surveyed. One of the most common types of sites surveyed was the courtyard-type settlement, called 'Bahaa' in Newari, or 'Bahaal' in Nepali which are basically community courtyards, often surrounding a temple or stupa at the middle, houses in the surrounding and large space in between. The neighborhood manages these grounds, and the funds for the upkeep are often provided by agricultural lands on the outskirts of the city.

Apart from the typical Newari Bahaal, there are several types of public open spaces were found during the survey. They are: open spaces used by religious purposes, i.e. temples, guthi, church, Bihar etc. The other type is the land occupied by other public entities such as Red Cross, public schools, and ward offices. Land being used by government offices are also holding significant amount of open spaces within the valley. In the survey, open space of oxidation pond and Tribhuvan University compound in Kirtipur still remain larger open spaces within the valley.

Total 887 public open spaces were identified and mapped within Kathmandu Valley. Total area mapped was 15.5 square kilometers (sqkm) of open spaces of different sizes ranging from small to large. The majority of open spaces found in Kathmandu District (numbers 488), followed by Lalitpur District (numbers. 346) and Bhaktapur District (numbers 53). The total usable area is 9 sqkm, which is about 58 % of the total open spaces mapped.

As part of this study, many potential risk of the built environment were observed. Various types of open spaces and government office premises were surveyed. The findings have been found immensely useful for the emergency planning and response related activities. The Open Spaces are very useful during the time of earthquake for the local communities. After the publication of findings, Ministry of Home Affairs (MoHA) came straight into action with view to protect 22 ropanis of open plot in Kathmandu valley which was under threat as it was illegally occupied by people, school as well as so called clubs.

Conducting the assessment of open spaces of the Kathmandu valley or job to look for open space is not easy job either. During the survey, surveyors were threatened by people who were illegally occupying the public land and tried to threaten not to carry out. As the assessment is very useful for emergency planning and response, it has been felt that such work need to be carried out in all reaming district.

Open spaces available	Number of open spaces	Total open spaces in square kilometer	Useful open spaces
Kathmandu	488	10,576,269	5, 938,820
Lalitpur	346	3,486,077	2,092,636
Bhaktapur	53	1,473,459	998,819
Total	887	15,535,804	9,030,275

The useful open spaces are 58 percent of total land

Chapter 9

NSET Communications for Building Better Understanding on Hazards and Risk Reduction Measures

- Communication remains as an integral part of NSET programs. NSET acknowledges its vitally important role to play throughout the cycle of Disaster Risk Management. Communication efforts of NSET are primarily focused on building better understanding of hazards and risk reduction measures. NSET fosters the advancement of science and practice of earthquake engineering and technology for reducing earthquake risk and increasing seismic safety. NSET Communication efforts are multi-pronged, targeting different audiences and audience segments through different mediums, channels, at different venues, using different techniques.
- NSET Communications works to accomplish NSET's Mission through Knowledge & Information Management: develop, produce and disseminate IEC Materials (Publications, Audio/Visual Materials and others); 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 Communications follows the guiding principles while communicating; demystification of science, Engineering, Technology and knowledge, Break the rooms – from Research Labs to Grassroot lives, Simple & Bold, Scale up efforts: start from one, reach to each, and DO NOT PANIC.

IEC Material Production and Dissemination

NSET has been engaged on producing various publications on different aspects of Earthquake Risk Management. These publications are in the form of Guideline, Manual, Booklet, Story Book, Brochure, Flier, Poster, 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 etc. These materials are widely disseminated to reach targeted groups and more.

Publications

Adding on the stock of publications, NSET worked on following during the period 2014-2017 under various programs.

- Go Bag Guidebook and Household Emergency Kit – NSET is promoting the concepts of Emergency Kits to maintain basic requirements in view of Earthquake Emergencies. Huge public attention has been drawn so far. To keep this into useful knowledge and practice of communities, NSET has published the Handbook and Flier of "Earthquake Go Bag" and "Household Emergency Kit".
- 'Emergency Diary', a small notebook format has been published. It consists of a space for personal details, family details, in case of emergency contact numbers with other emergency contact numbers and some blank pages to take notes.

- NSET has published the outcomes of the creative process executed with the title "Shocks and Reverberations: A Creative Journey" where noted and popular Nepali Poets, Artists and Writers had made contribution in. The artists and writers had created 27 numbers of paintings, 13 of poems and 4 numbers of articles on different aspects of earthquake risk reduction. Earlier, an Exhibition of those works also done in association with Nepal Academy of Fine Arts (NAFA).
- Flier on Drop, Cover and Hold (DCH) developed and widely circulated mostly during Earthquake Safety Day.
- 'Bhukampa Surakshya Diwas Margadarshan, 2071' is a guideline for organizing Earthquake Safety Day (ESD) in municipalities and district. That has been published by ESD National Organizing Committee led by Ministry of Home Affairs and NSET, in the capacity of Member Secretary of the Committee contributed to draft, publish and disseminate the same.
- 3 (Posters, Fliers and Flex) materials focusing on NSET activities in 3rd World Conference on DRR (WCDRR) produced and distributed/displayed in WCDRR March 14 -18, 2015 in Sendai, Japan.
- “Inspect your house for Earthquake Safety”: This manual is for general public to evaluate the seismic performance of own house. In order to determine the house’s likely damage resulting from an earthquake of specific intensity, a structural assessment of the building is required.
- 'Vocabulary of ISDR Terminology on DRR’ in Nepali language has been published by Ministery of Home. It is a Dictionary of Disaster Risk Reduction Terminologies in Nepali language translated from the UNISDR Terminology on DRR to have the same level of understanding of all stakeholders working in this sector. This is an outcome of series of interactions, workshops, consultations and expert services from linguist and DRR professionals facilitated by NSET. An expert team comprising 4 Senior Linguists; Professor Devi Gautam, PhD, Professor Madhav Pokharel, PhD, Mr. Sarachchandra Wasti and Associate Professor Balaram Adhikari, PhD and one Senior Artist and Academician Professor Govinda Singh Dangol provided expert supports on the contents.

- 'Guideline for Seismic Non-structural Vulnerability Reduction and Earthquake Preparedness for Household' has been finalized. As the name suggests it is a guideline in Nepali language to raise awareness for seismic non-structural vulnerability reduction and earthquake preparedness at household level. It is intended for non-technical resource persons but also useful for general public. One can easily insert one hand in the triangular portion and hold it and flips over the page with the other hand while explaining. It can be easily carried in a hand bag.
- Training Manual for Architects on Earthquake Resistant Design of Buildings: A Training Manual for Architects on Earthquake Resistant Design of Buildings has been developed.
- A guideline on 'Do it Yourself Guideline on Non-Structural Mitigation of Common Residential Building' has been finalised. Its translation into Nepali has also been completed. It is also a guideline with theoretical description as well as illustrations focused on non-structural hazard assessment and planning of non-structural mitigation activities including the calculations of the cost required.
- Draft of a "Handbook on Urban Regeneration in Nepal" has been prepared and submitted to government for perusal and endorsement as a national guideline.
- Guideline on Emergency Preparedness and Response Planning for Business has been published in collaboration with Nepal Business Initiative (NBI) – a not-for-profit arm of the Nepalese business community.
- Calendar with Safety concepts and ideas, Tips on Earthquake Safety, 2 Advisories, 4 Posters and booklets on earthquake Safety published and distributed to public at various places.

Audio- Visual Materials

NSET has been partnering with Audio Visual Production teams for the production of Short Videos, Films, Documentaries, Telefilms and Visual PSAs focusing on various facets of Earthquake Risk Management.

- As a part of massive public awareness raising campaign under USAID/OFDA funded program 3PERM, NSET has produced 8 videos of 5-minute duration, 9 videos of 10-minute duration, 4 videos of 15-minute duration on ERR produced, and aired through TV and cable TV Channels. These video materials are on various topics of earthquake risk reduction and can be seen and downloaded from NSET Youtube Channel.

NSET has produced Earthquake Orientation in DVD for the wider circulation, have produced 20,000 copies and being distributed to schools, community organizations and various stakeholders.

- NSET has produced a Telefilm titled “Ghar” meaning “home or house” of 60 minutes duration. Copies of the telefilm has been distributed among stakeholders during the awareness and orientation programs. The Telefilm has been broadcasted from National Television Channels. A team of top ranked actors from Nepali cinema have worked on the Tele Drama that storifies the lives under unsafe houses when earthquake strikes.

Earlier, NSET has produced a 5-minute video “Feeling the Risks” that reveals and highlights the various seismic vulnerability factors of Kathmandu, an ancient city housing world heritage sites and one of the most at risk cities in the world to the effects of a large earthquake. Also, 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.

NSET has established a well-equipped Audio-Visual Studio for in-house works on A/V Materials production. The studio was used for the recordings of several of the audio and video products mentioned above.

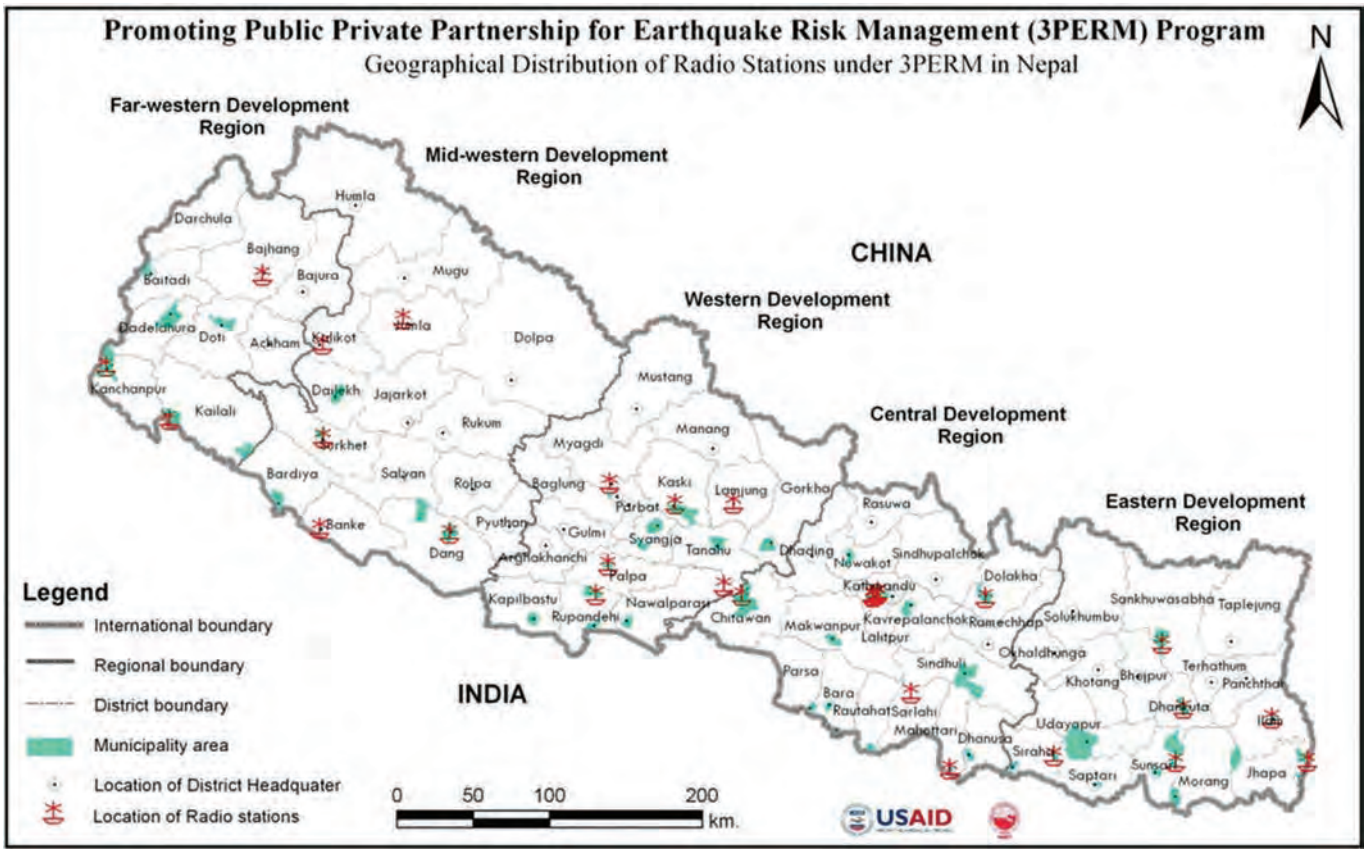
Campaigns through Mass Media

Radio Program

Pioneered in the region particularly on Community Radio, Nepal is very rich in FM Radio culture with more than 450 radio stations in number scattered all over the country, and reach is said to be to 90% Nepali communities. Nationwide Public Poll conducted by Interdisciplinary Analysts (IDA) finds Radios – the most trusted in Nepal amongst all the public and social sector entities.

NSET began using radio to help raise public awareness on earthquake risk reduction and preparedness in August 2000. NSET's partnership with Radio Sagarmatha, a community FM Radio Station in Kathmandu and the first in the region goes on continuing since then. It began with weekly 15-minute interaction program which got increased to 30 minutes from 2001. NSET also began collaborating with FM stations outside Kathmandu; weekly broadcasts from Annapurna FM Pokhara in 2003. In 2007 Capital FM in Kathmandu partnered with NSET on airing 5-minutes tips on earthquake safety daily.

Under the massive awareness campaign program component of 3PERM, NSET in 2012 partnered with 20 radios from all the geographic regions of the country to make safety concepts more heard. The radio programs have helped spread awareness messages and concepts on earthquake risk reduction and safety measures. Based on the local need, willingness for local contribution and possibility of resource mobilisation, NSET 2013 increased the number of partner radios to 28. Till 2016, Weekly half an hour radio program "Earthquake Safety" was produced and aired from 28 Radio stations all over the country. Also audio PSAs on safety message are being broadcasted from all the partner radios minimum 10 times daily regularly. This partnership has also encouraged local radios to produce and air program promos and PSAs locally on their own.



Television Program

TV Magazine "Earthquake Special"

NSET started in 2009 partnering with Watchdog Media for the "Earthquake Special" segment of regular TV program Janachaso. This was a regular weekly 10 minute magazine format broadcasted from Nepal Television, the state owned national television channel. This program was moduled to serve commoner people with simple but useful concepts and ideas on earthquake preparedness and disaster resilience. The program partnership continued till 2014.

TV Magazine "Surakshit Samudaya"

NSET under 3PERM program partnered with All Three Media Ghar to produce TV Magazine "Surakshit Samudaya" and broadcast from News24 Television. This was a regular weekly 15 minute magazine focused on various aspects of earthquake safety promotion. The program continued till 2016.

TV Talk Show "Sankalpa"

A DRR focused Weekly Television Talk Show 'SANKALPA' was produced and broadcasted from Nepal Television during 2013-2016. This program was more focused to help building community resilience through knowledge dissemination and public discourses on key issues and concepts of risk reduction and preparedness. "Sankalpa" was a regular weekly production of Watchdog Media Services in partnership with NSET under the USAID/OFDA funded program 3PERM.

TV Talk Show "Talk of the Town"

NSET partnered with Media Help Line for Television Talk Show "Talk of the Town" that is broadcasted from Image Channel Television. NSET partnered with the team first in March 2011 for couple of episodes. One sequel of partnership programs was followed with 2011 Himalayan Earthquake that hit eastern Nepal. This program is more focused to policy advocacy and more on lobbying for appropriate systems to address DRR issues be in place and keep functional. NSET partnered with the program under USAID/OFDA funded 3PERM program during 2013-2016.

Print Media

NSET works with Print Media in coordination and partnership at the level possible. The purpose is to disseminate earthquake safety messages and ideas correctly and widely to help build better understanding on earthquake risk management.

New Media

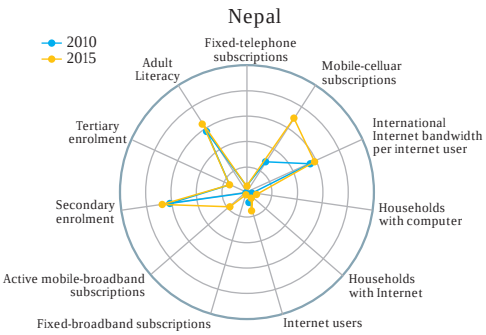
NSET maintains its Website as Formal Communication Online Platform. This platform serves with information, knowledge, ideas, approaches and learning NSET has to gather and pass on.

NSET also adopts social media for disseminating the safety promotion ideas and experiences.

Order	Page	Sessions	Drop-off
1	Home page	2,300	517%
2	Vacancy Page	322	66.5%
3	Event Pages (all)	305	82.6-100%
4	Pillar system flyer-Nepali	199	78.9%
5	News: BCIPN Launched	104	82.7%

Access to and use of New Media in Nepal

Source: ITU

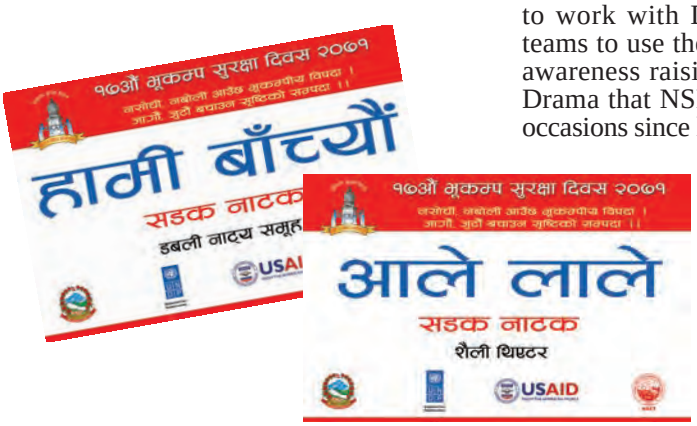


Awareness Campaigns through other means

NSET has collaborated with Government Departments, Municipalities, Private Sector under NSET implemented programs for placing Display Boards with the awareness message and information on Earthquake Safety promotion. NSET in 2014-2015 designed, prepared, and placed 18 display hoarding boards on promoting Earthquake Safety and safe construction practices in five cities.

Display Boards

Street Drama



NSET has been very much involved to work with Drama and Creative teams to use the innovative ways of awareness raising and one is Street Drama that NSET is doing on quite occasions since long. NSET under the program 3PERM arranged 48 street drama performances on earthquake safety using local young artists in 26 urban areas.

Baliyo Ghar Radio Program and Audio PSAs

As a part of reconstruction effort under BaliyoGhar, NSET is partnering with 14 FM Radio Stations in central region for regular radio programs and messaging. The regular weekly radio programs are 25-minute magazine format. Each radio air 10 times daily the messages on safer construction practices and reconstruction processes.

BaliyoGhar Radio Program Stations and airing time

Kathmandu	Ujyaalo 90 Network	Saturday 7:30pm Repeat : Monday 4:30pm
	Radio Sagarmatha 102.4 Mhz	Tuesday 7:30PMRepeat: Wednesday 12:30
	Radio Janasanchar 107.9	Thursday 8:30 am Repeat: Saturday 7:00 and Monday 12:00Noon
	Mero Fm 93.5	Saturday 7:00 Pm Repeat: Sunday 10am and Thursday 1Pm
	Radio Audio	Monday 800-900 Repeat: Tuesday 1300 Wednesday 1400
Dolakha	Sailung FM 104.0	Thursday 7:00 - 7:30pm and Friday 1:10 – 1:40pm
	Hamro Radio 103.4	Saturday 7:30- 8:00am
	Kalinchok FM 106.4	Wednesday 6:30-7:00pm, Monday 12:30-1:00pm
	Bhimeshwor FM 90.8	Saturday5:30-6:00pm Sunday11:30-12:00pm
Nuwakot	Nuwakot FM 106.8	Tuesday7:00PM Wednesday7:30AM
	Radio Trishuli 88.4	Sunday6:00PM Monday 5:30PM
	Radio Jalapa 104.5	Sunday9:15AM Tuesday1:00PM
Dhading	Radio Dhading	106 Thursday6:00pm-6:30pm Friday8:00am-8:30am
	Radio Bihani 97.6	Monday8:00-8:300pm Tuesday7:30-8:00am

Baliyo Ghar TV Program and PSAs

As a part of awareness raising component under USAID funded BaliyoGhar program, NSET has been partnering with All Three Media Ghar to produce a Weekly TV program "Baliyo Ghar" and broadcast from four Television Channels; Kantipur Television, Image TV, Avenues TV and News24 Television. The program started in May 2016. The program episodes are focused on policies, practices and technologies for safer reconstruction in Nepal. This is a regular weekly 25-minute magazine format.

Media interaction held in 3 districts under BaliyoGhar Program

In order to share ideas and experiences on reconstruction and exchange understanding in Disaster Risk Reduction (DRR), the NSET/ BaliyoGhar Communication team has conducted an interactive meeting with the local journalists of Dolakha, Nuwakot and Dhading. Members of Federation of Nepalese Journalists (FNJ) District Committee, media persons from local newspapers, radio stations and correspondents from national broadsheets in all three districts participated. With the understanding that media has been very active stakeholder in efforts, BaliyoGhar is building relationships with media outlets of project implementation districts for their enhanced engagements in promoting safer reconstruction.

Poster, Manual, and Guidelines developed and published

As part of the broader public awareness promotion efforts, NSET has been preparing various communication and IEC materials including Brochures, Posters, Pamphlets, Booklets, Two-pagers, book and newsletters, hoarding boards among others.

NSET communication, Earthquake Engineering Research and Training (EERT) Division and various other divisions of NSET has regularly been providing various technical assistance on it. In this context, during the year of 2016, NSET has developed and published various training materials, curricula, manuals, and guidelines for the purpose.

Posters

NSET is using various medium to disseminate the right information to its targeted beneficiaries. Poster is one of them. NSET has published posters to convey the message of earthquake resistant building constructions methodology and technique. The posters incorporate the following constructions. i) Stone in mud ii) Stone in cement iii) Brick in mud iv) Brick in cement and v) Reinforced Cement Concrete have been developed based on the requirement of Nepal National Building Code. The posters has emphasized on ten important points to be considered for the construction of earthquake resistant buildings. These are developed to assist the house owners and technical support team to guide the building reconstruction in earthquake affected areas. Sample poster is shown below.

Ten Key Points for ER Stone in Mud Building

Housing Inspection Manual

Training to master trainers on SOP

Besides technical assistance, NSET's EERT division has also developed "Standard Operating Procedure SOP for Housing inspection" manual and guideline for inspection was prepared to facilitate the grant distribution to the beneficiaries for housing reconstruction. It has provided technical input to develop checklists for inspecting different housing type to meet the criteria of Building Code. Inspection guidelines have been prepared to facilitate the inspector and technical assistant team for inspecting the reconstructed buildings at different stages. The main objective of the Inspection guideline is to provide information to the inspector about the minimum requirements and the methodologies to check the compliance of minimum requirements. After which the training to the master trainers on Standard Operating Procedure for housing inspection and Inspection guideline was conducted for the engineers and technical inspectors of government authority.

Correction/Exception Manual

This manual is on behalf of masonry Structures houses that are built under Housing Reconstruction Program. It was carried out with the initiation of NSET and JICA. The beneficiary will get the housing reconstruction grant only if the house complies with the standard that has set forth as a minimum requirement. The houses that are reconstructed that do not fulfil all the minimum requirement as per SOP of inspection will need to be corrected through implementation of remedial measures as suggested in the correction/exception manual. Many exceptional cases and tolerances have been introduced in the manual to guide the engineers and technical inspectors at field to fill the inspection checklist.

Enhancing Communication for Disaster Emergencies

Nepali Hams in Hamfest? 2014; NSET Prioritizing Ham Radio

Nepali Amateur Radio operators, the Hams participated in Hamfest 2014 in Hyderabad got involved to explore and learn from Indian experience the ways how Hams could be best utilized for disaster emergency communications. Nepali pioneer Hams Satish,9N1AA and Suresh,9N1HA and also new generation hams Ravindra,9N3AA and Khadga,9N1KS participated in the event.

Hamfest 2014 was held at Muffakham Jah College of Engineering and Technology in Hyderabad, India during Nov 8-9, 2014. Nearly 500 ham operators from different part of India, and also from Nepal, Bangladesh, Gulf countries and other parts participated in. Ham fests are events organized by amateur radio enthusiasts for social gathering and promotion of amateur radio hobby. Typically annual events are held on weekends which last from several hours to several days which also feature buying and selling of radio and related equipment.

Emergency Communication Systems which are pivotal in managing disasters should have not only appropriate technology and adequate infrastructure, but also need proper backup and redundancy mechanisms. Amateur Radios, popularly known as Ham Radio are found globally as one of the best options in such adversities. Nepal can also benefit from this zero-operation-cost technology particularly in case of emergencies not only due to earthquakes but in all types of disaster situations. The need is hence to extend and strengthen the Ham capacities throughout the country.

NSET has been prioritizing enhance possible use of ham radio in disaster emergencies. There are 104 Nepali hams and NSET has 15 professionals who got operator's license in 2011 and 2014.

HF Antenna installations at NSET

HF Antenna for 42m (7MHz) and 10m (28 MHz) band plan to operate Amateur Radio Station has been successfully set up at NSET Office, Bhainsepati on 25 December 2014. Mr. Satish Krishna Kharel 9N1AA, pioneer of Nepalese amateur radio (HAM) movement imparted the skills on establishing HF Antenna of various band plans to other HAMs during the antenna set up.

NSET with its 15 Ham Operators is now all set to communicate with the Global Arena during disaster emergencies where no other means of communication are to exist.

Demonstration Test done under Mason Training in Dolakha to see how earthquake resistant technologies work (under TSESHR NSET), Oct 2015

Photo: Laxmi Nyakhusi

Chapter 10

Ensuring Inclusion in DRR Efforts (GESI Considerations)

Gender Equality and Social Inclusion (GESI) has become the issue of global concern and the concept has been viewed as an effective means for the success of any development agenda. Asia and the Pacific region including Nepal have been remarkably progressing on mainstreaming GESI considerations over the last decades. Effort are to make all stakeholders accountable to fulfilling commitments made in the international arena towards non-discrimination, gender equality and social justice.

Women and excluded groups are more vulnerable to the impacts of disaster risks. The death and injury ratio of women in comparison to men is also higher when a disaster strikes. We can take the example of Gorkha Earthquake 2015 where the number of deaths of women was higher than the men. In addition, women and youth can play important role for resilient recovery. It is simply, in most cases, the needs and responsibilities of women and socially excluded groups are not adequately considered in the design and planning of disaster risk reduction, response and recovery, making it critical to recognize the role of GESI in crisis situations.

NSET aims to mainstream Gender Equality and Social Inclusion (GESI) strategies into all stages of its disaster risk management efforts, including disaster reduction, disaster preparedness, disaster response and disaster recovery as well as post-disaster reconstruction. NSET focuses to promote women and socially excluded groups not only as beneficiaries, but as change agents and leaders of the communities.

Customized gobag for wheel chair users distributed in a program organized by NSET in association with National Disabled-Nepal (NAPD), Nov 2016

NSET has been promoting the active participation of women and socially excluded groups in the DRR program both as decision makers and recipients of the program services. With view to mainstream and empower women, girls, and members of traditionally disadvantaged groups of the society and to reduce disparities where possible, NSET has recognized GESI as its principle guideline. A GESI Strategy and Action Plan has also been prepared which contributes development of GESI friendly environment, capacity buildings and awareness raising at various levels through various means with GESI considerations. Likewise NSET also has been integrating the GESI perspective in all its programs in bid to nurture socially inclusive development in the society by addressing the special needs of disadvantaged groups, disable, children, women and girls, elderly people and Dalit among others. NSET projects/programs have been also regularly undertaking rigorous GESI analysis and compliance evaluation.

Integration of GESI perspectives into its various programs

Women's involvement in Disaster Preparedness and Emergency Response capacity development

NSET has been working to enhance emergency response capacity in Nepal and beyond through organized efforts for better preparedness. NSET's Disaster Preparedness and Emergency Response (DPER) Division has been designed to develop concepts, impart ideas and skills to enhance the capacity for disaster preparedness and emergency response in Nepal.

As part of regular activities as well as PEER program, NSET/DPER has been ensuring the participation of female in various activities such as simulation exercises, national, city, family, community and institutional planning, capacity enhancement programs (DAT, CSAR, BEMR, FRT) and earthquake orientations to communities, organizations, schools, house owners, special groups and training programs such as MFR, CSSR HOPE, CADRE, SWR, TFI, IWs, MIW. More than 3500 woman were benefitted from earthquake risk reduction and preparedness orientations and drills between the periods of 2010 to May, 2017. A total of 554 female were graduated from 2012 to May, 2017 from various Community Search and Rescue (CSAR) Trainings. Likewise, 228 female participants were graduated from Basic Emergency Medical Response (BEMR) Training, 132 woman graduated from Damage Assessment Training (DAT-1001) from 2013 to 2017 May, 1178 female have been graduated from Simulation Exercises as part of Developing Emergency Response Plan (ERP) trainings from 2010 to May,2017. Likewise, under the PEER program, there is also significant number of female participants have been graduated from its various training programs including CADRE, CSSR, HOPE, MFR, SWR and TFI.

Community Based Disaster Risk Management (CBDRM) is another flagship program being implemented by NSET in 9 Village Development Committees, 40 Municipalities, and 32 Districts. As part of the preparation of Local Disaster Risk Management Plan under the CBDRM program, there has been ensured female's participation in significant numbers. From 2014 to 2016, out of 361, 214 were females participated as part of ERR orientations. Likewise, in CBDRMP trainings, 53 out of 118 participants were female while in VCA trainings, 124, out of 226 were female participants. Likewise, in Non Structural Mitigation training 85 out of 95 were female participants.

Women involving in Non-Structural Mitigation

Non-structural mitigation is one of the important strategies for reducing the earthquake risk that women can play a key role as they are highly involved with decision to place various non-structural elements in the house.

Campaign on Earthquake Non-Structural Mitigation was implemented in Kathmandu and Lalitpur in association with Shapla Neer to increasing the understanding level of the general people particularly women on non-structural risk mitigation.

As part of Training of Trainers (ToT) Program on Non-structural Mitigation (NSM), out of produced 71 NSM volunteers, 63 were female. The Training graduates' major activities are the conducting orientation program at the community level. The TOT graduates organized mass awareness programs in the form of community orientation, informal group discussion including video shows and distribution of IEC materials in their neighborhood. This activity was able to reach to 1400 persons including 830 women.

Promoting/developing women masons through capacity enhancement training

NSET is implementing the BCIPN project with the main goal to enhance earthquake resilience of urban settlements in Nepal to enhance earthquake resilience of communities of Nepal through compliance to and enforcement of the National Building Code. One of the objectives of the program is to enhance the capacity of stakeholders like engineers, masons and house owners to effectively implement the building code. Masson training is one of the component of the program and traditionally the profession is dominated by the male. However, NSET has envisioned to promote the women for the profession and out of a total of 47 masons ware female masons.

Mainstreaming inclusion in Post-Earthquake Reconstruction effort

With the objectives to promote earthquake resilient housing reconstruction and provide technical assistance to the people, NSET is implementing Baliyo Ghar, a 5-year long USAID funded program in four districts, namely, Dolakha, Dhading, Nuwakot and Kathmandu.

In a bid to foster socially inclusive housing reconstruction in the country by addressing the special needs of disadvantaged groups, including women, the GESI has been envisioned in 'Baliyo Ghar' program as well. From the GESI perspective engagement of female masons in construction sector has been found encouraging in the program districts and Dhading has the highest number, which is more than 275. Likewise, engagement of female labor in construction sector has also seen in significant number. Nuwakot has the highest number of female labor and the rest of two districts have more or less the same number. Similarly, about 16 % people of the total Dalit population are engaged in building construction sector.

As part of capacity building activities in the quake-hit districts, Baliyo Ghar is conducting Mason Training for existing masons to assist in the earthquake reliant reconstruction effort. With view to developing inclusive reconstruction workforce, Baliyo Ghar has been emphasizing on development of women mason as part of program. A total of 131 mason trainings have been accomplished till March 2017 where 4045 masons have got trained. Out of them, 110 were female.

Enhancing Earthquake Preparedness in communities through Woman's Network

With view to make the communities safer from earthquake risks through awareness, capacity building and implementation of earthquake-resistant construction, non-structural mitigation and preparedness measures, NSET implemented a program called 'Enhancing Earthquake Preparedness of Communities through Women's Network: A Collaborative Initiative' to expand the earthquake preparedness and mitigation activities at grassroots level involving and targeting women's groups in a collaborative approach for a long run. The program envisioned a number of activities such as orientation program, Training for Trainers (TOT), Door to Door campaign, Assessment of non-structural items and vulnerabilities, Support in implementing non-structural mitigation, Production and promotion of Go Bag, Assembling of Emergency Household Kits and Non-structural Item Kits and selling in collaboration with local government eventually making the disaster resilient community. This has brought organization such as NSET, Lumanti, and National Network of Women for Community Resilience (NNWCR) and few women organizations and networks such as Community Women Forum (CWF) of Thankot and Kirtipur Women's Network (KWN) to work together on various aspects of disaster risk mitigation and preparedness for community resilience.

Disability inclusive ESD Walkathon

People with disability of different kinds are more vulnerable to the disaster incidents including earthquake and as part of NSET's GESI efforts, NSET is focusing on disability consideration in DRR. As part of marking the 19th Earthquake Safety Day (ESD), a Disability Inclusive Earthquake Safety Walkathon was held in the historic city of Mangal Bazar, Lalitpur Metro-Metropolitan City on 23rd January 2017. At the event, more than 500 people including 300 persons with disabilities participated. The Walkathon, started from the Patan Durbar Square, Lalitpur and advanced across Mahapal – office of the Lalitpur Sub-Metropolitan City, Pulchowk – Jawalakhel and finally assembled at Lalit Mandap, Jawalakhel, Lalitpur covering a distance of around 1.5 Km and concluded at Lalit Mandap, Jawalakhel. The 5 Lucky Winners via random picking of coupon got awarded with the prize of "Earthquake Go Bag" for their participation.

National Symposium on the lesson learnt from Gorkha Earthquake

On the occasion of 19th Earthquake Safety Day, National Symposium on the lesson learnt from Gorkha Earthquake included one thematic session on 'Lessons learned in inclusion of most at-risk groups including persons with disabilities in the Gorkha Earthquake response, recovery and reconstruction process". The program was organized by NSET in collaboration with various organizations on as part of 19th Earthquake Safety Day. The objectives of the session were to share the lessons learned from the Gorkha Earthquake in terms of inclusion of most at-risk groups including persons with disabilities in the post-earthquake response, recovery and reconstruction process, and identify challenges and ways forward towards all-of-society approach to disaster risk reduction (DRR) and resilience building.

Presentations during the session were focused on three major areas including: "National policies, progress, challenges and ways forward in inclusion of most at-risk groups in the post-earthquake recovery and reconstruction process", "Inclusion in the post-earthquake response, recovery and reconstruction from the perspective of persons with disabilities" and "Practical examples of inclusion of persons with disabilities in the post-earthquake response and recovery process by the non-governmental actors in Nepal".

Various speakers and presenters have raised the variety of issues on the matter. Mr. Keshab Bhattarai, Under Secretary and Chief of Disability Coordination Section MOWCSW, Government of Nepal (GoN) also one of the key note speakers in this thematic session, highlighted various existing policies and laws relating to disability in Nepal in various timeframes. Dr. Bhisma K. Bhusal from National Reconstruction Authority (NRA), in his key note address, briefed about key national policies and frameworks and mentioned the progress made in reconstruction. He also specified that the new policies are inclusive in nature.

A total of three presentations were made at the thematic session. In his presentation, Mr. Manish Prasai highlighted experience, response and recovery, current situation in terms of inclusion and concluded his presentation with recommendations for greater inclusion. He pointed out that access to information; WASH, relief, temporary shelter and inaccessible physical infrastructures were some of the barriers faced by the persons with disabilities during response and recovery. One of the challenges he shared in terms of response and recovery after the earthquake was that persons with disabilities are still viewed as passive recipients. He further acknowledged about the gap between the policies and implementation. Likewise, Mr. Sunil Pokharel from Handicapped International (HI) talked about HI's good practices including accessible safe shelters, rehabilitation of earthquake injured and other disability inclusive DRR works. In the third presentation Mr. Manish Prasai from National umbrella organization of the Disabled People's Organizations shared the experiences of the recently organized National Human Rights Summit of Persons with Disabilities where more than 600 people from all over the country had participated in the summit which focused on education, women and people with disabilities and came up recommendations as Kathmandu Declaration 2016 to be adopted by all stakeholders. Mr. Prasai also presented the summary of the recommendations and the Declaration was distributed to the audience for the next group exercise.

During the panel discussion, various questions were raised from floor including need of ensuring reliable data of people with disabilities in next census, issues relating to disability inclusion in the Sustainable Development Goals (SDG) 2030, issue related to accuracy of data regarding PWD and issue related to disability friendly identity card among others. Responding to questions raised during discussion, panelists stressed on the need of encouraging and supporting to people with disability and adopting post-earthquake response, recovery and reconstruction from the perspectives of persons with disabilities.

Issues and Way Forward

The session arrived at a conclusion identifying a total of 11 issues as Key barriers and challenges to inclusion in the post-earthquake response, recovery and reconstruction:

- Limited representation of most at-risk groups including persons with disabilities in the local governance structures and disaster relief committees
- Barriers to accessing basic services such as WASH, temporary shelter and relief
- Lack of disability disaggregated data
- Inaccessible physical infrastructure and communication
- Information barriers and intersectional forms of social exclusion
- Lack of participatory policy development, implementation and inclusive monitoring

- Lack of clear guidelines policy for housing support
- Disabled People's Organizations (DPOs) have been a major yet underutilized resource in the post-earthquake response
- Disability has been often overlooked as part of the broader definition of 'vulnerable' groups
- Attitudinal barriers
- Limited training, knowledge and skills and lack of collaborative good practices

Various points for inclusive post disaster and recovery and reconstruction were also recommended:

- Ensure meaningful participation of persons with disabilities and their representative organizations in all aspects of post-disaster recovery and reconstruction (inclusive policy development, implementation and M&E).
- Carry out specific provisions for internal capacity building and place greater emphasis on inclusion of persons with disabilities across all relevant government institutions. Ensure that all new public and privately built infrastructure including schools, roads, hospitals and houses are made safe and accessible for everyone following the principles of Universal Design and 'build back better'. Use principles of 'Reasonable Accommodation' for the existing structures. Develop clear guidelines and mechanisms for recovery and reconstruction interventions targeting/ prioritizing the needs of the most at-risk and vulnerable households. Carry out interventions that are tailored to meet the needs of the most vulnerable.
- Develop M&E system for disability inclusive recovery and reconstruction programming for promoting real-time review of outcomes, greater accountability, and evidence-based learning and knowledge sharing. Invest in building capacities within the disability sector.
- Provide information on reconstruction policies, earthquake-resistant designs, disaster risk reduction and safety in accessible formats for everyone (including persons with visual or hearing impairments). Establish accessible Early Warning and mobile text messaging system.
- Ensure representation and meaningful participation of persons with disabilities and Disabled People's Organizations in local governance structures and provide inclusive (humanitarian) response taking into account specific needs of persons with disabilities including but not limited to health, WASH, education and protection.

Distribution of Customized 'Earthquake GO BAG' for Wheel-Chair Users

Dr. Amod Mani Dixit distributing GO BAG

As the part of GESI effort, NSET in coordination with National Association of Physical Disabled – Nepal (NAPD) has distributed customized version of 'Earthquake GO BAG' for wheel-chair users. In a program organized by NAPD at Kathmandu on Nov 6, 2016, Executive Director of NSET Dr. Amod Mani Dixit distributed GO BAGs as help kit for disaster emergencies. Total 20 persons received the kit.

Speaking on the occasion, Dr. Dixit emphasized the very need to consider how emergency support systems could be ensured in favor of people at most risk. 'We believe; no one should be underprivileged in preparing themselves during disasters specifically earthquakes. NSET is focusing for all domains and clusters of society in making them aware on and equip with earthquake safety and preparedness measures. In coordination with NAPD, NSET extends its pleasure in distributing earthquake safety kit, GO BAGs for the physically disabled persons" he remarked.

Kiran Silpakar, Chairperson of NAPD highlighted the objectives of program including working approaches and strategies of NAPD. Likewise Vice-president of NAPD, Mr. Sanjay Bantawa addressing the program shared, 'Making aware on earthquake safety and preparedness for the people like us is a historical move done by NSET, great thanks to it."

GESI expert of NSET, Mrs. Bhubaneswari Parajuli presented on the safety measures and preparedness during earthquake including non-structural mitigation measures focused for the people with disabilities.

Customized version of 'Earthquake GO BAG' carries the essential items needed during emergencies such as first aid kit, water, fast food items and clothes. The demonstration of keeping and using GO BAG was done. The demonstration of doing safe behavior as drop, cover and hold on customized wheel chair was also done so that it could help the people using wheel chair to be safe.

Earthquake simulation/ evacuation drill at Old Age Home

Similarly, NSET in collaboration with other organizations conducted an earthquake simulation/evacuation drill as one of the activities of International Day for Disaster Reduction (IDDR) celebration at Pashupati Old Age Home on October 13, 2014. About 230 senior citizens including 120 female, 41 people with disabilities and 50 with people with partial disabilities participated in the demonstration. All the elderly people took part in the demonstration as if a real earthquake had hit the old-age home.

The whole drill event had 3 components, orientation, drill and sharing of the lessons learned from this drill. The elderly people were given the orientation one day earlier than the actual drill conducted. The experience and lessons learned were shared through the symposium among the stakeholders.

The IDDR day was observed on 13th of October annually worldwide after the resolution made by The UN General Assembly. The IDDR is a day to celebrate how people and communities are reducing their risk to disasters and raising awareness about the importance of DRR. It's also a day to encourage every citizen and government to take part in building more disaster resilient communities and nations. This year the focus of the IDDR Day was on older person and disasters, including their needs and what they contribute to better planning and understanding of disaster risk in their communities.

Dependent elderly people assembling after evacuation

Nepal also observed the IDDR 2014 with a series of events at national level as well as at local level like, national symposium, rally, media interactions, IEC materials development, documentary development, press meet, quiz contests, street drama, folk's songs in TV, earthquake evacuation drill with vulnerability assessment and orientation at Pashupati Old Age Home

of IDDR 2014 was a joint initiative led by MoHA and coordinated by DPNet-Nepal in collaboration with various stakeholders, Gov Agencies, UN Agencies, DIPECHO partners, Red Cross Movement, Youth Networks, National Senior Citizen's Federation, AIN/TGDMCC and other national networks of DRR in Nepal.

Elderly people evacuating the dormitory in a queue

Chapter 11

Promoting Use of Science and Technology in DRR: NSET Involvements

The Sendai Framework for Disaster Risk Reduction 2015-2030 is a global guiding policy framework for any DRR related to activities. A main feature of the Sendai Framework, in comparison to the Hyogo Framework of Action, is the shift of focus from managing 'disasters' to managing 'risks'. Such a shift requires a better understanding of risk in all its dimensions of hazards, exposure and vulnerability. Therefore, the role of science and technology in providing the evidence and knowledge on risk features heavily in the Sendai Framework.

Linking science, engineering and Technology to communities is one out of two main areas of NSET work. NSET continiously identify research outcomes from different universities which are applicable in Nepalese context, adopt, modify or customize and help communities to implement them. At the same time, if there are not sufficient research outcomes that are required to meet the demand of communities, NSET conducts joint research in collaboration with different universities around the world.

NSET, Beijing Normal University jointly work in Experimental Tests in China

Recently, NSET is jointly working with Beijing Normal University of China in a collaborative research project of International Center for Collaborative Research on Disaster Risk Reduction ICCR-DRR on the project titled "Development, testing, demonstration and training of better-built procedures and retrofit techniques for non-engineered housing in urban and Peri-Urban areas of the Himalayan belt" with the financial support from the UK's Department for International Development DFID. The project period is from July 2016 to September 2017. The study is on low strength stone masonry buildings which got extensive damage in Gorkha Earthquake 2015. Many studies and researches have been conducted on reinforced concrete buildings in developed countries and other parts of the world and the proper knowledge based guidelines are available for those buildings. But the study is inadequate in stone masonry buildings which are abundantly available in rural parts of Nepal.

The main purpose of this project with Beijing Normal University is to do laboratory experimental tests on stone masonry buildings to understand the behavior of the buildings in earthquake and help develop a proper evidence based guideline for the construction of such buildings. Number of walls and three shake table tests have been conducted under this project.

Push-over tests of walls of size 2400 mm x 2100 mm X 400mm with 11 different options were conducted to understand the behavior of various strengthening options. Shake table tests on three types of stone masonry houses were conducted. These tests were completed for two story stone masonry buildings, 3/5 scale in shake table of Kunming University of Science and Technology with the input data of El-Centro earthquake at incremental loading. The size of the room for full scale is 4.5 m X 4.5 m and wall thickness 450 mm. The building models were tested using well-dressed stones and proper through and corner stitches.

The three building models were tested

1) Unreinforced stone masonry (Model 1)
2) Stone masonry with wooden bands and posts as per NBC:203 (Model 2) and
3) Stone masonry with wooden bands and posts plus gabion wire meshing (Model 3).

The first shake table test of Model 1 was conducted on 19th September 2016 in presence of the representatives from Beijing Normal University (BNU), Kunming University of Science and Technology (KUST) and NSET.

The second and the third building models Model 2 and Model 3 were tested on 21 and 22 January 2017 at KUST in presence of the large group of representatives from the Government of Nepal, faculty members from the universities of Nepal, Bangladesh and China as well as people from technical fields and project team members.

Model wall and shake table tests have demonstrated lots of evidence based studies that would assist in the construction of such earthquake resistant buildings.

Test Set up and Wall tested on Stone in Mud with Wooden Bands

Damage to the Building with Wooden Bands and Posts as per NBC 203 at 0.51g

Delegates from Nepal, China and Bangladesh for Shake Table Demonstration at Kunming University of Science and Technology KUST holding discussion and experience sharing after the tests.

NSET and Ehime University signed MOU for joint efforts to conduct research activities and exchange of staff including study tour

With a view to perform the joint research activities and exchange of staff include study tour, conducting research and/or supervision of student projects, attending seminars, colloquiums and academic discussions, a Memorandum of Understanding (MOU) has been signed between NSET and Faculty of Engineering and Graduate School of Science and Engineering –National University Corporation Ehime University, Japan on December 23, 2016 in Kathmandu.

The MOU was signed by Dean of Faculty of Engineering Professor Hidenori Yahiro of Graduate School of Science and Engineering Ehime University and General Secretary and Executive Director of NSET Dr. Amod Mani Dixit in the presence of dignitaries from Nepal and Japan including Hon. Dr. Gangalal Tuladhar and HE Ambassador of Japan to Nepal and high officials of JICA Nepal in a meeting devoted to honour the immense contribution of Prof. Ryuichi Yatabe to Nepal and to mark his forthcoming retirement from Ehime University in March 2017.

This is a formalization of cooperation between NSET and Ehime University started decade back by installing the two accelerometer at NSET premises to monitor the ground shaking during the earthquake with the support of Ehime University.

The tangible joint work was conducted just after the 2015 Gorkha earthquake to investigate the liquefaction potential of Kathmandu valley with the financial support from Japan Science and Technology (JST).

work came out with the fruitful findings on the leadership of Prof. Mitsu Okamura from Ehime University and Mr. Surya Narayan Shrestha from NSET.

Regional Discourse on Earthquake Engineering and Seismology conducted in Pakistan

Focusing on need to collaborate for more organized and coordinated research efforts at regional level to tackle common threats in the South Asia region, a workshop has been conducted in Karanchi, Pakistan during 9-10, August 2016.

Department of Earthquake Engineering, NED University of Engineering & Technology, Karachi, Pakistan had organized the "Workshop on Recent Advancements in Earthquake Engineering and Seismology in South Asian Countries" in collaboration with National Disaster Management Authority (NDMA), Pakistan and with funding support from Abdus Salam Internal Centre for Theoretical Physics (ICPT) Trieste, Italy.

Various participants representing USA, Italy, Pakistan, Nepal, Tajikistan, Sri Lanka, Bangladesh and Bhutan have taken part in the workshop.

In a session dedicated to April 2015 Gorkha Earthquake, Dr. Amod Mani Dixit from NSET, Nepal presented on Twenty-three years of ERM efforts in Nepal tested against the 2015 Gorkha Earthquake. Mr. Kuber Bogati, Structural Engineer from NSET discussed on Fragility Functions of Nepalese Buildings: A Comparison between Analytical Proposition and Actual Damage Recorded during the 2015 Gorkha Earthquake.

In a panel discussion, Prof. Sarosh presented a concept for creating mutual working environment in common scientific problems in the south Asian region i.e. SHAKE [South Asian Network for Earthquake Studies]. Prof. Abdelkrim shared his best experiences of such networks in the world that he is associated with. And he stressed about seeking support (not grant) from internal and external bodies of the network. Dr. Amod Mani Dixit shared his experiences too in this regard. The idea of SHAKE is to work hand in hand in common issues of the region mainly on sharing knowledge and experiences, sharing resources & facilities with each other and ensuring the involvement of young scientific minds to help make the living worthy and easy.

Professionals and Researchers from UK and Nepal studied physical and social impacts of the Gorkha Earthquake 2015 and subsequent landslides

A team of professionals and researchers from UK and Nepal made an observational visit to Upper Bhote Koshi Valley, Sindhupalchok District, Central Nepal that included visit to NSET's project sites en route to the Upper Bhote Koshi area in Talakhu VDC, Nuwakot and Melamchi City, Sindhupalchok. The purpose of field visit was to observe physical and social impacts of the Gorkha Earthquake 2015 and subsequent landslides, and the landslide monitoring work currently underway. The visiting team had representations from DFID London Office, DFID Nepal Office, UN Office for Project Services (UNOPS), The Durham University and NSET.

Visit started from Kathmandu across the old city of Sankhu that was worst hit by the Gorkha Earthquake 2015. Team first observed newly reconstructed houses in Talakhu VDC Nuwakot where NSET is implementing Baliyo Ghar program, a capacity building program for post-2015 earthquake housing reconstruction funded by USAID Nepal. Team next observed a newly built school construction in Melamchi, Sindhupalchowk under NSET's School Earthquake Safety Program (SESP).

The team headed towards Upper Bhote Koshi Valley areas observing landslide monitoring sites operated under research works supported by Duharm University, UK; and also other landslide sites that were triggered by the last earthquake as well as other villages on the way to Kodari, which were impacted by the Earthquake.

The team made observations on the social and physical impacts of the earthquake, recovery efforts and progress on research initiatives undertaken towards long term earthquake and landslide risk mitigation. The observational visit held during March 3-5, 2017.

Discussion with local villagers and masons regarding safer reconstruction works in Talakhu VDC, Nuwakot

Dr. Amod Dixit briefing to DFID UK, DFID Nepal and Durham University about the NSET's School program in Melamchi, Sindhupalchowk

NSET joins IRDR Family as a New ICoE

National Society for Earthquake Technology – Nepal (NSET) has now become a new International Centre of Excellence (ICoE) to join the Integrated Research on Disaster Risk (IRDR) family. The IRDR Scientific Committee (SC), at its recent 16th meeting on November 30, 2016, convened in Sanya, China unanimously approved NSET as a new ICoE. IRDR inducted total four ICoEs this time, including the Chinese University of Hong Kong for Disaster and Medical Humanitarian Response (CCOUC) from Hong Kong, Disaster Risk and Climate Extremes from Malaysia and Spatial Decision Support for Integrated DRR from Netherlands.

Integrated Research on Disaster Risk (IRDR) is a decade-long research programme co-sponsored by the International Council for Science (ICSU), the International Social Science Council (ISSC), and the United Nations Office for Disaster Risk Reduction (UNISDR). It is a global, multi-disciplinary approach to dealing with the challenges brought by natural disasters, mitigating their impacts, and improving related policy-making mechanisms.

IRDR International Centres of Excellence (ICoEs), established through the IRDR Scientific Committee (SC) and the relevant National Committee (NC) provide regional and research foci for the IRDR programme. ICoE research programmes embody an integrated approach to Disaster Risk Reduction that directly contributes to the ICSU/IRDR.

"The SC found that the proposal for the new ICoE-NSET had outlined an appropriate plan of action; they also applauded the proposers for a well-designed consortium with partners showing clear complementarity of expertise. The SC was pleased to see links already identified to IRDR's strategic objectives and Research Working Groups and encouraged the new ICoE to continue to strengthen links between science and policy" mentions Prof. Dr. Rajib Shaw, Executive Director of IRDR in the Letter issued.

On the occasion, the International Training Workshop on Strengthening Science Capacities for Sustainable Development and Disaster Risk Reduction was organized by CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM), jointly with "Digital Belt and Road" Initiative (DBAR), Integrated Research on Disaster Risk (IRDR) International Programme Office (IPO), IRDR China National Committee (IRDR CHINA), Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences (CAS) in Sanya, China, during 27 Nov - 3 Dec, 2016.

With the view to strengthen science capacities for sustainable development and disaster risk reduction under the Digital Belt and Road Initiative, a side event of the Consultative Workshop of DBAR Regional Research Platform for DRR held in the RADI Sanya Campus on 1-2 December, 2016. The consultative workshop discussed training mechanism on DRR (e.g. training workshop), the potential needs and priorities under the DBAR-Disaster project, and the need of a regional research strategy to bridge the gap between science and policy/decision making.

Also, Dr. Amod Mani Dixit from NSET has been appointed as a Member of the DBAR Disaster Working Group for 2017-2019.

NSET, USGS jointly organize training workshop on Earthquake Engineering

With view to enhance national capacity in earthquake risk reduction in Nepal, National Society for Earthquake Technology-Nepal (NSET) and United States Geological Survey (USGS) jointly organized a training workshop on Earthquake Engineering during 19-22 September 2016 in collaboration with California Institute of Technology (CalTech) and Earthquake Safety Solutions (ESS). NSET and USGS also held a training workshop on "PSHA, Seismic Microzonation and Monitoring" during 25-27 April 2016 at the time of Gorkha Earthquake Anniversary. The USAID/OFDA provided the funding support for the program.

This training was the continuation on the previous efforts on bringing state of art knowledge on earthquake engineering and enhance the understanding on seismic hazard in the region.

Various people from different institutes, government organizations/ municipalities, professional societies including representatives from Department of Mines and Geology (DMG), Institute of Engineering (IOE), Pulchowk Campus, Khwopa Engineering College, different municipalities and professional societies participated the program. Various personalities including Dr. Susan Hough, Dr. Amod Mani Dixit, Mr. Stacey S. Martin, Prof. Henry Benjamin (Ben) Mason, Prof. Andreas Stavridis, Prof. Richard L. Wood and Mr. Gopi Krishna Basyal worked as course instructors/leaders of this training.

This training was intended to make the people able to account the effect of soil structure interaction in the design of building, determine the dynamic slope stability factor of safety (FOS) and displacement prediction of slope, understand the earthquake response of infilled framed structure, understand the basics of structural instrumentation and use the data for analysis of structure, use simplified modelling approach for infilled framed structure and understand the analysis process and visualization of the intensity data.

NSET, USGS, CalTech and ESS jointly organize training workshop on Geotechnical Earthquake Engineering

National Society for Earthquake Technology-Nepal (NSET), United States Geological Survey (USGS), California Institute of Technology (CalTech) and Earthquake Safety Solutions (ESS) has jointly organized a training workshop on Geotechnical Earthquake Engineering with Emphasis on Ground Failure Risk and Mitigation during 30 November-2 December 2016 with the funding support from USAID/OFDA. This training was the continuation on the previous efforts on bringing state of art knowledge on earthquake engineering and enhance the national capacity to broaden the understanding on the seismic hazard and risk in the region. This training workshop was an extension of training workshop on "Earthquake Engineering"

organized during 19-22 September. A training workshop on "PSHA, Seismic Microzonation and Monitoring" during 25-27 April 2016 at the time of Gorkha Earthquake Anniversary was also organized by NSET/USGS Various participants including one from Department of Urban Development (DUDBC), 6 each from six municipalities (Dharan Sub-metropolitan city, Dhangadi Sub-metropolitan city, Bhimdutta Municipality, Biratnagar Sub-metropolitan city, Butwal Sub-metropolitan city and Karyabinayak Municipality), 3 from Institute of Engineering, Pulchowk Campus, 2 from Khwopa Engineering College and remaining 15 participant represented from professional societies, professional working for different organization such as ITECO, Earthquake Safety Solutions (ESS) and NSET.The instructors were from CalTech, Oregan State University and NSET.

EERI Reconnaissance Team accomplished Gorkha Earthquake field research

A team from Earthquake Engineering Research Institute (EERI) has accomplished reconnaissance with filed visits and meetings in the affected areas of Gorkha Earthquake. EERI conducted field research in the most affected districts Gorkha, Dolakha and Sindhupalchok. EERI, dedicated to reducing earthquake risk, had dispatched a multidisciplinary reconnaissance team to perform field research in Nepal from May 31 to June 7, 2015. While in Nepal, the team had to focus its study on the impacts of the April 25, 2015 earthquake and its aftershocks.

The team assembled for the Nepal reconnaissance trip was led by Mr. Bret Lizundia, Structural Engineer and Principal at Rutherford + Chekene in San Francisco and Mr. Surya Narayan Shrestha, Deputy Executive Director and Senior Structural Engineer at the National Society for Earthquake Technology-Nepal (NSET.

Traditionally, in EERI reconnaissance efforts, professionals from earthquake engineering and disaster-response disciplines have been united under one roof. The experienced team members include Mr. Luke Allen (Registered Architect), Mr. John Bevington (Geospatial Technologist), Ms. Rachel Davidson (Professor, Civil and Environmental Engineering), Mr. Kishor Jaiswal (Licensed Professional Engineer, Loss Model Developer), Mr. Ganesh Kumar Jimee (Director, Disaster Preparedness and Emergency Response Division, NSET), Mr. Hemant Kaushik (Associate Professor, Civil Engineering, IIT, Guwahati), Mr. Hari Kumar (Civil Engineer, DRR), Mr. Jan Kupec (Geotechnical Engineer), Ms. Judy Mitrani-Reiser (Assistant Professor, Civil Engineering, Johns Hopkins University), Mr. Chris Poland (Structural Engineer), Mr. Suraj Shrestha (Sr. Engineer, Dharan Sub Metropolitan City) and Ms. Courtney Welton-Mitchell (Social Psychologist) . After visiting outlying regions, the team finished its reconnaissance with meetings and detailed observations in Nepal's capital city, Kathmandu, and the surrounding valley.

NSET in Global Earthquake Model

The Global Earthquake Model (GEM) is a initiated in 2006 by the Global Science Forum of the OECD to develop global, risk assessment software and tools. GEM drives a global collaborative effort in which science is applied to develop high-quality resources for transparent assessment of earthquake risk and to facilitate their application for risk management around the globe. With committed backing from , governments and industry, GEM contributes to achieving profound, lasting reductions in risk worldwide by following the global priorities.

Since March 2009, GEM is a legal entity in the form of a non-profit foundation based in Pavia, Italy. The GEM Secretariat is hosted at the European Centre for Training and Research in Earthquake Engineering (EUCENTRE).

NSET's Executive Director Dr. Amod Mani Dixit served as one of the members in the Science Board of GEM from 2009 – 2012. NSET now sits in the Governing Board of GEM since 2014. Earlier, Executive Director Amod Mani Dixit represented NSET in the board and now Deputy Executive Director Mr. Surya Narayan Shrestha represents NSET in the Governing Board of GEM.

GEM and NSET have jointly organized several training courses, workshops and learning events in Nepal and GEM. Also, several NSET and other Nepali professionals have attended GEM training courses in GEM Foundation Pavia;

- NSET professionals attended the GEM Hazard Workshop during March 13-16, 2017 in Pavia, Italy
- Organized a "Seminar on Global Earthquake Model (GEM) Approaches and Tools: Potential Collaboration for Nepal" on Dec 10, 2015 with DRR stakeholder, Academia of Nepal during the high level visit of GEM Delegates in Nepal.
- NSET, DMG and DUDBC professionals attended Second Annual GEM Risk Workshop and training courses during 26 Oct – 28 Nov, 2015 in Pavia, Italy
- Organized Post Gorkha Earthquake Review Scorecard Method Workshop in Lalitpur Sub-Metropolitan City during June 2015.
- NSET professionals attended the First Annual GEM Risk Workshop during 12-14 Nov, 2014 in Pavia, Italy.
- NSET and GEM organized Scorecard Method Workshop for measuring resilience of communities in Lalitpur Sub-Metropolitan City jointly with Karlsruhe University during 25-26 March, 2014 in Lalitpur, Nepal
- Mr. Surya Narayan Shrestha, Deputy Director of NSET attended 10 days long exposure and learning visit to GEM Foundation, Pavia, Italy during Dec. 2013
- NSET and GEM jointly organized GEM South Asia Meeting (GEMSAM) and GEM Technical Training (GEMTRAIN) during 1-3 March 2013 in Dhulikhel, Nepal

Chapter 12

NSET Involvement in National, Regional and Global Initiatives

In order to achieve the goal of earthquake safe communities, collaboration and networking with related organizations and disaster management practioners around the world is an important step. It simply helps to share the best practices, innovative solutions and common experiences of the other organizations involved in the field. NSET is also committed to sharing knowledge and learning with other institutions and individuals in Nepal and around the world.

Ever since the establishment, NSET has been establishing and maintaining the collaboration and networking with many national, regional and global organizations including Asian Disaster Reduction and Response Network (ADRRN), Disaster Preparedness Network (DPNet-Nepal), Coalition for Global School Safety (COGSS), International Live Lessons Transfer Network (TeLLNet), International Association for Earthquake Engineering (IAEE) and World Seismic Safety Initiative (WSSI). It has also been participating and contributing to the various national regional and global meetings, workshops and similar initiatives.

NSET participates in third UN WCDRR, hosts three side events

With view to share experiences from Nepal on risk reduction and preparedness efforts, NSET participated in the third World Conference on Disaster Risk Reduction (WCDRR) held in Sendai, Japan during 14-18 March 2015.

The global World Conference on Disaster Risk Reduction (WCDRR) is a mega gathering of governments, UN organizations, bi-lateral and multilateral organizations, professional societies and civil society organizations from around the world to review the achievements of past and frame the path of Disaster Risk Reduction for future. This was the third WCDRR and earlier two episodes were organized in 1994 in Yokohama Japan and in 2005 in Hyogo Japan. Approximately 6,500 delegates including 187 states, 25 Heads of States and Governments and 100 ministerial-level delegates and other senior leaders representing governments, NGOs and private sector attended the 3rd WCDRR. This WCDRR adopted Sendai Framework for Disaster Risk Reduction 2015-2030, the successor to the Hyogo Framework for Action 2005-2015.

Specifically, the conference was aimed at carrying out assessment and review of the implementation of the Hyogo Framework for Action; reflecting the experience gained through the regional and national strategies/institutions and plans for disaster risk reduction and their recommendations as well as relevant regional agreements within the implementation of the Hyogo Framework for Action; adopting a post-2015 framework for disaster risk reduction; identifying modalities of cooperation based on commitments to implement a post-2015 framework for disaster risk reduction; and determining modalities to periodically review the implementation of a post-2015 framework for disaster risk reduction. In addition to intergovernmental negotiations on the details of the successor agreement, the conference included ministerial roundtables, high-level multi-stakeholder partnership dialogues, working sessions and many other events

organized in and around the conference venue at the Sendai International Centre. Intense discussions ended in the adoption of the Sendai Framework for Disaster Risk Reduction 2015-2030 in a closing plenary.

NSET organized the participation of 16 Nepali professionals, 8 from government departments and municipalities and 8 from NSET. NSET hosted three side events, namely, on Building Code Enforcement in Developing Countries and Promote Mutual Experiential Learning, School Earthquake Safety and Public Private Partnership in Disaster Risk Management during the conference.

During the session on Building code enforcement, the issue of building code enforcement in developing countries was extensively discussed. It also debated various concerns including why are buildings continually to be constructed badly despite countries having have good building codes?, what should be the strategy: "Build Back Better" or "Build Better Now"?, what could work in developing countries: Building Code Enforcement or Building Code Compliance?, what should be the objective of Building Code implementation - revenue generation or safety assurance, or both?, who is responsible and who is accountable for building code implementation?, how to ensure code compliance of non-engineered buildings, especially in developing countries?, how to make the knowledge effectively trickle down to ensure skills of safer construction at the grass roots?, how to secure investments on housing/building?, how to increase involvement of banking / insurance sector to promote safer building construction?

The session, moderated by NSET's Deputy Executive Director Mr. Surya Narayan Shrestha, was participated by various national and international panelists including Mr. Shiva Hari Sharma, Deputy Director General, Department of Urban Development and Building Construction (DUDBC), Government of Nepal, Mr. Michael Ernst, Regional Advisor, U.S. Office of Foreign Disaster Assistance (USAID/OFDA) Regional Office for Asia-Pacific, Bangkok, Thailand, Dr. Carlos Villacis, Regional Project Manager and Strategy Coordinator, Global Earthquake Model (GEM) Foundation, Professor Soichi Ando (Dr., Engineer, Architect), Director, Disaster Management (DM/DMP) Program, National Graduate Institute for Policy Studies (GRIPS), Tokyo, Japan, Dr. Fouad Bendimerad, President, Earthquakes and Megacities Initiative (EMI), Mr. Narayan Prasad Sapkota, Mayor and Executive Officer, Bharatpur Sub-Metropolitan City, Nepal .

NSET Executive Director, Dr. Amod Mani Dixit presenting at the 3rd WCDRR

The another side event hosted by NSET at the conference was a panel discussion on School Earthquake Safety. In the context of low level awareness among teachers, students, parents and other stakeholders about the vulnerable conditions schools in developing countries due to numerous natural hazards, this session provided an opportunity to bring multiple ideas on and discuss the issues of School Safety and mutually learn from the similar initiatives in the developing countries.

As many countries have put the school disaster safety issues in high priority, Nepal has also made great strides in developing concepts and methodologies on School Earthquake Safety by combining physical vulnerability reducing and enhancing school disaster risk management planning. Such efforts of structural, non-structural, and functional vulnerability reduction have, either comprehensively or at least in one of the three components, been successfully implemented in about 500 public schools in Nepal. The session, moderated by NSET's , Deputy Executive Director Dr. Ramesh Guragain, was participated by various panelists including Mr. Jhapper Singh Vishokarma, Senior Divisional Engineer, Department of Education, Nepal, Mr. Iwan Gunawan, World Bank, Indonesia, Mr. Hari Kumar, Geo Hazards International, Mr. Nick Ireland, Save the Children and Professor Kimiro Meguro, The University of Tokyo.

Another side event at WCDRR that hosted by NSET was a panel discussion on Public Private Partnership for Disaster Risk Management (DRM). Private sector is the largest contributor to the national economy of any country, it also can play a major role in disaster preparedness, planning, recovery, and post disaster reconstruction and rehabilitation. The session extensively discussed on various aspects of PPP on DRM such as How do businesses perceive Business Continuity Planning in developing countries?, How can a business plan to successfully bounce-back after a disaster?, How can PPP be incorporated within a sustainable business model in developing countries?, How to accelerate involvement of private sector on DRM?, What are the other measures of success for a business besides profit?, Is it a cost or a value in term of investment on DRR?, is it just a social responsibility or is it a business opportunity in terms of DRM for private sector?, How can we successfully tie-up the strategic DRM needs and sustainable CSR values of a company?, Is PPP for DRM a charity or can it be a profitable business ? Can disaster risk management prove to be a creative business opportunity for companies?

In the session, various panelists including Mr. William S. Berger, Principal Regional Advisor, U.S. Office of Foreign Disaster Assistance (USAID/OFDA), Regional Office for Asia-Pacific, Bangkok, Thailand, Mr. Loy Rego, Advisor, Global Disaster Preparedness Center, American Red Cross, Washington, D.C., U.S., Professor Kimiro Meguro, The University of Tokyo, Japan, and Mr. Iwan Gunawan, The World Bank participated. The session was moderated by Dr. Amod Mani Dixit, Executive Director, and NSET.

Nepal Booth at 3rd WCDRR

Nepal had a booth at 3rd WCDRR to showcase Nepal's efforts on DRR. On behalf of Government of Nepal, NSET, Eco-Nepal and Nepali DRR Stakeholders had managed a Exhibition Booth where very good number of visitors keenly attended to learn about DRR efforts in Nepal.

Nepali Deligation members at Booth managed by GoN, NSET, Eco-Nepal and DRR stakeholders during 3rd WCDRR

NSET jointly organizes 14th international symposium on new technologies for Urban Safety of Mega Cities in Asia (USMCA2015)

With the overall objective of sharing experiences on urban disaster safety and environmental management among the researchers, academics, scientists, and other stakeholders, National Society for Earthquake Technology-Nepal (NSET) jointly organized the 14th "International Symposium on New Technologies for Urban Safety of Mega Cities in Asia" (USMCA2015) in Kathmandu. The internationally acclaimed symposium was observed thru 29 – 31 October, 2015 at Radisson Hotel in Kathmandu. The co-organizer of the event were International Centre for Urban Safety Engineering (ICUS), Institute of Industrial Science (IIS), the University of Tokyo (UTokyo), Japan.

Over half of the world•'27s population is concentrated in urban areas. Over the last 50 years, Asia has become home to more megacities than any other continent in the world. A megacity refers to a metropolitan area with a total population in excess of ten million people and are characterized by a high population density, an increasing susceptibility to lack of safe drinking water and adequate sanitation. Urban safety and environmental management are challenges for any country in the world today. In this context, the USMCA is an international event where scientists, researchers, academics and politicians from governments, universities, institutions and societies are engaging together to find new solutions to face these challenging global issues.

Considering the high risk of different disasters in Nepal as well as continuous efforts of different organizations to reduce the risk, Nepal was selected to organize the 14th conference. After the Gorkha Earthquake in Nepal, relevance of this symposium has increased further.

USMCA is a regular yearly event being organized in Asia seeking to bring together expertise in urban infrastructure design, construction and urban maintenance, with researchers and practitioners engaged in the development of new environmental management technologies. This symposium provides a forum for decision makers and researchers to share expertise on urban infrastructure and new technologies for environmental management and disaster reduction and recovery.

The conference had an extensive participation of around 250 scientists, researchers, practitioners, professionals and other DRR stakeholders from 8 different countries within the continent. The symposium focused on various facets of urban disaster safety including Disaster Risk Management, Urban Planning, Environmental Safety as well as lessons learnt from the recent Gorkha Earthquake 2015.Under Urban Safety and Disaster Mitigation, various issues including Risk assessment, Disaster mitigation and urban planning, Early warning, Emergency response, Disaster management, Recovery and rehabilitation planning, School disaster safety and Building code implementation were

discussed. Likewise, under the Infrastructure Management theme, the issues of life cycle and stock management, construction materials and technology and maintenance and sustainability were discussed while issues of climate change, water resources, biodiversity, transportation and GIS and remote sensing covered under the Environment Informatics theme. In the symposium, a special session was also held on Gorkha Earthquake theme.

A total of seven keynote presentations and 80 scientifically researched papers were presented during the parallel sessions tightly scheduled within the 3 days long intensive discourse. In addition, three nationals and one international young scientists were awarded 'Excellent Young Researcher Award' for their papers presented in USMCA 2015.

The symposium was inaugurated by Minister of Industry Mr. Som Prasad Pandey. Mr. Pandey reinforced the safer reconstruction commitments of the government to build back better during his inaugural remarks. Various personalities including Mr. Gangalal Tuladhar, Member of Parliament and former Education Minister, Mr. Masashi Ogawa, Ambassador of Japan to Nepal, Mr. Hiroyasu Tonokawa, Senior Representative, JICA Nepal , Prof. Kimiro Meguro - Director of ICUS, IIS, The University of Tokyo, Japan and Dr. Amod Mani Dixit, Executive Director of NSET, Nepal addressed the inaugural session of the event.

16th World Conference on Earthquake Engineering (WCEE) features three papers presentations from NSET

NSET attended and made three paper presentations at the 16th World Conference on Earthquake Engineering (16WCEE) held in Santiago, Chile during January 9-13, 2017. The conference was a mega event encompassing all about the newest developments in Earthquake Engineering and Earthquake Risk Management.

Dr. Amod Mani Dixit, Executive Director of NSET attended the General Assembly of IAEE as a National Delegate, and Deputy Executive Directors Mr. Surya Narayan Shrestha and Dr. Ramesh Guragain also attended the 16 WCEE. Dr. Amod Mani Dixit, made an oral presentation during the special session on Future Risk of Cities of the paper titled, " Changing Risk Perception of People: A Key for Enhancing Building Code Compliance". Mr. Surya Narayan Shrestha made a presentation on "Lessons from Response Activities during April 25, 2015 Gorkha earthquake, Nepal." Similarly, Dr. Ramesh Guragain also made a presentation under the title, " Building Damage Patterns of Non-engineered Masonry and Reinforced Concrete Buildings during April 25 2015 Gorkha Earthquake in Nepal."

The conference was organized with the objective of bringing together researchers, civil engineers, structural engineers, seismologists and geotechnical engineers, both from the academic world and from the professional practices around the world; who are interested in exploring all the topics related to Earthquake Engineering and more. NSET has been participating in the World Conference on Earthquake Engineering since WCEE Acapulco, Mexico in 1996.

In addition, a paper on Building Code Enforcement was also presented which was jointly written by Dharan Sub-Metropolitan City, Vyas Municipality, Bharatpur Sub-Metropolitan City, Dhangadhi Sub-Metropolitan City and NSET. All the papers and presentations reflected the unique work done in Nepal. The conference which hosted more than 3000 attendees, was featured thousands of papers from around the globe, both in oral and poster presentations, keynote lectures, invited lectures and debates.

The World Conference on Earthquake Engineering is global conference organized by the International Association of Earthquake Engineering (IAEE). The conference is a mega event encompassing all about the newest developments in Earthquake Engineering and Earthquake Risk Management. The conference cover areas like Engineering seismology, Tsunamis, Geotechnical earthquake engineering, Design of new structures, Assessment and retrofitting of existing structures, Infrastructures and lifeline systems, Social and economic aspects, Preparedness and emergency management of large earthquakes, Urban risk assessment.

The Journey from Views from the Frontline to the Frontline

Global Network of Civil Society Organisations for Disaster Reduction (GNDR) has been leading the monitoring/review of the process on implementation of HFA at local level since 2009 with the direction of UN-ISDR. GNDR implemented VFL in 2009, 2011, 2013, AFL in 2013 and Frontline 2015 for this purpose.

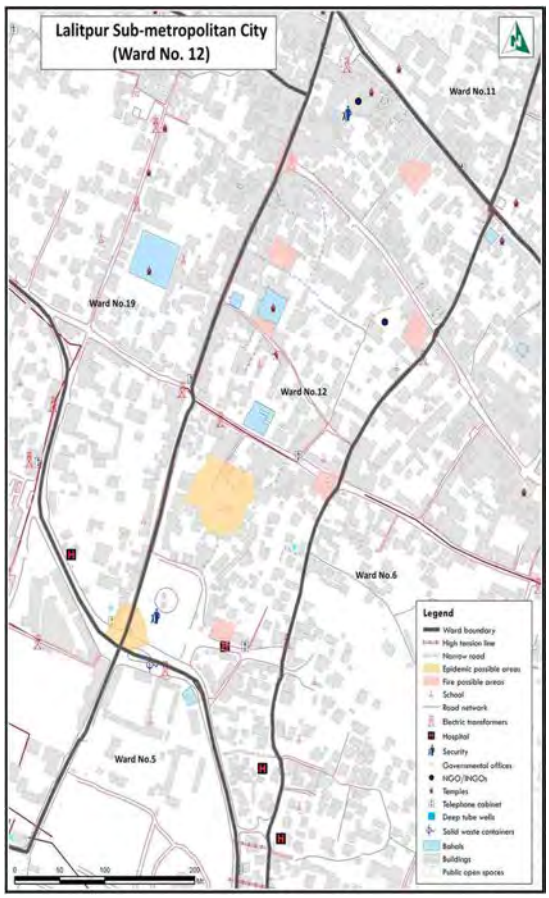
The 'Views from the Frontline' (VFL) project, initiated in 2009, has been highly effective to review the progress on implementation of HFA where the presentation of views from respondents from 69 countries in 2011 made a major impact at the UN 'Global Platform for Disaster Risk Reduction', and at the local level, where dialogue, collaboration and action have been promoted. VFL 2013 aimed to prepare the way for a HFA Post -2015 discussion.

VFL 2009 and 2011 highlighted the role of local action and learning as being at the heart of community resilience, and members have called for VFL to support implementation based on this. As a result VFL 2013 focused on Action and Learning. It was the cycle of reflection, learning and action which enabled communities to become active participants in building community resilience. VFL 2013 had two stages, Survey and Consultation activities like those which have been conducted in VFL 2009 and 2011 and a new Action and Learning stage which builds on the local level information gathered in the survey and consultation stage and supports practical implementation at the local level. Action at the Frontline (AFL, 2014) was designed to strengthen local capacities for learning and action in the face of everyday disasters; building community resilience. And in 2015, Frontline was launched as the successor to Views from the Frontline

NSET served as the Regional Coordinating Organization (RCO) for South/South East Asia for the implementation of VFL program during (2009, 2013) and as the National Coordinating Organization (NCO) for Nepal to implement the VFL 2009-2013, AFL 2014 and now the Frontline (2015).

Action at the Frontline

Action at the Frontline (AFL) aimed to strengthening local capacities for learning and action in the face of everyday disasters; building community resilience. With the support from GNDR, NSET implemented AFL project in Nepal in 2014 in partnership with Ward No. 12 Disaster Risk Management Committee, Lalitpur Sub Metropolitan City.



AFL was built on previous Views from the Frontline (VFL) programs which were a participatory action-research project undertaken by civil society actors in conjunction with government bodies and local communities. VFL was aimed at measuring progress towards the implementation of the Hyogo Framework for Action (HFA) at the local level across developing countries and regions, while AFL focused on facilitating processes where local communities understand risks and root causes and strengthen their ability to address these through regular reflection and by working in partnership with others.

Major tasks accomplished

- Focused Group Meetings with DMC and Community frontliners
- Workshop on "Community Level Disaster Risk Management"
- Risk profiling
  - Earthquakes, Fire, Epidemics are major threats
- Fire Response Training focusing to housewives
- IEC materials produced and disseminated

Major challenges

- Revitalising community level volunteerism in sustained ways is critical
- Local activities are more influenced with local dynamics rather than program schedules

Key lessons

- Community resilience is only possible through community involvement.
- Listen community people, they will listen you.
- Addressing everyday disasters is important entry point to building community resilience.
- DRR should be included in the menu of various social discourses and lives.

Consultative meetings held

With view to interact and gather ideas for Disaster Management Committee (DMC) to develop plan of action that should fit in Ward level periodic plan and many specific programs such as AFL, a community level consultative meetings held on Nov 14-15, 2014 with community people separately at Chakrabahil, Prayagpokhari, Hakha and Tangal locations of Lalitpur-12.

Community people and representatives of Tole/Lane Organizations, Mothers' Group and also school teachers and students took part in identifying local priorities for resilience.

The meeting identified that Knowledge and skills on fire safety as key elements to integrate in planning focusing to household women and people working in their workshops. Enhancing local capacity on emergency response is another key element highlighted. Community people pointed out to place safety messages in public places and mobilize community volunteers for propagating simple ideas on risk identification and mitigation measures. School in the community also expressed its willingness to work together with community on this cause.

Frontliners review Disaster Risk Management Plan and Program

Group works, Workshop on Community Level Disaster Management (AFI/Nepal)/ NSET

Community frontlines from Ward No.12 of Lalitpur Sub Metropolitan City intensively worked on finding ways to identify and tackle local risks. The participants from the Community, Local Government, Red Cross, NSET and other partners reviewed existing Disaster Risk Management Plan and Programs and also brainstormed on how they can revitalize the community level efforts in more organized ways. Nearly 40 participants executed group works in a half day workshop on "Community Level Disaster Risk Management" organized by Disaster Risk Management Committee (DMC) of LSMC-12 with the support from NSET under GNDR Action at the Frontline (AFL). The participants included the DMC members, team leaders of different sub committees namely First Aid, Search and Rescue, Fire Fighting, Mason, Vulnerability Assessment teams and also representatives from Municipality, Nepal Red Cross Society, NSET and other partners. Program outcomes were shared with the community frontliners for further consultations and feedback.

Fire Response Training To Reduce Fire Risk

With view to provide basics of fire safety and also acquired hands-on skills on responding to fire disasters, namely how to use bucket brigade method at the locality and also operating fire extinguishers., 'Community Fire Response Training' was conducted in Lalitpur-12 on April 13, 2015 for the community participants from Tangal and Prayag Pokhari areas of the ward.

There were 28 people took part in the training among them 16 female and 12 male.

A half day program was jointly organized by Disaster Risk Management Committee (DRMC) of Lalitpur-12 and National Society for Earthquake Technology-Nepal (NSET) with the support of Global Network of Civil Society Organization for Dias aster Reduction (GNDR) under the "Action at the Frontline (AFL)" process.

Women of LMC-12 participate in a fire response training

Frontline

The Frontline program builds on the findings from VFL, and analyses in more detail the Threats, Consequences, Actions and Barriers of disasters in particular everyday disasters, and resilience. Local impact is a critical measure of progress in the framework being established in 2015 and beyond. A vital component of assessing this is Local knowledge of the many threats that affect communities. Frontline will establish baselines during 2015 to 2017 as a basis for ongoing monitoring during the currency of these frameworks.

Frontline is a global initiative, working at a local level to collect community perceptions of disasters and risk, to measure threats, local capacities and underlying development factors, bringing local knowledge to national, regional and global actors. This three year research based advocacy program is implemented by NSET for Nepal.

Frontline in Nepal

Frontline is based on local risk profiling which identifies the range, impact and frequency of risks faced by local groups. Profiling takes account of the perspectives of different stakeholders including old/young, female/male and particular indigenous groups. Frontline strengthens local engagement by placing an emphasis on communicating with local groups to explain the relevance of the program.

Frontline identifies risks, its magnitude, impact, and frequency through local risk profiling done in qualitative surveys. The survey is simple and is designed to support local action and learning by allowing people in the community to describe their realities in their own terms. It looks at the point-of-views of different stakeholders regardless of age, gender, and ethnic background.

The main objectives of the Frontline program are as follows:

- Enable Civil Society Organizations (CSOs) and local communities to work together on strengthening local capacity and leadership to build resilience.
- Enable CSO and local communities to learn and share with each other on actions, strategies and innovations to strengthen local capacity to address threats and to build resilience.
- Enable CSOs and local communities to create political space to inform and influence local, national, and global institutions on policies and practices that affect stakeholders' resilience, security, wellbeing, and dignity

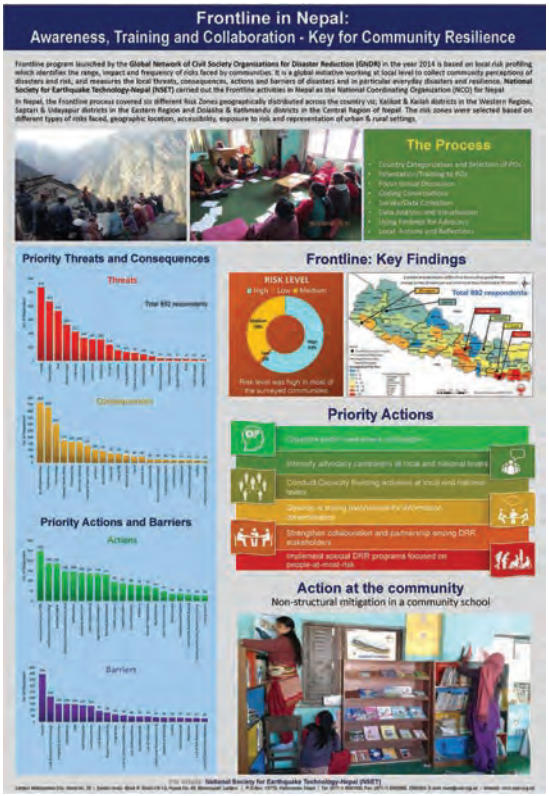
Frontline Process

- Country Categorization and Selection of POs
- Orientation/Training to the POs
- Focus Group Discussion
- Coding Conversations
- Survey/Data Collection
- Data Analysis and Visualisation
- Using the Findings for Advocacy
- Local Actions

Risk Zones and Participating Organizations (POs)

The Frontline process covered six different Risk Zones geographically distributed across the country viz, Kalikot and Kailali districts in the Western Region of Nepal, Saptari and Udayapur district in the Eastern Region and Dolakha and Kathmandu district in the Central Region of Nepal. The risk zones were selected based on the different types of risks faced, geographic location, accessibility, exposure to risk, urban vs. rural realities. 6 different Participating Organizations (POs) working in the selected communities were identified and partnered with to implement the Frontline activities.

A total of 892 surveys were administered across the 6 Risk zones in Nepal. The survey respondents indicated that the key local actions for reducing the risks has to be Awareness Raising on DRR, Construction of Earthquake Resistant Buildings, Reforestation and Poverty Reduction. Poverty and Lack of Access to Technology was identified as the major barrier to implement the above mentioned actions by majority of the respondents.



Participating Organizations

- Forum for Awareness and Youth Activity (FAYA), Dhangadi municipality, Kailali
- Karnali Integrated Rural Development and Research Centre (KIRDARC), Kalikot
- Human Rights Awareness and Development Center (HURADEC), Dolakha
- Nava Prabhat Nepal, Triyuga Municipality, Udayapur
- Koshi Victim's Society (KVS), Saptari
- Thankot Mahila Bachat Tatha Rin Sahakari Sanstha Limited, Chandragiri Municipality, Kathmandu

Community members participating at an earthquake orientation in Kalikot

Caption

Enhancing Resilience of Communities: An Action by Women's Group in Nepal

Women group of Chandragiri Municipality in Kathmandu, Nepal implemented their learning to their own houses to reduce non-structural vulnerability. They started the non-structural mitigation with their own kitchen and bedroom by fastening their cupboard, Photo frames, refrigerator, gas cylinders etc. Prior to this implementation, they had gone through a hands-on training session on Non-Structural Mitigation conducted by NSET in 2012. President of Thankot Mahila Jagaran, Mrs. Bindu Shrestha, elicit the identified four risk in the communities of Thankot. She said, we implemented NSM in 9 schools of our municipality. We were trained on NSM through NSET, and Lumanti supported us to link with the school. She remembered those days; we had skills, we had contacts but we didn't have adequate equipment for carrying out NSM. Meanwhile, frontline program supported us by giving drill machine and we had started the mitigation measures in the schools. Now, the process and activities is going on in various parts of the Kathmandu Valley to mitigate the risk.

National Advocacy Workshop for Disaster Risk Reduction in Nepal

The National Advocacy Workshop for DRR at local level was organized in Nepal on May 11, 2017 by National Society for Earthquake Technology-Nepal (NSET) with support from Global Network of Civil Society Organization for Disaster Risk Reduction (GNDR). Total 30 participants from community based organizations and various stakeholders shared and discussed on lessons and experiences of DRR actions at community level and also worked on Draft Advocacy Initiative Plan for 6 communities based on findings of surveys conducted in those areas under Frontline program. In the program, Dr. Amod Mani Dixit from NSET stated that, all these global strategies and their transformations are spearheading towards building community resilience as to fit in broader frame of DRR" Mr. Rouf Mohammad Abdur, GNDR Regional Development Coordinator for Asia & Pacific explained briefly on GNDR current efforts and also on roles and contributions local and national organizations are to take and make in strengthening global CSOs initiatives.

Glimpse of the Workshop

Mr. Surya Narayan Shrestha from NSET addressing National Advocacy Workshop, 2017; Kathmandu, Nepal (Photo: NSET)

Earthquake Resistant Elements identified in Nepali Vernacular Buildings

The Nepali vernacular buildings made of clay, brick, timber and stone are found earthquake resistant in general with the incorporation of various earthquake resistant elements and technologies as they have withstood the past earthquakes. However, not all the buildings, elements and technologies are equally earthquake resistant. Study by NSET in association with ADRRN has captured and analyzed the integration of earthquake safety concepts and considerations in traditional construction practices in Nepal. Study has shown that some practices are good enough to be adopted and some require adaptation by strengthening and some have to be eliminated as they are no more earthquake resistant.

Traditional knowledge and skills are built to cope and withstand the vagaries of nature over the years and have evolved with time. These are valuable assets which contains deep insights. However, much of this traditional wisdom is gradually fading out due to various reasons. One of the major reasons is that its existence is largely in tacit form and not properly documented. The advancement of science and modern technology has also overshadowed it. With the pace of time people failed to understand the logic behind it. So most of the indigenous knowledge and wisdom has remained either as rituals or confined in a small area. Those ideas are still valid today in building the disaster resilient communities. Hence, there is a need to explore and recognize the importance of local innovative practices in disaster risk reduction and validate this through modern scientific knowledge.

Realizing this need, Asian Disaster Risk Reduction Network (ADRRN), a network of organizations in Asia is promoting grassroots innovations by combining knowledge and local wisdom of different countries under its strategic objective to reduce the gap between knowledge and practice by demystifying scientific approaches as well as identifying and promoting traditional knowledge.

NSET carried out the study called 'Traditional Wisdom of Earthquake Resistant Building Construction in Nepal' under the campaign "Promoting Grassroots Innovations by combining scientific knowledge and local wisdom" conducted by ADRRN.

The objective of the study was to trace and share traditional wisdom and indigenous practice of Nepal for disaster preparedness particularly on Earthquake Resistant Building Construction Practices.

Identification of indigenous knowledge and wisdom in building construction practice comprises mainly exploring the old settlements and old buildings which are believed to have experienced the earthquake of 1934 or approximately 100 years old. Building typologies such as stone masonry, brick masonry, timber frame and geographical coverage from east to west and from Himal to Terai were considered during the study.

A series of consultation and interactions with various people organized to explore the earthquake resistant building practices.

Altogether 49 household were surveyed covering 8 districts including 3 of Kathmandu Valley. Among them, 3 were the temples, 2 Buddhist Monasteries and the rest were residential buildings.

Geographical distribution of surveyed buildings

S. No	District	Areas	Total	Remarks
1	Solukhumbu	Salleri, Junbeshi	8	
2	Sankhuwashava	Khandbari, Chainpur	4	
3	Kathmandu Valley	Kathmandu, Lalitpur, Bhaktapur	21	
4	Kavrepalanchowk	Panauti	4	
5	Makawanpur	Chitang, Palung, Bhimphedi	8	
6	Humla	Rodikot, Simikot	4	
		Total	49	

The architecture and planning of building the Kathmandu Valley has evolved over the years to suit the various local conditions of the valley. Development of building technologies in the valley was guided not only by a coping strategy for disaster and socio-cultural beliefs and values, but also influenced by climatic condition, availability of local materials and skills. Slope roofs with large overhangs were mainly to protect the wall and mud mortar from the heavy rain. Similarly, an extensive use of mud in various forms of the building materials such as roofing tile, flooring tile, brick for wall and timber in flooring and roofing structure reveals the fact of abundance of these local materials. Hence all the elements and technology incorporated in the building was a result of combination of all these realities.

The various factors including the structural condition of the buildings call for a comprehensive revision in traditional buildings from earthquake point of view. In order to use the traditional methods keeping earthquake resistant aspect intact, certain innovations would have to be introduced. Emphasis would therefore be laid on a whole range of measures which will keep future maintenance down to the minimum and at the same time ensure that the buildings last for a considerable period. These innovations include better roofing, stronger foundations; moisture barriers and efficient timber treatment against rot, fungi and insects.

It is clear that there are certain technologies in traditional buildings which can be adopted and replicated, some needs adaptation by strengthening and those which has remained just as rituals can be discarded as they have no relevancy from earthquake resistant perspective. Since technological practices and aspects have always been associated with economic and socio-cultural practices and very crucial for recovery, the earthquake resistant cultural beliefs and practices as well as the technological practices in the traditional buildings need to be viewed together.

NSET, ETH and IIT to jointly work for the resilience of Civil Infrastructures in Nepal

The Swiss Federal Institute of Technology (ETH) Zurich, the Indian Institute of Technology (IIT) Bombay, National Society for Earthquake Technology-Nepal (NSET) and the Institute for Social and Environmental Transition-Nepal (ISET-N) have agreed to conduct a collective efforts on disaster relief, recovery, planning and preparing for future events. After a scientific conference 'Safe Infrastructures for Resilient Communities in Nepal', the partnering institutes have committed to intensify coordination so that the civil infrastructure systems of Kathmandu and Nepal will be more resilient to future earthquakes.

Mr. Sushil Gyawali, then Chief Executive Officer of National Reconstruction Authority (NRA) opined in his inaugural remarks that the country is leading towards rebuilding safer and better settlements as guided by Recovery Framework that well covers housing as well as infrastructures. Mr. Gyawali emphasized on the need to translate the learning of last earthquake to better tackle future shocks.

The conference was jointly organized by ETH Zurich, IIT, NSET and ISET-N with funding support from CODEV on 23rd and 24th Oct, 2016 to present the findings of an 18-month long project conducted to gather the data on and

quantify the resilience of civil infrastructure systems in Kathmandu during and after the 2015 Gorkha earthquake. The conference has emphasized, 'Civil Infrastructure systems are the backbones of modern societies and their resilience is key for safe communities. Participating professionals, scientists and experts from different domains, covering a large expertise in the functioning of multiple civil infrastructure systems intensively engaged in this scientific discourse.

The project was focused on the electrical power supply, water distribution and telecommunication infrastructure systems as well as on residential building inventory where the newly developed Re-CoDes framework was used to model the evolution of the supply and demand in those systems.

ADRRN Innovation Workshop held at NSET

With view to document the innovations made by NSET and to discuss the prevailing issues that need innovative approach to address and their solutions, Asian Disaster Reduction and Response Network (ADRRN) in association with National Society for Earthquake Technology- Nepal (NSET) organized the workshop on March 24, 2017 at NSET. One-Day Workshop set to explore and understand the ideas and ways for building in innovation in plan, program and practices of disaster risk reduction.

Participants at innovation workshop

A total of 30 participants from Nepal, India and Japan participated in the process. Ms. Ikue Uchida, Mr. Jun Matsumoto and Mr. Takeshi Komino served as resource persons from ADRRN and other participants from SEEDS-India and NSET's key staff from each divisions and programs as well as team of communication contributed to the workshop.

On the occasion, Mr. Takeshi Komino of ADDRN Tokyo Innovation Hub (ATIH) opined NSET is where science meets practice and, hence, serves as the best place to apply innovative approaches through its program. In the day-long workshop participants raised several issues such as the requirement of appropriate technology required to preserve the traditional heritage, a need of good network of professional responders as well as implementation of effective awareness in the context of aftermath of Gorkha Earthquake 2015.

Global Platform for Disaster Risk Reduction (GPDRR)

The Global Platform for Disaster Risk Reduction (Global Platform), as recognized by the UN General Assembly, is the main forum at the global level for strategic advice, coordination, partnership development and the review of progress in the implementation of international instruments on disaster risk reduction. It was established in 2006 and is now the world's foremost gathering of stakeholders committed to reducing disaster risk and building the resilience of communities and nations. The Global Platform holds biennial sessions. To date, there have been five, in 2007, 2009, 2011 and 2013 held in Geneva, and the recent 2017held in Cancun, Mexico.

NSET's participation in GPDRR

Mr. Surya Narayan Shrestha, Deputy Executive Director of NSET and Ms. Nisha Shrestha, Program Analyst participated in the GPDRR 2017 held in Cancun, Mexico during 22-27 May 2017.

Apart from participating in the formal sessions of the GPDRR and other side meetings, NSET professionals' key role were in the following specific sessions;

- Mr. Surya N Shrestha, presented progress report on the 17th Scientific Committee Meeting organized by Integrated Research on Disaster Risk (IRDR). NSET is one of the International Center of Excellence (ICOE) in IRDR; NSET is assisting in the development of Science and Technology Policy/Plan for DRM in Nepal.
- Mr. Surya N Shrestha was the Key note speaker at Session on Post Disaster Reconstruction.
- Mr. Surya N Shrestha was one of the Panelist in the session Promoting Safer Buildings, schools and hospitals organized by Overseas Development Institute(ODI), the Mexican Institute of Social Security and Save the Children

Mr. Surya Narayan Shrestha from NSET participating as a speaker at the biennial sessions on Post Disaster Reconstruction at GPDRR 2017

Ms. Nisha Shrestha from NSET briefing participants about Frontline in Nepal during biennial sessions at GPDRR 2017

- Frontline Session: Ms. Nisha Shrestha, presented poster on Key findings of Frontline Program in Nepal. NSET is serving as the National Coordinating Organization(NCO) for implementing the Frontline program in Nepal
- Ms. Nisha Shrestha, attended meeting with GNDR Executive Committee, GNDR Members from different countries
- Ms. Shrestha represented Nepal at the GNDR booth organized at the Market Place

ADRRN launched Resilience Guide for Local Leaders

With view to empower local leaders to be at the centre of achieving the 2030 sustainable development agenda, a resilience guide/ training program on building resilience to local leaders has been launched on 21 March, 2017 from Dolakha, one of the districts severely devesteted by the 2015 Gorkha Earthquake.

Over 50 participants including government officials, representatives, NGOs, INGOs, media and the private sector came together for the launch. The program, hosted National Society for Earthquake Technology (NSET)-Nepal, was developed by the Asian Disaster Reduction and Response Network (ADRRN).

The five global frameworks--Sustainable Development Goals, the Sendai Framework for DRR, the Paris Agreement on Climate Change, the Agenda for Humanity and the New Urban Agenda--that came up in 2015 have emphasised the role that local stakeholders to play in community resilience.

In this context, this training programme is expected to look at putting all the frameworks together through a resilience lens of six main themes and 21 core areas. These directly align to work being done on the ground. It is also expected to help in planning, in sorting out challenges, in doing mid-term course correction and in assessing the impact of work. It is structured in a way that can be useful to local NGOs, private sector organisation and government officials across the world.

Speaking at the program, Dr. Amod Dixit, Executive Director of National Society for Earthquake Technology (NSET), highlighted the significance of launching the programme from Dolkha, among those who have survived the devastating earthquake. “This is the place that has suffered. There are many challenges, but also many opportunities that are being taken by local leaders.”

Chapter 13

Monitoring, Evaluation and Learning at NSET

Realizing the importance of systematic monitoring, evaluation and learning procedures and standards in all programs and activities, NSET has established a Monitoring and Evaluation (M&E) Unit in the year 2014. The main aim of the NSET M&E Unit is to establish a common structure and standards that govern the application of effective and timely monitoring, evaluation and learning.

The unit is working towards offering integrated monitoring and evaluation solutions from project design through to implementation and closedown. M&E systems established will analyze performance and whether targets have been achieved, ensuring the five core standards of 'relevance', 'effectiveness', 'efficiency', 'impact' and 'sustainability'.

Purpose of M&E

M&E at NSET has emerged with the objectives of

Monitoring the progress

To know whether the intended results are being achieved as planned, what corrective action may be needed to ensure delivery of the intended results, and whether initiatives are making positive contributions or not.

Learning and improvement

M&E will help to understand why, and the extent to which, intended results are achieved or not achieved, and to understand their impacts. It is an important process for change through the provision of useful feedback and a commitment to act on that feedback, thereby driving organizational learning.

Accountability

M&E plays a crucial role in accountability. M&E process will enhance the credibility of NSET in the eyes of clients, donors, partners and people. NSET is answerable to its partners, donors and people on whether its policies, programs and projects are having the intended results. NSET also needs to demonstrate that resources are used efficiently and effectively. The M&E process, together with the required documentation that accompanies it, holds NSET staff and its other partners responsible for their performance.

Evidence-based Management

The results of M&E will be an important input to the decision-making process within NSET and will affect a range of management processes, including risk and performance management and decisions to change, expand or contract programs.

Main areas of work under M&E

- Standard setting and implementation
- Preparation of program specific M&E plan , developing a framework of results and impacts and associated indicators.
- Baseline surveys, data collection and analysis
- Ensure quality of data collected/ generated by following Data Quality Assurance Guidelines of NSET
- Periodic Assessment and Evaluation
- Reporting on the status, quality and synthesis of evaluations and their findings
- Supporting the development of capacity for M&E through training, coaching and mentoring
- Establish a feedback loop by providing and receiving feedback to and from all stakeholders, concerned and follow-up
- Incorporation of Gender Equality and Social Inclusion (GESI) indicators throughout the development and implementation of M&E plan

Building Code Compliance Survey in the municipalities

In order to measure the change in the design and in the building construction practices and to measure the current level of building code compliance in the municipalities, Building Code Compliance Survey has been conducted in the municipalities where building code implementation is underway with support from NSET's BCIPN program.

This survey is intended to help policy-makers and practitioners in developing an effective plan to increase the rate of building code compliance. The survey was done following the checklist for Building code compliance with a scoring system based on the three main constituents of earthquake resistant buildings configuration, ductility and strength.

Accomplishments So far

A Preparation of Comprehensive M&E Plan of BCIPN Program, Baliyo Ghar Program and PEER Program

i) M&E Activities under BCIPN

- Baseline Survey on Earthquake Risk Perception
- Baseline Survey on Status of Municipalities for Building Code Implementation
- Baseline Survey on Building Code Compliance
- Midterm/Endline Survey on Status of the Municipalities for Building Code Implementation
- Midterm / Endline Survey on Building Code Compliance
- Retention Survey of trained Masons and Engineers
- Focus Group Discussions
- Regular Monitoring of Activities
- Development/Use of Web based Database system
- Development of Kobo Collect App for Building Compliance Survey
- Collection of Success Stories

ii) M&E Activities under Baliyo Ghar

- Baseline Survey on Earthquake Risk Perception
- Baseline Survey on the Status of VDCs
- GESI Situational Analysis (Baseline)
- Preparation of GESI Action Plan for Monitoring
- Retention Survey of Trained Masons and Engineers
- Focus Group Discussions
- Regular Monitoring of Activities
- Collection of Success Stories
- Development/Use of Web based Database system
- Development of NSET Android App for RPS Data Collection
- Development of Kobo Collect App for Building Compliance Survey

iii) M&E Activities under PEER

Baseline Survey on Status of PEER Graduates

Baseline Survey on Status of PEER Partner Institutions

B) Development of Guidelines and Reports

- Guideline to conduct the Risk Perception Survey
- Guideline to conduct Focus Group Discussion
- Data Quality Assurance Guideline
- Guideline/Template for Collecting Success Stories
- Report on Risk Perception Survey (Baseline- BCIPN)
- Report on Risk Perception Survey (Baseline- Baliyo Ghar)
- Report on Retention Survey (BCIPN)
- Development of GESI Action Plan Framework (Baliyo Ghar)
- Quarterly Reports/Annual Reports

The Process

An android application with the survey questionnaire has been developed in an open source platform called Kobo Tool Box. The data collected on the mobile device is then uploaded to the central server for further analysis. The survey is done at two levels- Study of Drawings submitted in the municipality for building permit process and the survey of same building constructed in the field.

A comparative study of buildings constructed in three fiscal years i.e. 2012, 2014 and 2016 for both drawings and field was carried out through this survey. The survey is carried out by trained engineers and sub-engineers so that the survey on even a relatively small sample is expected to be a good representation of the total population. The survey of 29 municipalities was conducted during 2016-2017.

The sample size is calculated with 10-15% margin of error and 95% confidence interval. The total population is the total no. of buildings that has been permitted by the municipality in the particular year. The no. of buildings to be surveyed in each ward is then calculated according to their construction rate per year in that particular ward. For the quality assurance of the data, a very strong monitoring system and post editing system was developed. Poor file management system in the municipalities was a constraint to the study resulting in a smaller sample size being accessible to the surveyor.

Key Findings

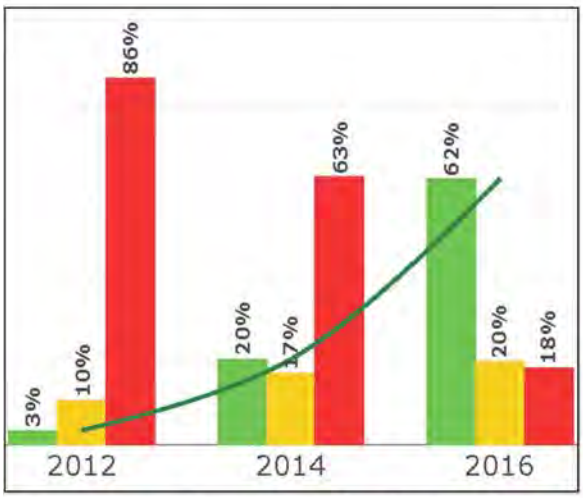
Assessment of the Drawings submitted

A total of 4097 building drawings submitted have been assessed in the three years period. 1,333 drawings submitted in the year 2,012, 1,401 drawings submitted in 2,014 and 1,363 drawings submitted in the year 2016 were assessed.

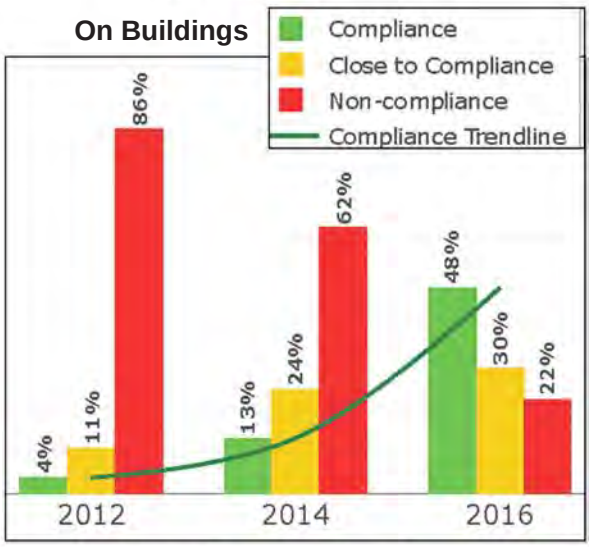
Out of 4097 building drawings, 42% of the buildings were one storey, 36% two storey, 19% three storey and 4 % were more than 3 storey.

It was observed that in 2012, only 1% of the drawings submitted was found to have met the building code compliance while 17 percent of drawings were close to meeting the compliance and 81% of the drawings were found non-compliant to building code as shown in figure below.

Analysis fo 4,097 drawings submitted for Building Permits



Results of On-Site assessment of 2,813 constructed houses



In 2014, 56 % of drawings were found to have met the building code compliance while 32 % were close to compliance and only 12 percent of drawings were found to be non-compliant to the building code.

A significant change has been observed in 2016 as 82% of the drawings were found to have meet the building code compliance while 11% were close to compliance and only 7% of the drawings submitted were found to be non-compliant.

Assessment of Buildings in the Field

From among the 4097 building drawings assessed, a total of 2813 buildings were assessed in the field. 823 buildings built in the year 2012, 957 built in 2014 and 1033 buildings being built in 2016 were assessed.

It was observed that, of the buildings constructed in the year 2012, 21% of the building were built with full compliance to the national building code, 15 % of building were close to compliance while 64% were non-compliant.

Gradually, the trend has increased in 2014, where 49 % of the buildings were found to have met compliance, 40 % building were close to compliance and 11 % were non-compliant to the national building code. A remarkable achievement was observed in the year 2016 as 76 % of the buildings met building code compliance, 14 percent building were close compliance and only 11 percent were found non-compliant to building code.

Hence the survey showed that there has been significant improvement in the construction practices over the years since the implementation of BCIPN program in the program municipalities. The change (Building Code Compliance) on both the design and in the building construction practices is very visible in the municipalities.

Understanding Risk Perception of People

A Baseline Study Conducted by NSET in the BCIPN program Municipalities of Nepal

Risk Perception Survey was conducted in 23 municipalities during 2013- 2015. A total of 39,874 samples were administered. 415 enumerators (local social mobilizers, community volunteers) were mobilized to do the survey.

What is Risk Perception?

Risk perception is the subjective judgment that people make about the characteristics and severity of a risk

Attributes of Risk Perception

K: What the respondents know about it (Knowledge)

A: How the respondents feel about it (Attitude)

P: What the respondents do about it (Practice)

Hypothesis of the program

Enhancing the risk perception of the people will create demand for earthquake safety and influence the building code compliance.

Objectives

I) To measure the residents' -
- current perception of risk to earthquakes,
- their level of preparedness and
- the earthquake risk reduction activities they are implementing

II) To use as a baseline for evaluation of changes in perception

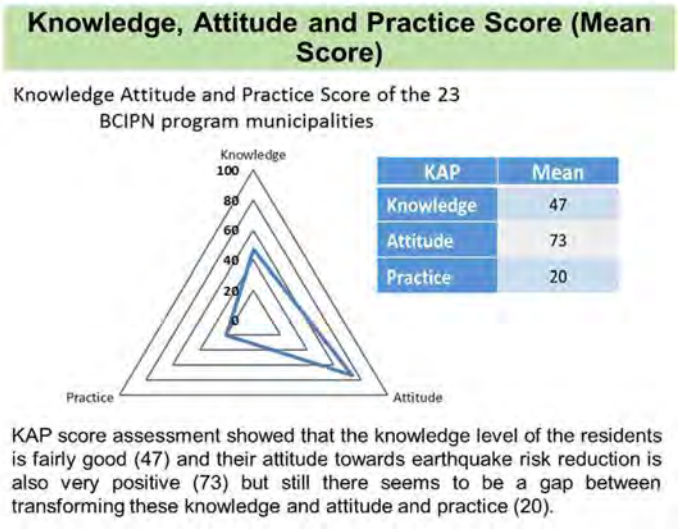
III) To derive recommendations for improving the effectiveness of the program.

Population Characteristics

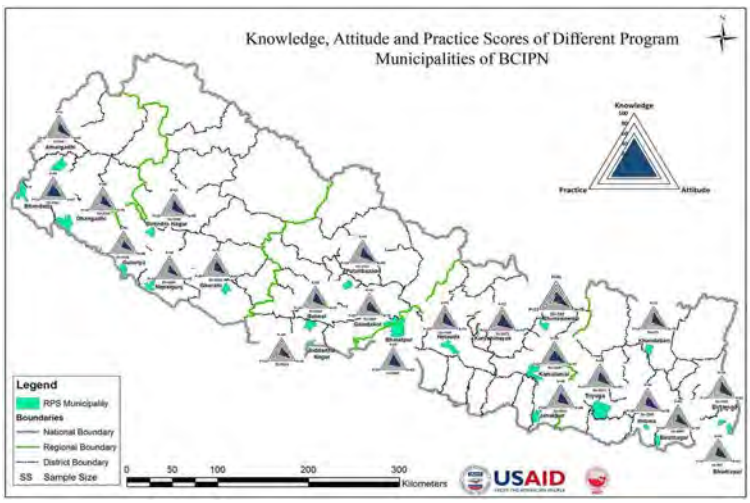
Among the survey respondents, female respondents (55%) were higher in number than male participants (45%). About 23% have completed secondary education and 17% had studied up to higher secondary level. 33.5% were housewives and 20% of the respondents were involved in business. Furthermore, 79% of the respondents mentioned that they have experienced earthquake at least once, while only 10% have participated in earthquake awareness programs.

KAP Assessment

A structured questionnaire with 38 questions was developed; 12 questions assessed the demographic characteristics of the participants; 6 questions assessed the existing Knowledge, 5 questions Attitude and 5 questions assessed if they have taken any precautionary measures as Practice. Each question was given certain weightage depending upon their importance. The sum



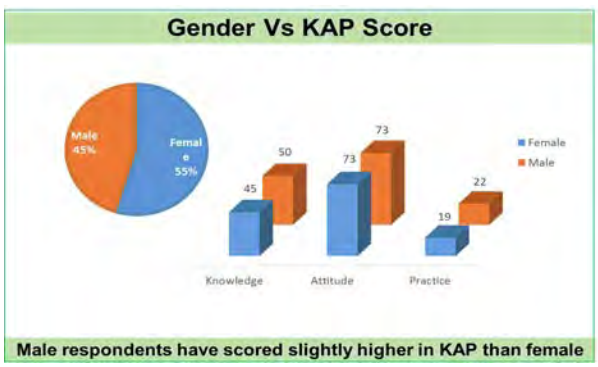
A local community volunteer conducting the survey, Putalibazar



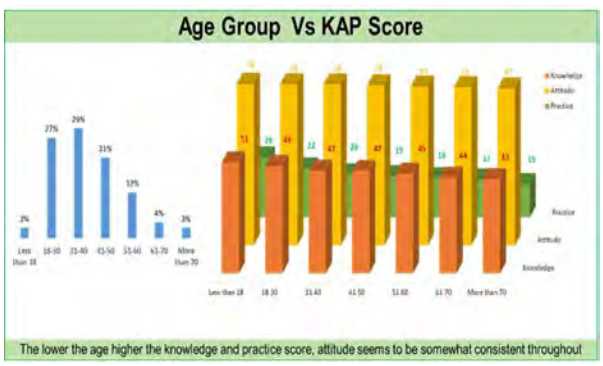
KAP scores of dirrerent municipalities

Factors Affecting Knowledge Attitude and Practice

Various factors such as gender, age, occupation, participation in awareness programs and trainings, prior experience of earthquake, presence of disaster response groups in the community were found to influence the behavior of the residents of the municipalities.

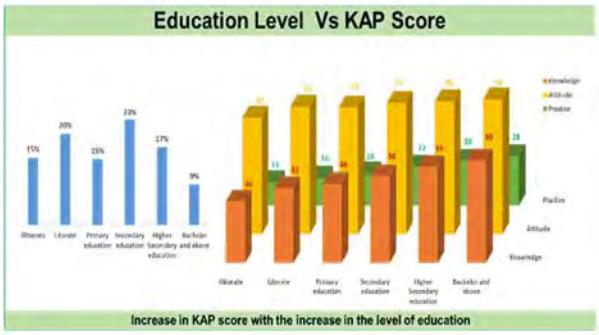


Gender Vs. KAP Score

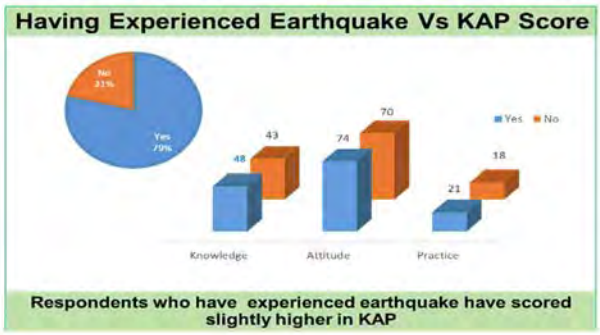


Age Group Vs. KAP Score

In 23 municipalities Knowledge Attitude and Practice scores of male respondents were found to be higher than those of female respondents. Significant relation between age group and Knowledge and Practice scores was observed. The lower the age the higher the Knowledge and Practice score, and the higher the age the lower the Knowledge and Practice score.

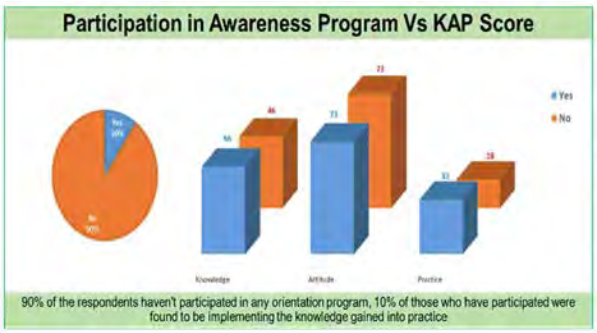


Level of education Vs. KAP Score



Having Experienced earthquake Vs. KAP Score

It was observed that higher the level of education higher is the Practice score. Most of the respondents have experienced earthquake and when compared, those who have experienced earthquake have higher score on Knowledge, Attitude and Practice than those who haven't experienced earthquake.



Participation in awareness programs Vs. KAP Score

Participation in Training Vs. KAP Score

The mean Knowledge and Practice scores of the respondents who have participated in awareness and training programs were higher than the scores of respondents who hadn't participated in any programs.

Overall Findings

- Gender, age, occupation, participation in awareness programs and trainings, prior experience of earthquake influence the behavior of the residents.
- Increasing age, lower education level, previous experience of earthquake, non-participation in awareness/training program were identified as the risk factors for low knowledge of earthquake risk.
- Those who participated in awareness and training programs were found to be implementing the knowledge gained into practice.
- Knowledge and Practice scores of male respondents was found to be higher than the scores of female respondents.
- The respondents who work in private organizations, government offices, and students have the highest KAP scores whereas laborers and housewives have the lowest.

Change in Risk Perception after BCIPN intervention

With an objective to measure the change in the perception of the people and professionals on earthquake risk and earthquake-resistant construction technology after the implementation of BCIPN program, endline surveys on risk perception was carried out in the BCIPN program municipalities. The level of risk perception together with the level of building code compliance was measured in the year 2017. Preliminary results show that the level of building code compliance increased significantly as the level of risk perception enhanced.

Change in the KAP Score in 2013 and 2016

During the enumerators training, Amargadhi Municipality

Enumerators reviewing the questionnaire during the training, Ghorahi Municipality

Retention Survey of Masons: Retention of Work and Knowledge

As a part capacity enhancement of the construction stakeholders a number of training programs were conducted under BCIPN program. In this regard a number of Mason Training program were conducted by the program in the program municipalities.

A total of 4600 masons and contractors were trained on earthquake resistant building construction. In order to assess whether the masons trained by BCIPN have continued their profession as mason and the level of knowledge retained by them after some years of the training, Retention Survey was conducted.

The survey was conducted among 150 masons trained by the program. Also the survey was expected to provide an insight to the challenges and achievements of the masons after the training.

Methodology

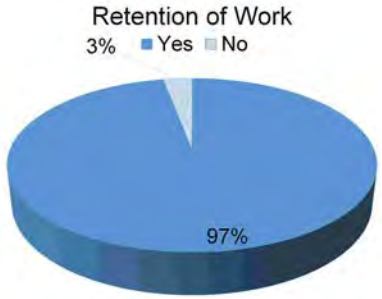
The survey was conducted among 150 masons that included 130 males and 20 females trained by the program in different time period. The sample size was calculated so that the findings of the survey could be generalized with a confidence level of 95% and a margin of error of 8%. A set of questionnaire was developed and all the respondents were approached via telephone. Scores were assigned to correct answers from the respondents.

Key Findings

Retention of Work

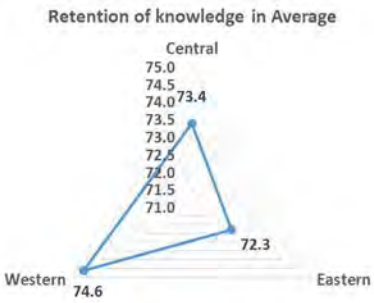
A major focus of the retention survey was to measure what percentage of the masons were still continuing their profession as mason.

It was observed that a majority of the masons were found continuing their profession as mason. Only 3% masons had changed their profession.



Retention of Knowledge

Retention of knowledge gained by masons during the training is a vital component for continuation of safer construction practices. The survey measured what percentage of knowledge do the masons still retain/have and the result is presented below.



The current scores of all the respondents showed that the average knowledge retention was 72%. And nearly equal level of knowledge was found to be retained by the masons across the program regions. The average retention of knowledge was calculated as 73.4% for Central Region, 74.6% for Western Region and 72.3% for Eastern Region.

And nearly equal level of knowledge was found to be retained by the masons across the program regions. The average retention of knowledge was calculated as 73.4% for Central Region, 74.6% for Western Region and 72.3% for Eastern Region.

Challenges and Achievements as perceived by Masons

As the masons say: house owners are still reluctant to pay the extra cost of constructing an earthquake resistant building and getting design approval from the municipalities. This issue has created barriers to the implementation of building code. Although the masons are aware of the earthquake resistant construction practices, they are facing difficulties in convincing the house owners.

The absence of the provision of Standard of Wages for masons have also discouraged the trained masons. The masons want the municipality to allow only the trained ones to practice construction and to have monitoring over their work.

The telephonic conversations found positive attitude of the masons towards the training they received. Masons are confident about implementing their knowledge in practice and have earned higher respect in their community along with the increase in wages to some extent, in some cases. They are looking for further training that can help them build their capacity even more in the future.

Status of Building Code Implementation in Municipalities:

A Study to Understand the Level of Efforts for Enforcing Building Code

This is a study conducted in the municipalities to identify the status of level of efforts in the municipality towards effective building permit systems and enforcement of building code.

The main objectives of the study are:

- To know the level of capacity of the municipalities for building code implementation
- To measure the level of potential sustainability of sound building permit process and building code implementation

Based on the previous experiences and interactions with the municipalities, three major components are identified for the assessment of the municipalities in terms of Building Code Implementation. Three major components are:

1. Institutional Mechanism of Building Permit Process and Building Code Enforcement
2. Technical Capacities in municipality area and within Municipal Office
3. Budget allocation for BCI by the municipal office

Methodology

The following are the main factors and criteria used for the assessment of BCI Status.

i) Institutional System on Building Permit Process

This component measures the institutional mechanism, system and capacity of the municipality towards implementing building code, and the system for overall disaster risk management. There are 9 indicators in this category (Presence of Earthquake damage scenario, Advisory committee, separate EQ unit/staff, need structural drawing, field inspection system, BP application content, certification system, provision for retrofitting, understanding of other municipal staff) . And each question is given score based on their yes/no answers.

ii) Technical Capacities Human Resources

This component measures the availability of technical capacities within the municipality. Here the people who are directly involved the construction of house (engineers, masons and the house owners) are assessed. The proportion of human resources trained/oriented with respect to numbers of new building constructed per year is measured and the scores are assigned accordingly.

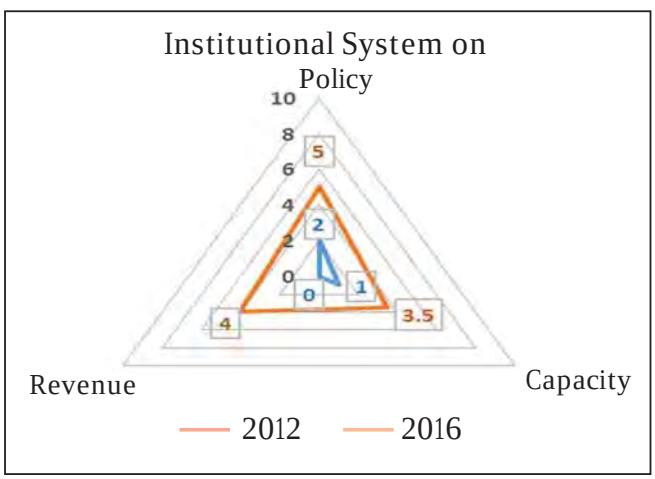
iii) Municipality Revenue/ Budget

This component measures the proportion of budget allocated by the municipality for building code implementation. The proportion for the amount of revenue generated from building permits in the municipality and budget allocated for BCI was measured.

The total score obtained under each component is then represented in the radar graph.

Key findings

The BCIPN program municipalities were assessed in two phases: at the initial phase of the implementation of BCIPN program (2013) and then towards the end of the BCIPN program (2016) to measure the change in the municipalities over the years. The preliminary findings in some of the municipalities shows that there has been significant improvement in the institutional system and process of the municipalities towards building code implementation. All the three major components for the assessment of the municipalities: Institutional system on building permit process, Technical capacities/Human resources and Municipality Revenue/Budget are improved over the years as represented in the figure (Figure of one of the municipality surveyed).

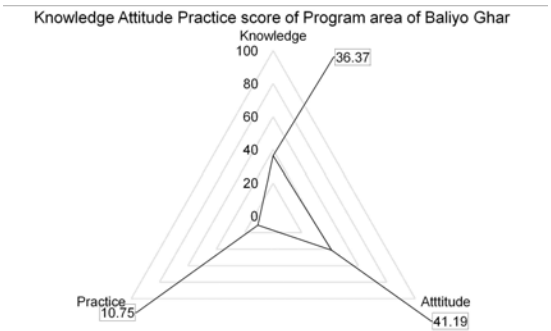


Dynamics in Municipal Building Permit System

Earthquake risk perception survey conducted in 33VDCs and 3 municipalities under the Baliyo Ghar Program

Earthquake risk perception of the population is defined in terms of Knowledge, Attitude and Practice (KAP) on earthquake risk and reduction measures. To measure the understanding/ perception of the earthquake risk and safer construction practices, a baseline study was conducted in 33 different VDC and 3 municipalities of Nepal, under the Baliyo Ghar program. The survey was conducted among 9856 respondents in the different wards of the program VDC and municipalities. The study used simple random sampling based on the Stratified Systematic Area Sampling procedure. The results can be extrapolated to the whole population with a confidence level of 95% and an accuracy of 5%. KAP analysis was conducted and questions were grouped accordingly and assigned certain weighting and scores. A sample of 3.6-7% of total household of each of the municipalities and 15-48% of total household of each VDC was selected for conducting the Baseline Risk Perception Survey.

Key Findings of Survey

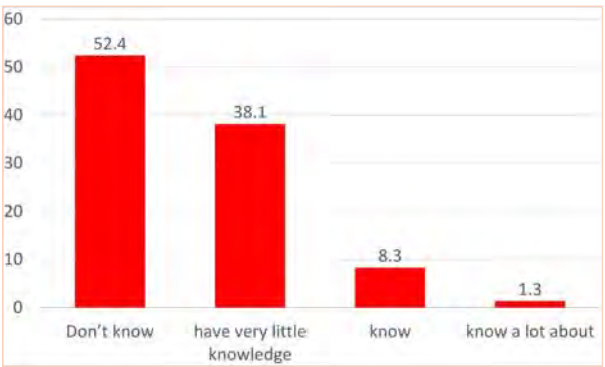


The KAP score assessment of all the respondents clearly shows that the attitude level of the respondents was fairly good (scored 41 of 100). In addition, their knowledge was moderate (scored 36 out of 100). Their practice score was poor (11 of 100) compared to the attitude and knowledge scores. However, this showed that there seems to be a large gap between transferring the knowledge and attitude into real practice.

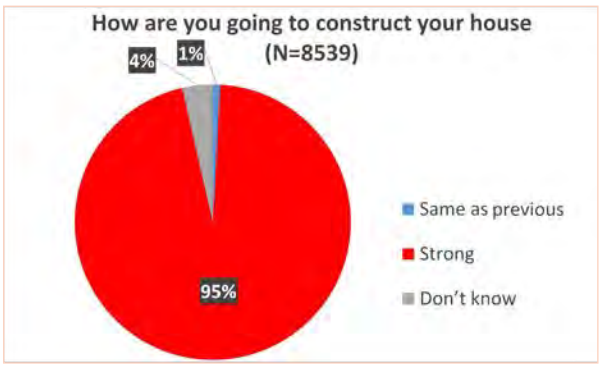
Respondents who had participated in the awareness program (2692 respondents) had higher KAP scores than those who had not (7146 respondents). Notably, the practice score is more than three times as high amongst respondents who had participated in the awareness program.

Regarding the safer reconstruction, the survey results indicate that the majority of participants in the program have very little knowledge on earthquake-safe construction. When asked, “Do you have any idea on safe construction technique?” half of the total respondents said that they did not know about safe construction techniques.

The respondents when asked, “If you are building a house, how are you going to make it?” Majority, 95% of the respondents replied that they wanted to make a strong house. Only 4% of respondents did not think about it, and 1% of respondents would make same as their previous house.



Knowledge of earthquake safe construction amongst respondents



How are you going to construct your house

Overall Findings

- Male respondents were found to have higher KAP scores than female respondents
- The mean knowledge score of respondents who had experienced earthquakes was found to be higher than for those who had not experienced earthquakes
- It was found that there was a significant association between income of respondents and their KAP scores. Comparatively, economically sound respondents had higher KAP scores compared to respondents with lower monthly incomes
- Increasing Age, low monthly income, minority ethnicity (such as Dalit and others), lower education level, no participation in the awareness program not listening or watching awareness program and geographically remote VDC were identified as the risk factors for scoring low KAP scores.

Masons sharing their views during FGD in Bharatpur Municipality

23rd NSET Day at Charikot, Dolakha

23rd NSET Day at HQ, Bhainsepati, Lalitpur

23rd NSET Day at Bidur, Nuwakot

23rd NSET Day at Dhadingbesi, Dhading

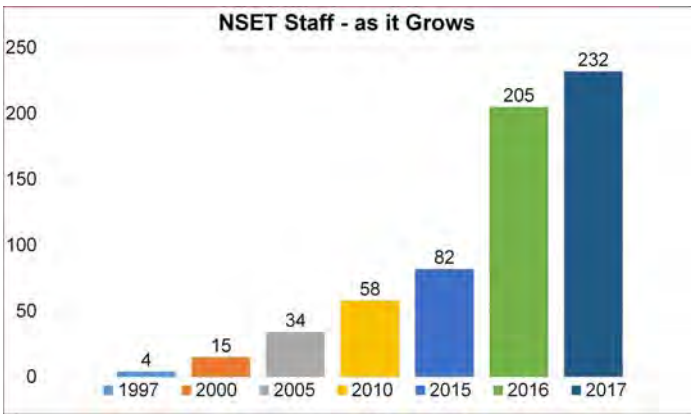
Chapter 14

Organizational Development

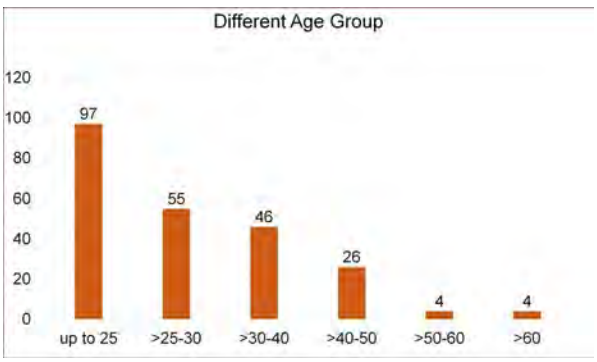
NSET has completed 24 years of its mission on June 18, 2017 and entered then on to mark Silver Jubilee year. This course has not only made NSET to contribute to Earthquake Risk Management and Disaster Risk Reduction spectrums at various levels; local, national, regional and global; but also helped consolidate NSET as an Organization. Together with increase in scope and scale of work, there has been also increase in number of staff in NSET. Massive reconstruction need in Post Gorkha Earthquake 2015 also pushed NSET to increase its staff size more than double. NSET has been growing in terms of staff size, geographical coverage and number of programs.

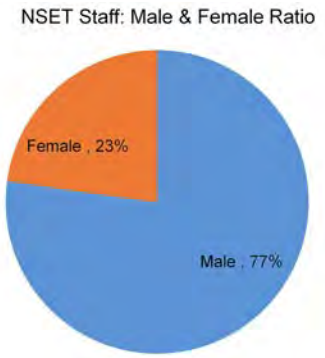
NSET Staff – as it grows

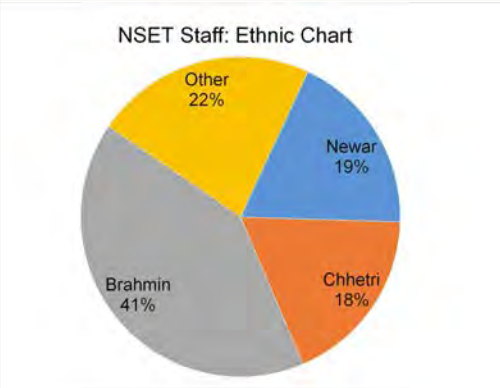
NSET now has grown significantly into one of the leading organizations with a large number of qualified professionals and with adequite physical facilities. With a total of 4 staff back in 1997, we are now more than 232 professionals and supporting staff who dadicately serve as of May 2017; various projects across the country and beyond.

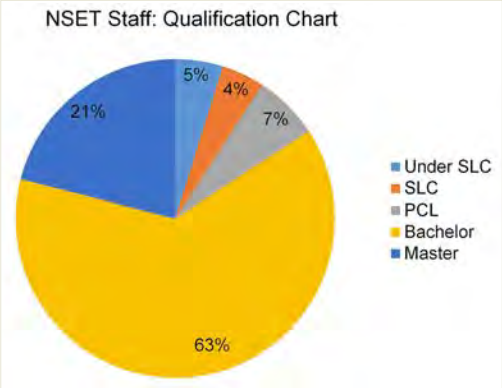


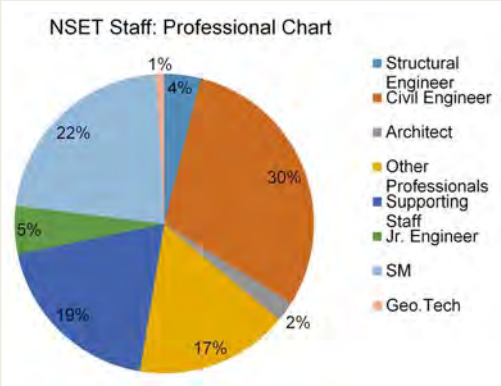
The current NSET Staff has following characteristic:

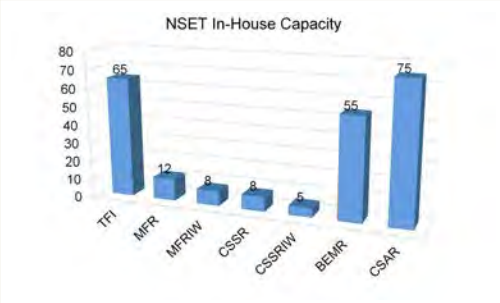










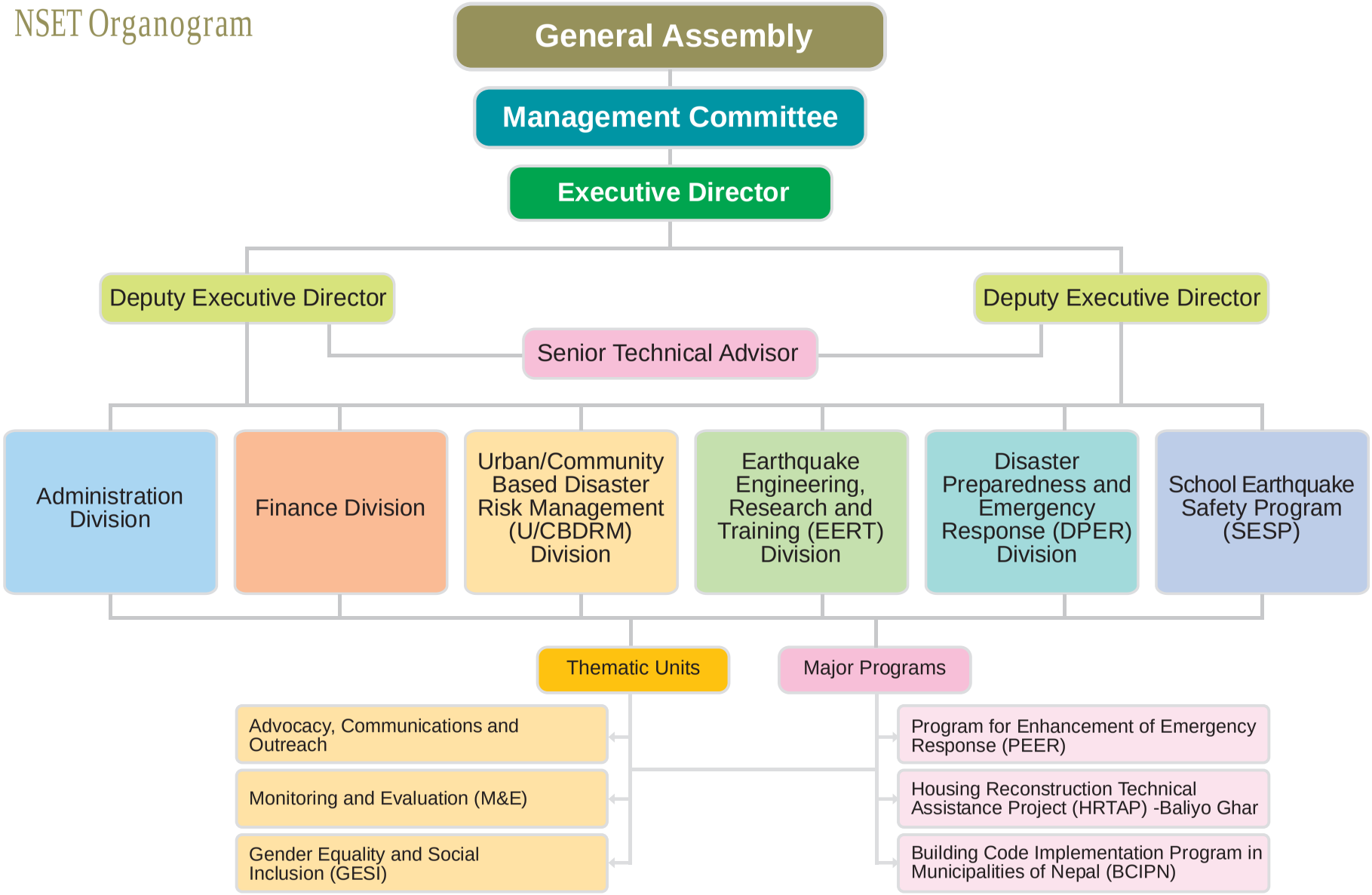


NSET Staff are also trained as Emergency Responders and Qualified Instructors. Apart from technical expertise they serve with, they are equally contributive to help communities in responding disaster emergencies and also in developing qualified trainers.

NSET conducts Sign Language Classes for Staff

National Society for Earthquake technology-Nepal (NSET) is running Nepali Sign language Classes for 15 staff. NSET partners with National Federation of Disabled Persons and the Nepalese Society of hearing impaired for running the classes. These classes are the outcome of planning with the partners after realizing the need after the Gorkha earthquake 2015 during which many hearing and vision impaired Nepali in the earthquake areas were helpless because of the lack of knowledge of what to do during shaking. The classes will run for six months. The 15 instructors are expected to be able to conduct disaster awareness classes in the community through Nepali sign language.

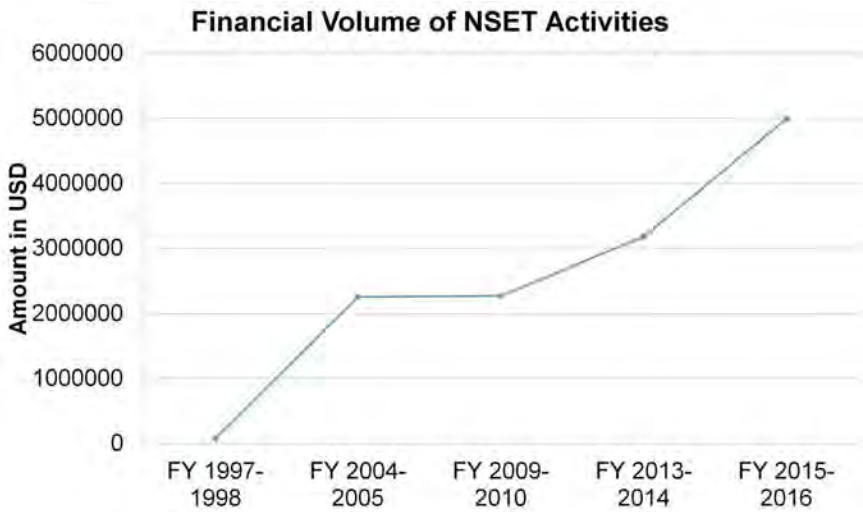
NSET Organogram



NSET Finances

The financial volume of NSET has also been increasing with the growth in number of staff and programs. The annual turnover of around 80 thousands USD which was back in 1997 has now in 2016 reached 4.9Million USD. This shows tremendous growth in financial volume of NSET. Following figure shows a trend of financial growth of NSET.

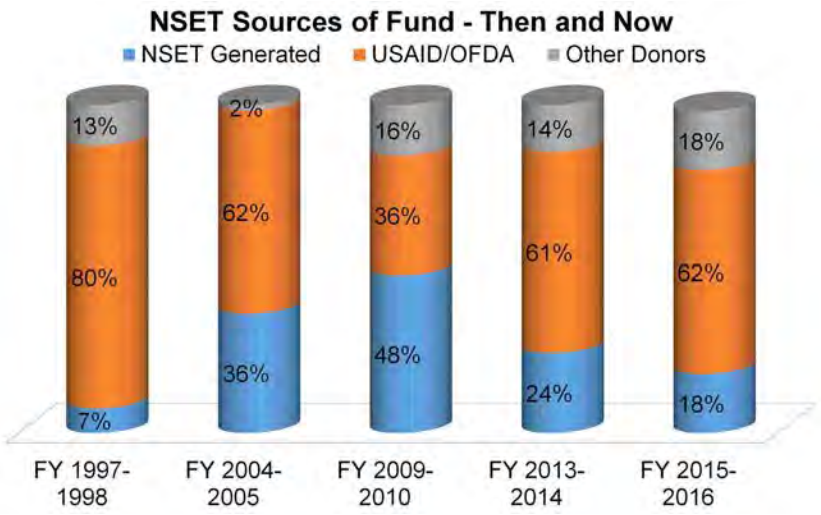
Volume of NSET Fund



Source of Fund then and Now

There is a gradual increase in NSET funds generated through its services in the form of building vulnerability assessment of existing buildings, orientation programs and emergency preparedness planning and drills. NSET has been prioritizing to diversify the sources of fund. NSET has also expanding its funding sources and now there are several key sources of funds including USAID/OFDA, project funding other bilateral agencies, and funds generated by selling technical services. This figure shows trend of financial diversification.

Sources



Annex 1

Income and Expenditure statement

National Society for Earthquake Technology - Nepal

Income and Expenditure Statement
for period July 17, 2015 to July 15, 2016

Particulars	Schedule	NSET Nepal NRs	PEER IV/USAID NRs	Bal Jya Ghar(HRTAP) NRs	3 PERM/USAID NRs	BCIP/NUSAID NRs	TSESSR NRs	NERMP/IDUSAID NRs	PEER III/USAID NRs	PLAN NRs	Shapla Neer NRs	HFRJ NRs	DCRN-ARC NRs	NTU/Singapore NRs	DRR CCA-UNICEF NRs	UNICEF/TLC NRs	Total NRs	Previous Year NRs
Income																		
Membership Fee																	-	3,500.00
Grant		22,005,265.69						1,595,440.83									24,600,706.52	13,423,458.43
USAID/OFDA			79,930,867.56	85,426,081.32	120,666,224.28	41,889,540.12	8,786,851.36										336,719,564.64	173,529,469.86
Save the Children/ MERLIN, Nepal																	-	1,415,033.24
OXFAM -Survey & DRR																	-	3,040,303.31
American Red Cross																	-	4,215,569.47
Nanyang Technology University Singapore (NTU)																	-	5,311,272.60
Lutheran World Relief (LWR)																	-	-
Unicef															7,921,170.98	26,260,844.88	79,182,015.86	49,119,318.00
PEER III, PEER IV and 3 PERM																	-	29,280,216.15
Asian Development Bank																	-	13,486,685.44
PLAN										15,840,020.40							15,840,020.40	-
HFRJ												10,149,803.39					10,149,803.39	-
Shapla Neer											3,904,963.00						3,904,963.00	-
Professional Service Charge		10,892,113.36															10,892,113.36	10,311,405.96
Earthquake Safety Day		173,000.00															173,000.00	1,399,750.00
Contribution from/For Publication																	-	400.00
Sale of GO Bag/ HH LSAR Kit		872,174.50															872,174.50	820,733.00
Income from Other Sources		72,342,328.01		125,444.65													72,507,772.66	3,806,496.03
Total Income		**107,324,881.56**	**79,930,867.56**	**85,551,525.97**	**120,666,224.28**	**41,889,540.12**	**8,786,851.36**	**1,595,440.83**		**15,840,020.40**	**3,904,963.00**	**10,149,803.39**			**7,921,170.98**	**26,260,844.88**	**504,842,134.34**	**307,883,612.51**
Expenses																		
Administrative Expenses	VI	95,223,768.44	50,779,157.90	60,872,431.23	44,880,777.07	29,546,193.00	5,827,488.33			1,889,060.75	888,690.84	2,403,867.63			3,314,031.28	9,589,529.89	303,015,196.35	187,344,656.44
SESP Expenses - Reconstruction and Wages	VII	513,575.16	-	-	-	-	-			-	-	-			-	-	513,575.16	-
Earthquake Safety Day	VIII	375,211.08	-	-	-	-	-			-	4,200.00	-			-	-	379,411.08	1,597,354.83
Workshop/Training/Seminar	IX	3,268,997.77	20,851,764.37	12,644,677.42	37,847,365.03	13,482,970.72	2,508,872.32			6,629,643.32	2,043,976.56	7,742,092.18			8,436,960.16	34,256,110.32	149,713,330.17	61,809,156.66
Travel Expenses	X	3,590,842.31	1,216,458.86	1,396,805.60	9,737,747.49	2,103,320.42	450,490.72			-	-	-			-	-	18,495,665.40	11,159,742.06
Public Awareness	XI	202,246.00	-	-	26,981,734.02	231,059.69	-			-	646,754.99	-	1,060,263.95	299,450.00	-	-	29,420,978.65	27,167,052.21
Exchange (Gain)/Loss		(820,753.07)	(380,379.44)		(630,175.52)	95,924.87		73,580.17				3,845.59	(48,898.34)				(1,706,857.74)	(2,499,046.05)
Total Expenditure		**100,353,887.69**	**72,467,201.69**	**74,913,914.25**	**118,817,448.09**	**45,459,468.71**	**8,786,851.36**	**73,580.17**		**8,518,704.07**	**3,582,992.39**	**10,149,803.39**	**1,011,365.61**	**11,850,441.44**	**43,845,640.21**		**499,831,299.87**	**286,569,916.17**
Excess of Income Over Expenditure		6,970,993.87	7,463,665.87	10,637,611.72	1,848,776.19	(3,569,928.59)	-	1,521,860.66		7,321,316.33	321,970.61	-	(1,011,365.61)	(8,929,270.46)	(17,584,795.33)		5,010,835.26	21,313,696.34
Opening Balance		96,727,906.27	(3,727,139.47)	-	(4,437,970.61)	813,698.58	-	(1,521,860.66)	23,111.50	-	-	-	3,889,043.37	1,011,365.61	8,929,270.46	17,584,795.33	119,292,218.38	98,869,284.76
Refund to donor													(3,889,043.37)				(3,889,043.37)	-
Exchange Fluctuation Gain/ (Loss)		-	(884,849.02)	-	(233,080.85)	21,506.29	-		1,554.87	-	-	-		0.00	-	-	(1,094,868.71)	(561,484.28)
Balance of funds as on July 15, 2016		**103,698,900.14**	**2,871,677.38**	**10,637,611.72**	**(2,822,275.27)**	**(2,734,725.71)**	-	**0.00**	**24,666.37**	**7,321,316.33**	**321,970.61**	-	-	**0.00**	**0.00**	**(0.00)**	**119,319,141.81**	**119,421,576.82**
Represented by:		0																
Cash and Bank Balance		2,386,507.16																
Receivables		1,471,844.52																
(Payables)		(9,013.13)																
		3,849,338.55																
Significant accounting policies & notes to accounts forms an integral part of this Income & Expenditure Statement	XII							Payable										

Amod Mani Dixit
(General Secretary)

Varun Parsad Shrestha
(President)

Yogeshwar K. Tangali
(Treasurer)

Tika Sharma
(Finance Director)

Sanjeev Kumar Mishra
(Partner)
T.R.Upadhya & Co.
Chartered Accountants

Date: 30 November 2016
Place: Kathmandu

NSET

Balance Sheet

National Society for Earthquake Technology - Nepal

Balance Sheet
As at July 15, 2016

Particulars	Schedule	As at July 15, 2016 NRs		As at July 16, 2015 NRs
Assets				
Fixed Assets	I	51,841,787.80		55,882,614.49
Receivables	II	45,115,688.86		44,704,797.15
Cash & Cash Equivalents	III	51,972,892.32		56,548,852.67
Total Assets		**148,930,368.98**		**157,136,264.31**
Liabilities				
Current Liabilities	IV	29,611,227.37		37,714,687.48
Surplus as per Income & Expenditure Statement		119,319,141.61		119,421,576.82
Total Liabilities		**148,930,368.98**		**157,136,264.31**

Significant accounting policies & notes to accounts forms an integral part of this Balance Sheet — XII

As per our report of even date

Amod Mani Dixit *(General Secretary)*
Varun Parsad Shrestha *(President)*
Yogeshvar K. Paraiuli *(Treasurer)*
Sanjeev Kumar Mishra *(Partner)*
T R Upadhya & Co.
Chartered Accountants

Tika Sharma
(Finance Director)

NSET

Date: 30 November 2016
Place: Kathmandu

Annex 2

NSET Executive Committee

Mr. Varun Prasad Shrestha
President

Dr. Amod Mani Dixit
General Secretary

Mr. Yogeshwor K. Parajuli
Treasurer

Mr. Shreeram S. Basnet
Executive Member

Mr. Surya Narayan Shrestha
Executive Member

Mr. Manohar Rajbhandari
Executive Member

Mr. Tika Sharma
Executive Member

Dr. Ramesh Guragain
Executive Member

Annex 3: NSETs Partners

National

- Armed Police Force (APF)
- Curriculum Development Center (CDC)
- Department of Archeology (DoA)
- Department of Education (DoE)
- 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)
- 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
- Kathmandu Valley Development Authority (KVDA)
- Kathmandu University
- Kirtipur Women's' Network
- Lumanti support group for Shelter
- Ministry of Education
- 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 Forum for Earthquake Safety
- National Network of Women for Community Resilience
- Nepal Academy of Fine Arts (NAFA)
- Nepal Amateur Radio Operators' Society (NAROS)
- Nepal 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 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
- Thankot Women's Cooperative Network

Media Partners

- All Three Media Ghar, Ktm
- Radio Sagarmatha 102.4MHz, Ktm
- Ujjaylo 90 Network, Ktm
- Media Helpline, Ktm
- Radio Audio, Ktm
- Mero FM, Ktm
- Radio Janasanchar FM, Bhaktapur
- Kalinchowk FM, Dolakha
- Sailung FM, Dolakha
- Hamro Radio, Dolakha
- Bhimeshwor FM, Dolakha
- Radio Trishuli, Nuwakot
- Radio Jalapa, Nuwakot
- Nuwakot FM, Nuwakot
- Radio Dhading, Dhading
- Radio Bihani, Dhading
- Watch Dog Media

International

- Action Aid International Nepal
- All India Institute of Hygiene & Public Health (AIIH&PH), India
- Ambulance 118, Indonesia
- American Red Cross
- 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)
- Boarder Security Force of India
- Building Research Institute of Japan
- CAN-USA
- Central Reserve Police Force , 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
- Danish Cultural Institute , Denmark
- Disaster Management Bureau of Bangladesh
- DPRI/Kyoto University
- Durham University
- Earthquake and Megacities Initiatives (EMI)
- Emergency Rescue Unit Foundation of Philippines
- Emergency Medical Relief (EMR)/ Directorate of Health Services, New Delhi, India
- Earthquake Reconstruction and Rehabilitation Authority (ERRA), Pakistan
- Euro Center
- 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
- Indonesian Red Cross
- 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)
- 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 Industrial Security Academy of India
- Nat'l Institute of Preventive and Social Medicine of Bangladesh
- National Research Institute for Earth Science and Disaster Prevention of Japan
- New Zealand Society for Earthquake Engineering
- Oxfam GB Nepal
- Plan Nepal
- Practical Action, Nepal
- Philippines General Hospital
- Reynolds Geo-Sciences Limited, UK
- SAARC Disaster Management Center, India
- Safety Solutions Incorporated, USA
- Save the Children
- Sustainable Environment and Ecological Development Society (SEEDS/India)
- 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
- UN-ISDR
- 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
- UN-HABITAT
- U.S. Office of Foreign Disaster Assistance (USAID/OFDA)
- World Health Organization
- World Seismic Safety Initiatives (WSSI)

Abbreviations

AAN	Action Aid Nepal
ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
ADRC	Asian Disaster Reduction Centre
ADRRN	Asian Disaster Reduction and Response Network
APIP	Action Plan Implementation Project
AusAID	Australian Agency for International Development
BCPR	Bureau of Crisis Prevention and Discovery
BCIPN	Building Code Implementation Program in Nepal
BDPC	Bangladesh Disaster Preparedness Centre
BEMR	Basic Emergency Medical Response
BPKIHS	B.P. Koirala Institute of Health Sciences
BRI/Japan	Building Research Institute/Japan
BTRTC	Building Technology Research and Training Centre
BTT	Basic Technical Training
CAN-USA	Computer Association of Nepal-USA
CBDMP	Community Based Disaster Management Program
CBKMP	Capacity Building and Knowledge Management Program
CBOS	Community Based Organization
CDMG	Community Disaster Management Groups
CMM	Core Member Meeting
CLPIU	Central Level Project Implementation Unit
CSSR	Collapsed Structure Search and Rescue
DDRC	District Disaster Relief Committee
DEAN	Diploma Engineers Association Nepal
DEMP	Dharan Environmental Mapping project
DHS	Department of Health Services
DHWG	Disaster Health Working Group
DLPIU	District Level Project Implementation Unit
DMC	Disaster Management Committee
DOE	Department of Education
DNET	Development Network (p) Ltd
DPNET	Disaster Preparedness Network Nepal
DPRI	Disaster Prevention Research Institute
DPRP	Disaster Preparedness and Response Plan Framework
DPSS	Disaster Preparedness for Safer Schools
DRH	Disaster Reduction Hyper-Base
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRTC	District Reconstruction Technology Center
DTW	Deep Tube Well
DUDBC	Department of Urban Development and Building Construction
DWSS	Department of Water Supply and Sewerage
EAP	Earthquake Awareness Program
EDCD	Epidemiology and Disease Control Division
EDNeT	Education Network
EMP	Environmental Mapping Project

EPRP	Earthquake Preparedness and Response Plan
ERM	Earthquake Risk Management
ERR	Earthquake Risk Reduction
ESD	Earthquake Safety Day
ESS	Earthquake Safety Solutions
FNCCI	Federation of Nepalese Chamber of Commerce
FSCD	Fire Service and Civil Defense
GEM	Global Earthquake Model
GHI	Geo-Hazards International
GRIPS	Graduate Institute For Policy Studies
HAN	Hotel Association of Nepal
HESI	Housing Earthquake Safety Initiative
HFA	Hyogo Framework for Action
HOPE	Hospital Preparedness for Emergencies
IAEE	International Association for Earthquake Engineering
ICIMOD	International Centre for Integrated Mountain Development
ICLA	Information Counseling and Legal Assistance
IDCC	Integrated Disaster Communication Consortium
IDNDR	International Decade for Natural Disaster Reduction
IITB	Indian Institute of Technology Bombay
INGo	International Non-Government Organization
IOE	Institute of Engineering
IOM	Institute of Medicine
IRG	International Resources Group
ISDR	International Strategy for Disaster Reduction
ITB	Institute of Technology
ITC	International Institute for Geo-information Science and Earth observation
KMC	Kathmandu Metropolitan City
KVERM-APIP	Kathmandu Valley Earthquake Risk Management Action plan Implementation Project
KVERMP	Kathmandu Valley Earthquake Risk Management Project
LARED	Latin American Network of Social Studies on Disaster Prevention
LRTC	Local Reconstruction Technology Center
LSAR	Light Search and Rescue
LSMC	Lalitpur Sub Metropolitan City
LWF	Lutheran World Federation
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MFR	Medical First Responder
MIW	Master Instructors' Workshop
ML	Local Magnitude
MOE	Ministry of Education
MOIC	Ministry of Information and Communication
MOFALD	Ministry of Federal Affairs & Local Development
MPPW	Ministry of Physical Planning and Works
MT	Mason Training
NARL	Nepal Amateur Relay League

NATTA	Nepal Association of Tour and Travel Agents
NBC	National Building Code
NCDM	Nepal Centre for Disaster Management
NEC	Nepal Engineering College
NEFEJ	Nepal Forum for Environmental Journalists
NERMP	Nepal Earthquake Risk Management Project
NGO	Non-Government Organization
NIED	National Research Institute for Earth Science and Disaster Prevention
NRCS	Nepal Red Cross Society
NRRC	Nepal Risk Reduction Consortium
NRTC	National Reconstruction Technology Center
NSDRM	National Strategy for Disaster Risk Management
NSET	National Society for Earthquake Technology - Nepal
NWFP	North West Frontier Province
NWSC	Nepal Water Supply Corporation
OFDA	Office of Foreign Disaster Assistance
OJT	On the Job Training
PEER	Program for Enhancement of Emergency Response
PO	Partnering Organizations
PPERS	Project for Pre-Positioning of Emergency Rescue Stores
3PERM	Promoting Public Private Partnerships for Earthquake Risk Management
RADIUS	Risk Assessment tools for Diagnosis of Urban Areas Against Seismic disaster
RED	Regional Education Directorate
RUDO	Regional Urban Development Office
SEEDS	Sustainable Environment and Ecological Development Society
SESP	School Earthquake Safety Program
SIDE	Support for International Disaster Education
SM	Social Mobilizers
TFI	Training for Instructors
TOT	Training of Trainers
TU	Tribhuvan University
UMN	United Mission to Nepal
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	US Dollar
VCA	Vulnerability Capacity Assessment
VDC	Village Development Committee
WCDR	World Conference in Disaster Reduction
WCEE	World Congress on Earthquake Engineering
WDMC	Ward Level Disaster Management Committee
WHO	World Health Organization
WSSI	World Seismic Safety Initiative

NSET Publication

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