

NEA and IEI TSC Joint Venture

**Nepal's National Earthquake Day 2016 –  
&  
IEI-Tripura's Silver Jubilee Year 1995-2015**

# ***Regional Symposium on Seismic Resilience***

NEA's Experience with Gorkha Earthquake **2015:**  
Critical Assessment of Process Adopted and  
Lessons Learnt for RVDA

**Nepal Engineers' Association**

**Er. Kishore K. Jha  
General Secretary**

**Er. Dhruva R. Thapa  
President**

**January 16, 2016**

# About the Nepal Engineers' Association

- Umbrella Organization of Nepalese Engineers – comprising all engineering disciplines including architects, civil, electrical, mechanical, electronics etc.
- Registered as Civil Society with the mandate to safeguard professional rights of engineers and promote development of science and technology – enhance professional ideals – Executive Council- NEA CCEE – NEA BIC
- Members come from both the public and private sector economies – membership strength around 16,000 at present
- Facilitates and coordinates the professional activities of the relevant sister professional societies namely that of Agricultural Engineers (NSAE), Architects (SONA), Computer Engineers (ACEN), Electrical and Communication Engineers (SECEN), Electrical Engineers (SEEN), Irrigation Engineers (SIREN), Mechanical Engineers (SOMEN), Public Health Engineers (SOPHEN), Structural Engineers (SEANep), Technical Auditors (SOTAN), Regional & Urban Planners (RUPSON), Rural Development Engineers (SERDEN), Value Engineers (NVA) and Society of Consulting Engineers and Architectural Firms (SCAEF).
- Also promotes fellowship and goodwill with international engineering associations and institutions – presently NEA is a member of World Federation of Engineering Organizations (WFEO), Federation of Engineering Institute of South and Central Asia (FEISCA) and recently The Asian Civil Engineering Coordinating Council (ACECC). NEA has bilateral relations with IE India, IE Bangladesh, IE Sri Lanka, IE Pakistan, ASCE, JSCE, KSCE. And with CHINA !!!



Government of Nepal  
Ministry of Urban Development  
Department of Urban Development and  
Building Construction  
DUDBC

UNDP - CDRMP

Nepal Engineers'  
Association  
(NEA)

Supporting Professional Societies and Associations		
SEANep	RUPSON	SONA
NGeoS	NGS	NSC
NLSS	SERDEN	AITAAN
ISET-N	&	SCAEF

IOE-TU	KU
NSET	CORD

Mason  
Training

Advance Training on  
Repair and Retrofitting

**RVDA**

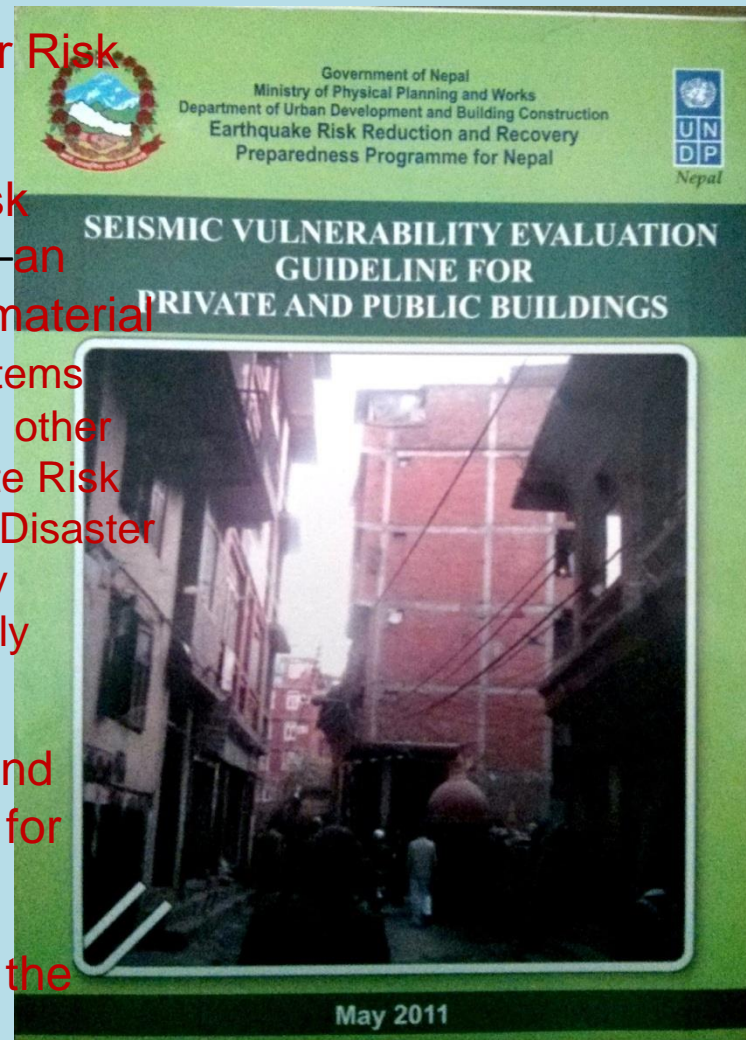
Rapid Visual Damage  
Assessment

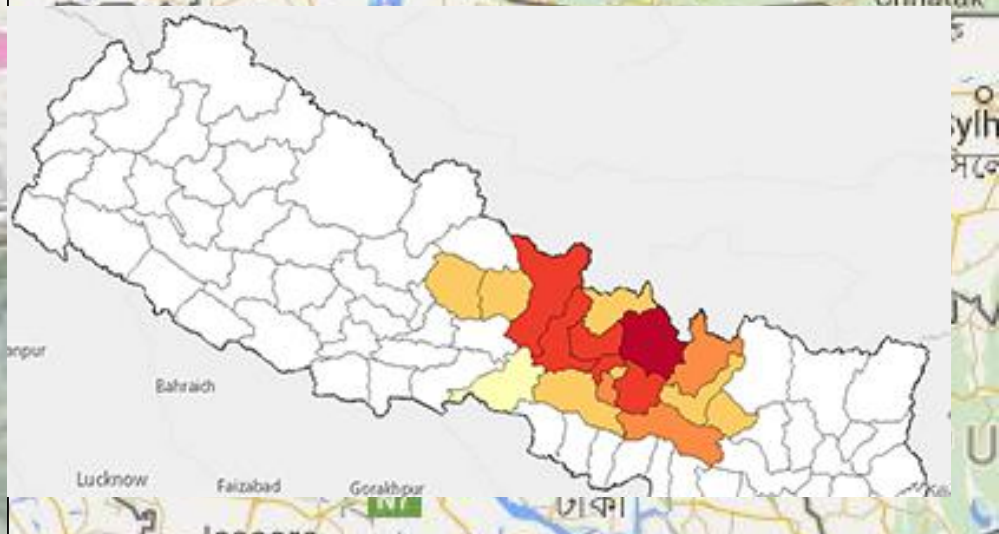
3-Day Training  
to Engineers

Design  
Competition

# Few Observations on Earthquake Preparedness

- Nepal's National Strategy for Disaster Risk Management (NSDRM)
- UNDP's Comprehensive Disaster Risk Management Programme (CDRMP) – an integrated package of technical and material support - . Institutional & Legislative Systems (NBC & RSLUP) - Strategic Linkages with other Sectors and DRM mainstreaming - Climate Risk Management (CRM) - Community Based Disaster Risk Management (CBDRM) - Emergency Preparedness and Response (EPR) - Early Recovery (ER)
- UNDP- Earthquake Risk Reduction and Recovery Preparedness Programme for Nepal – limited to 5 municipalities
- Disaster Management Section within the Ministry of Home Affairs.
- **National Reconstruction Authority** – established by the Act of Parliament in Dec.. 2015
- DISASTER PREPAREDNESS NETWORK NEPAL – DpNet Nepal









# PHOTOS OF DAMAGE

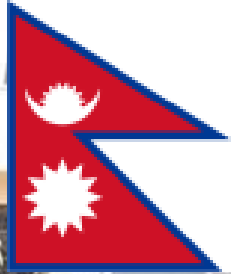






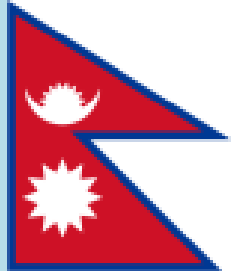


ज्ञान नै शक्ति, श्रम नै भक्ति  
**Build Back Nepal**

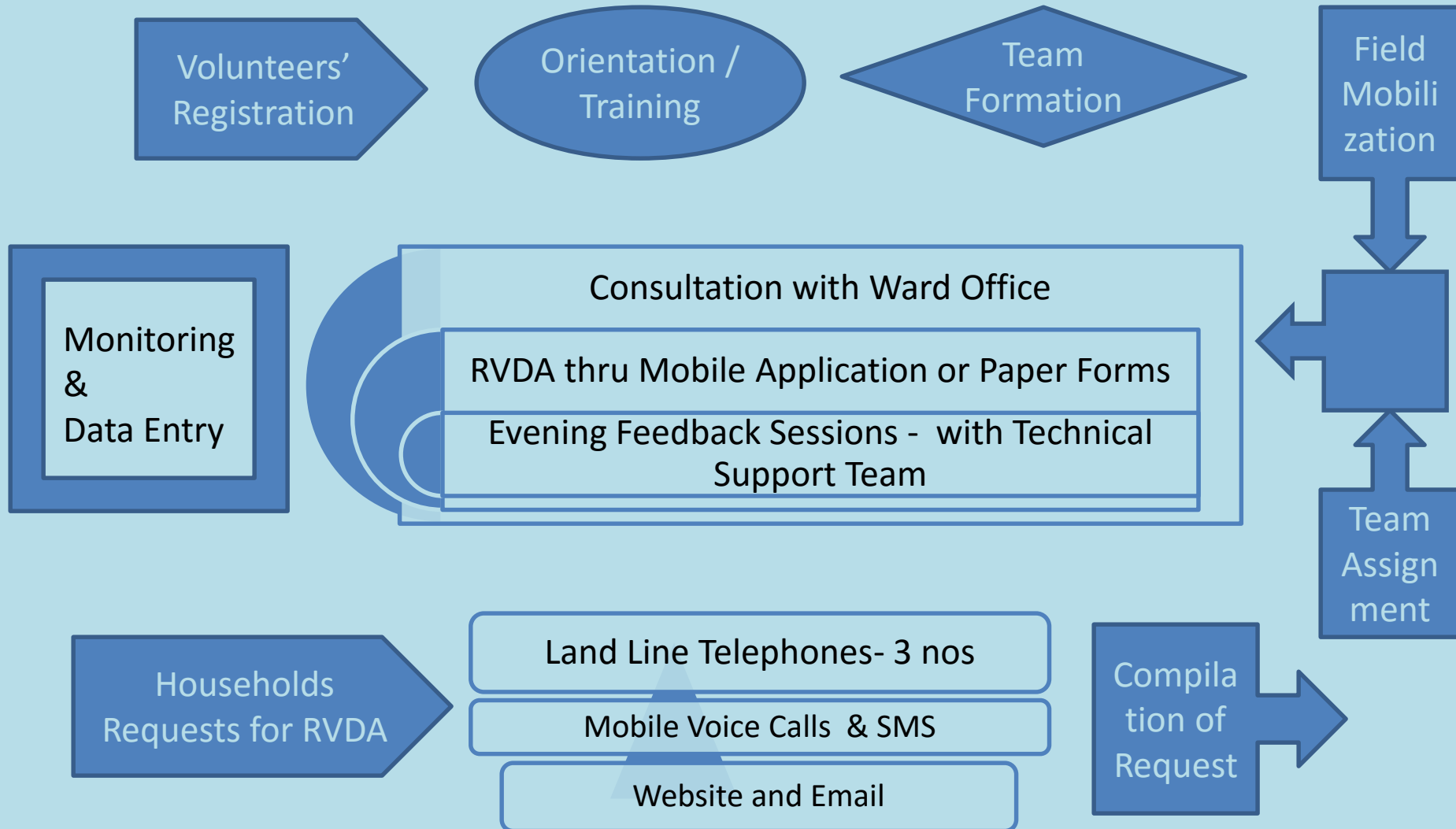




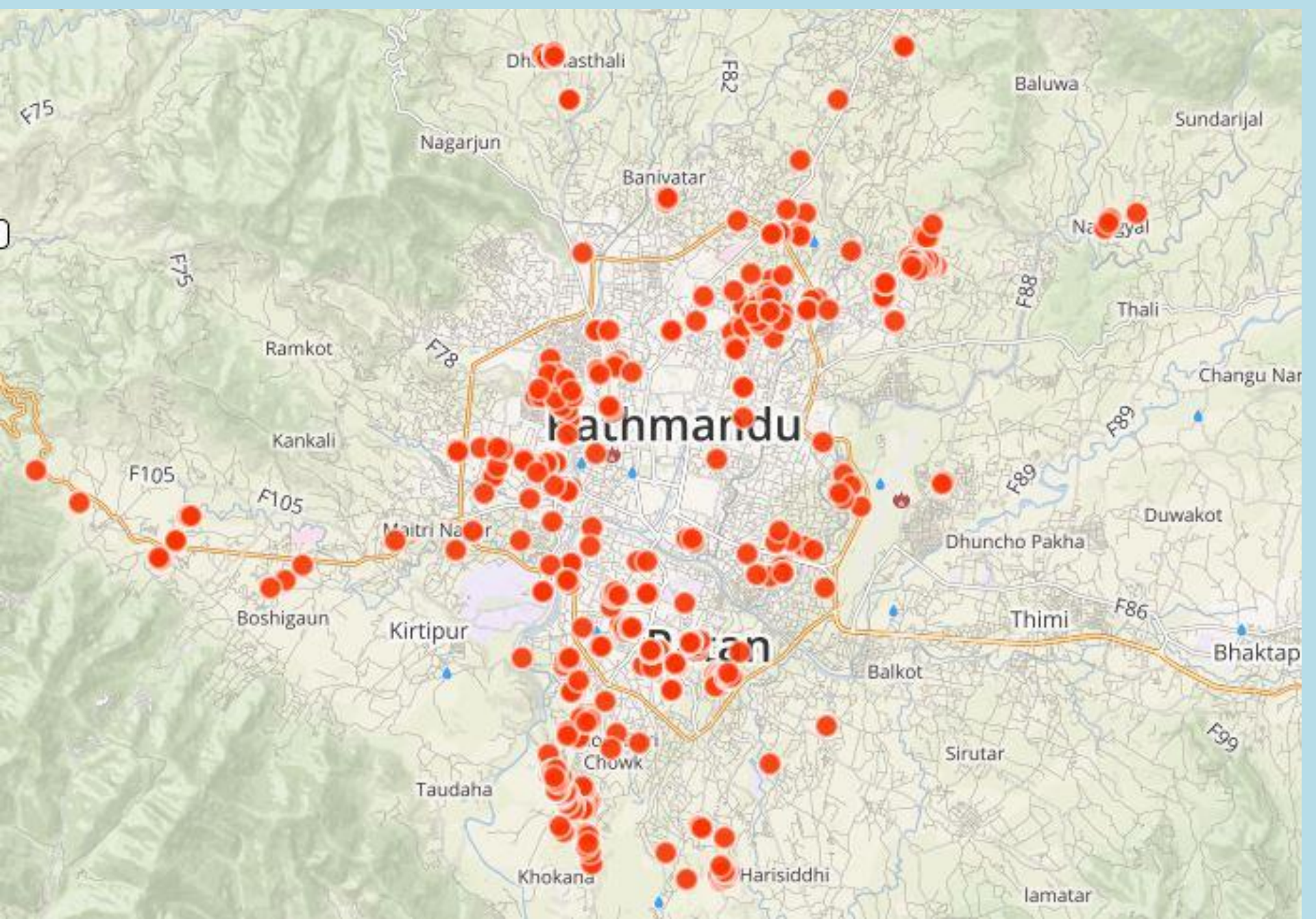
# ज्ञान नै शक्ति, श्रम नै भक्ति Build Back Better Nepal



# The Rapid Visual Damage Assessment .....

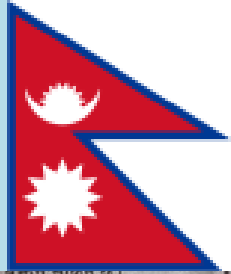


# Graphic Representation of RVDA Data by Kathmandu Living Lab





# ज्ञान नै शक्ति, श्रम नै भक्ति Build Back Better Nepal



भक्तपुर दामा सम्झार क्षेत्रको विटिलको भिटर भूकम्पबाट क्षतिग्रस्त भएको भण्डारण इटार्टि स्थानको। तस्वीर: देवस शोभा/एनएसई

## भवन जाँचन सयौं इन्जिनियर खटिए

भक्तपुर दामा सम्झार क्षेत्रको विटिलको भिटर भूकम्पबाट क्षतिग्रस्त भएको भण्डारण इटार्टि स्थानको। तस्वीर: देवस शोभा/एनएसई

भक्तपुर दामा सम्झार क्षेत्रको विटिलको भिटर भूकम्पबाट क्षतिग्रस्त भएको भण्डारण इटार्टि स्थानको। तस्वीर: देवस शोभा/एनएसई

भक्तपुर दामा सम्झार क्षेत्रको विटिलको भिटर भूकम्पबाट क्षतिग्रस्त भएको भण्डारण इटार्टि स्थानको। तस्वीर: देवस शोभा/एनएसई



भक्तपुर दामा सम्झार क्षेत्रको विटिलको भिटर भूकम्पबाट क्षतिग्रस्त भएको भण्डारण इटार्टि स्थानको। तस्वीर: देवस शोभा/एनएसई

## नेपाल इन्जिनियर्स एसोसिएसनद्वारा जारी अपिल

गत मिति २०७२ बैशाख १२ गते शनिवारका दिन भएको विनाशकारी महाभूकम्पका कारण मूलुकमा भएको ठूलो जनघनको क्षतिले इन्जिनियर समुदाय लगायत सबै नेपाली दिदी बहिनी तथा दाजुभाईलाई दुःखित र मर्माहत बनाएको छ । यस एसोसिएसन भूकम्पमा परि ज्यान गुमाउनुहुने सम्पूर्ण दिवंगत आत्माप्रति हार्दिक श्रद्धाञ्जली अर्पण गर्दै शोकसन्तप्त परिवारमा हार्दिक समवेदना प्रकट गर्नुको साथै उक्त घटनामा घाइते भई उपचाररत व्यक्तिहरुको शीघ्र स्वस्थ लामको कामना गर्दछ ।

यस विपद्को घडिमा सबैले अत्यन्त संयम र धैर्यताका साथ परिस्थितिको सामना गर्नु नै अहिलेको यथार्थ हो । यसै परिप्रेक्ष्यमा भूकम्पबाट क्षतिग्रस्त भौतिक संरचनाहरुको विश्लेषण गरी पिडित घरघनीहरुलाई घरमा बस्न हुने वा नहुने संबन्धमा प्राविधिक सल्लाह दिने अभियान स्वरूप नेपाल इन्जिनियर्स एसोसिएसनले IOE, NSC(DOMG), SCAEF, SONA, NSET, CORD, NGS, NLSS, RUPSON, SERDEN, SEANep, NGtS./ AITAAN समेतको संयुक्त सहकार्यमा गत बैशाख १८ गते देखि उपत्यका लगायत बाहिरका स्थानहरुमा स्वयंसेवक विज्ञ टोली परिचालन गरी रिपोर्ट लिने कार्य गरिरहको छ । हालसम्म २६०० भन्दा बढि इन्जिनियरहरु संबद्ध तोकिएका स्थानहरुमा खटिई लगभग २० हजार भन्दा बढी घरहरुको जायजा लिने कार्यसम्पन्न भैसकेको र यो कार्यलाई निरन्तरता दिन नेपाल इन्जिनियर्स एसोसिएसन प्रयत्नशील छ ।

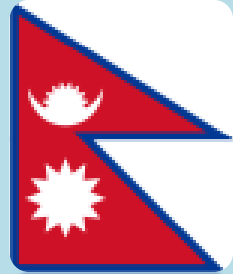
सिमित जनशक्ति र घरघनीहरुको मागको अत्याधिक चापका कारण तत्काल निरिक्षण कार्य सम्पन्न गर्न नसकियता पनि प्राथमिकताको आधारमा हाम्रो टोली अवश्य पनि संबन्धित घरघनिको घर निरिक्षण गर्न पुग्ने व्यहोरा सम्पूर्ण सर्वसाधारणमा जानकारी गराउँदछौ । नेपाल इन्जिनियर्स एसोसिएसन तथा सहकर्मी संस्थाहरु मार्फत क्षतिग्रस्त भवनहरुको निरिक्षणमा जाने टोलीले कोही कसैको घरमा रातो, पहेलो र हरियो स्टीकर टाँस गर्ने कार्य नगरेको तर सम्बन्धित घरमा बस्न हुने, नहुने वा सर्तकताकासाथ बस्न सकिने भनि प्राबिधिक सल्लाह मात्र प्रदान गर्ने गरेको व्यहोरा अनुरोध गर्दै विनाशकारी भूकम्प पश्चात क्षतिग्रस्त भएका भवनहरुको निरिक्षणमा गएका टोलीलाई यस एसोसिएसनको आधिकारीक परिचय-पत्र सहित पठाइएको व्यहोरा जानकारी गराउँदछौ । यस सम्बन्धमा खटिएको टोली सम्बन्धित कुनै गुनासाहरु भएको खण्डमा मोवाईल नं. ९८५१०२५६०० मा सम्पर्क गरी जानकारी गराउन हुन समेत संबन्धित सदैमा यसै सूचनाद्वारा हार्दिक अपिल गर्दछौ ।

**शिवम् सिमेन्ट**  
जगद्वितको लामि जारी नेपाल इन्जिनियर्स एसोसिएसनको अभियानमा शिवम् सिमेन्टको सहकार्य  
"घर राख्ने मात्र होइन, बलियो पनि बनाऔ गुणस्तरमा कठिन्दा सञ्जनीता नगरी"

असली O.P.C. सिमेन्ट



ज्ञान नै शक्ति, श्रम नै भक्ति



## NEA's Intervention

### 1. Rapid Visual Damage Assessment (RVDA)

- Total Engineer volunteers Mobilized : 3500
- Buildings Inspected : 65000+
- Suitable for Habitation : 51%
- Suitable for Restricted Use : 31%
- Not suitable for Habitation : 18%
- All done without any external financial support
- Many groups from different country cooperated particularly for Institutional Buildings
- Also RVDA of 150 nos mobile towers for NTA.



# ज्ञान नै शक्ति, श्रम नै भक्ति Build Back Better Nepal



## 3-day Training on Post Damage Assessment Repair and

From	To	Day 1	Contents	Resource
10:00	11:00	Introduction and Course Objectives	Objectives of program, Objectives of Training, Methodology of Training, Gorkha Earthquake	DUDBC/NEA
11:00	11:30	Building Categorisation	Common types of Building and practices in Nepal	IOE
11:30	11:45	Tea Break		
11:45	13:00	Behaviour of Masonry Buildings and Failure Patterns	Types of damages and it's implication , grades of damage, Decision making framework, grade of motor, brick & masonry buildings	NSET
13:00	13:45	Lunch Break		
13:45	15:45	Behaviour of RC Buildings and Failure Patterns	Types of damages and it's implication , grades of damage, Decision making framework	RD/CORD
15:45	17:30	Detail Damage Assessment Process - Masonry Buildings / RC Buildings (Qualitative Assessment)	Objectives of Assessment , methodology, outcome, Exercise	NSET
		Day 2		
10:00	10:30	Nepal Seismic Standard	General philosophy on NBC 105	JB
10:30	12:00	Shoring and Stabilization of Damaged Buildings	why and how?, Techniques and materials of shoring and stabilization	JB
12:00	12:15	Tea Break		
12:15	13:15	Introduction to Repair , Restore and Retrofit	Differences on Repair , restore and retrofit	CORD
13:15	14:00	Lunch Break		
14:00	16:00	Repair of RC Buildings	Strategies on Repairing for different damage grades, Deciding remediation Strategies	CORD/RD
16:00	17:30	Case Studies on Damaged RC Buildings		NSET
		Day 3		
10:00	12:00	Repair and Strengthening on Masonry buildings	Strategies on Repairing for different damage grades, Deciding remediation Strategies	JB
12:00	12:15	Tea Break		
12:15	13:45	Case Studies on Damaged Masonry buildings		NSET
13:45	14:30	Lunch break		
14:30	16:00	Geotechnical Input		BS
16:00	17:00	Post Training Assessment		
17:00	17:30	Closing		NEA

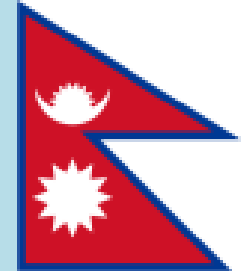




ज्ञान नै शक्ति, श्रम नै भक्ति

**Build Back better Nepal**

**3-day Training on Post Damage Assessment Repair and Strengthening**



Empowering Engineers  
For Prosperous Nepal



Empowered lives.  
Resilient nations.

**Capacity Development of Engineers**

on

**Post Damage Assessment and Repair & Strengthening of  
Masonry / Reinforced Concrete Buildings**

July 8-10,

2015 Batch - 14

Engineer Bhawan, Pulchowk

Organized by:

**Department of Urban Development & Building Construction**

**Nepal Engineers' Association**

Supported by:

**UNDP's Comprehensive Disaster Risk Management Programme - Nepal**

**Technical support: IOE, , NSET, CoRD**

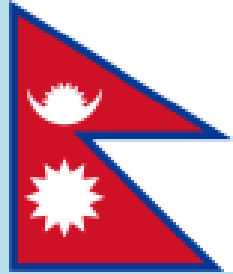
**Supporting Organizations: KU, SCEAF, NSC, SONA, RUPSoN, NGS, NGeoS, NLSS, SEANep, SERDEN, AITAAN, ISET-N**



ज्ञान नै शक्ति, श्रम नै भक्ति

# Build Back better Nepal

## 3-day Training on Post Damage Assessment Repair and Strengthening

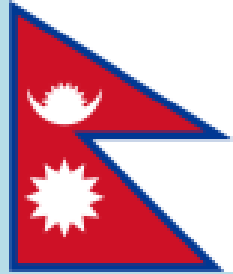


Government of Nepal  
Department of Urban Development and Building Construction  
&  
Nepal Engineers' Association  
**TRAINING ON  
POST DAMAGE ASSESSMENT, REPAIR & STRENGTHENING  
of  
MASONRY AND REINFORCED CONCRETE STRUCTURES**  
20-22 May, 2019  
Engineers' Workshop, Kathmandu,  
Technical Support  
from UNICEF  
Supporting Institutions  
ICAT, DINA, RUPAK, SARAD, SERDEN, INDR, INPR, MESS, NSC & AJTAAH





ज्ञान नै शक्ति, श्रम नै भक्ति  
**Build Back better Nepal**



# Advanced Training on Seismic Assessment and Strengthening of Existing Buildings

September-October, 2015

Technical Support:

**AECOM**, New Zealand

(Supported by: Government of New Zealand)

Jointly Organized by:



**AECOM**



Supporting Organization:



AITAAN,

CoRD,

ISET-N,

KU,

NGS,

NGS,

NLSS,

NSC,

NSET,

RUPSON,

SCAEF,

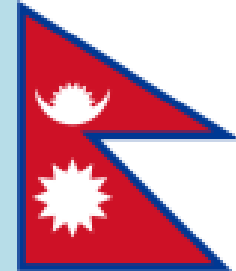
SEANep,

SERDEN,

SONA,



# ज्ञान नै शक्ति, श्रम नै भक्ति Build Back Better Nepal



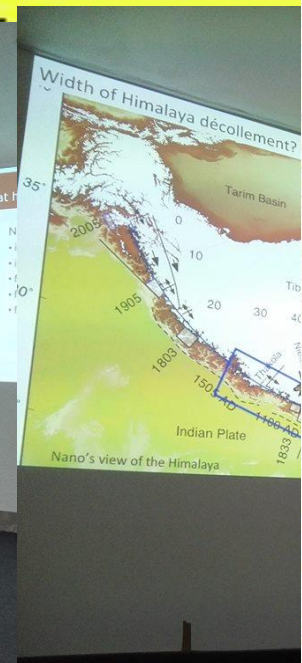
ज्ञान नै शक्ति श्रम नै भक्ति



नेपाल इन्जिनियर्स एसोसिएसन

## अन्तरकृया कार्यक्रम

भुकम्पले पुर्‍याएको क्षति र त्यसपछिको अ

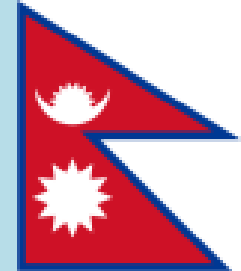


### EARTHQUAKE TALK

Sustainable Reconstruction after Nepal Earthquake 2015	Dr. Raj Kapur Shah, BEng, MEng, PhD, FHEA, ICIOB Senior Lecturer in Built Environment, Faculty of Technology & Environment Liverpool John Moores University, Liverpool, UK
Role of ICT In Reconstruction and Rehabilitation	Sushil Pandey, ICIMOD
The Cultural Heritage Disaster	Mr. Kai Weise, Coordinator, Earthquake Response for Cultural Heritage, UNESCO – Department of Archaeology, Government of Nepal
Pre-disaster Mitigation and Commentary on public safety as a result of the 2015 Gorkha-Nepal Earthquake	Er. Ananta Ram Baidya, P.E., Chairperson, Nepal Liaison Committee, American Society of Nepalese Engineers, Former Visiting faculty, KU
Overview of Wood, Masonry, Steel, Concrete Building Practices in U.S. (California) with Focus on Seismic Design	Er. Suresh Acharya, P.E., S.E., District Structural Engineer, Division of State Architect, State of California, USA
Post-Earthquake Building Demolition Methods	Mr. Lawrence Kwok, Project Director, Multi Demolition, Malaysia
Learning from Experience	Prof. Santiago Pujol, Lyles School of Civil Engineering, Purdue University, U.S.A.
The Challenges of Reconstruction (housing) after the April 25 2015 Nepal Earthquake and Way out	Er. Jitendra Bothara, Technical Director-Seismic Engineering, Miyamoto International NZ Ltd
Current Failures due to Earthquake & Some Remedies	Jagadishwar man Shrestha, Structural Engineer.
Owner Driven Reconstruction: An Approach for Successful Rehabilitation	Vivek Rawal, Founding member and Former convener of Owner Driven Reconstruction Collaborative (ODRC)
Anchoring & Rebaring Technology as Needed for Retrofitting Paper 1 Paper 2 Paper 3 Paper 4	Prashant Anand, National Technical Manager – Energy (Hill India)
Repair and Seismic Improvement of Non-Engineered Unreinforced Masonry Houses Paper 1 Paper 2	Rajendra Desai, Structural Engineer Hon. Jt. Director, National Centre for Peoples'-Action In Disaster Preparedness, Ahmedabad, Gujarat
Geotechnical Aspects of Gorkha Earthquake & Its Importance in National Building Code Revision	Er. Binod Tiwari, Ph.D., P.E., Associate Professor, California State University
Strategy for Mitigation of Damage and Recovery from large Disasters -	Prof Shoichi Ando - GRIPS
Earthquake study by MNIT Team A	
Earthquake Study by MNIT Team B	
Earthquake Study by MNIT Team C	
Overview of Structural Control in the Context of Retrofitting_ Nepal Gorkha Earthquake, 2015 - Damage situation and Interpretation of it for better rehabilitation and reconstruction of Nepal_	Prof TK Datta, IIT Delhi
Seismic Assessment & Strengthening of Unreinforced Masonry Building	Prof Shinichiro Mori, Ehime University
The mechanism of Nepal 2015 Earthquake	Prof. Jason Maxwell Ingham, University of Auckland
	Prof Roger Billham, University of Colorado Boulder Campus



# ज्ञान नै शक्ति, श्रम नै भक्ति Build Back Better Nepal





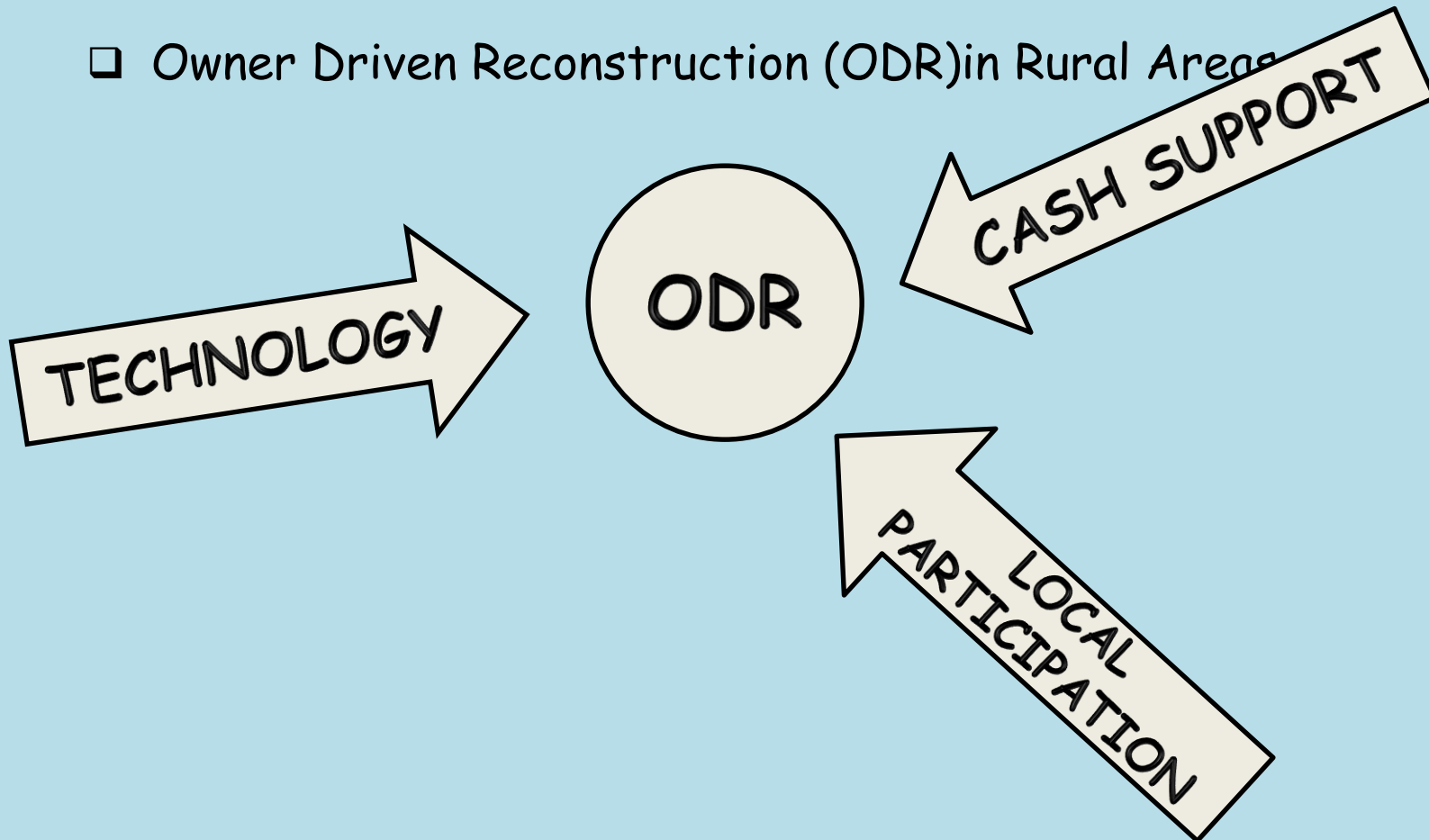
ज्ञान नै शक्ति, श्रम नै भक्ति



## D. Re-Construction

➤ Various Modalities of re-construction can be adopted, among which ODR may be appropriate for Nepal at present

- ❑ Owner Driven Reconstruction (ODR) in Rural Areas



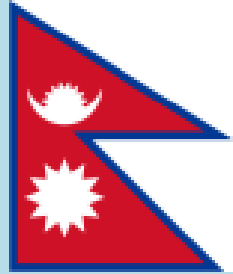
# RURAL HOUSING





ज्ञान नै शक्ति, श्रम नै भक्ति

## ODR



- Sustainable
- Preservation of Culture, Tradition and Heritage
- Economy
- Insures Peoples' involvement
- Insures people's confidence in building
- Insures disaster resistant building
- Economic and efficient use of resources

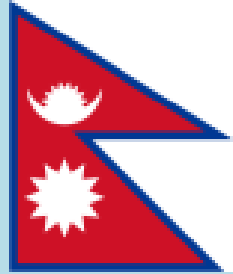


- Faster Recovery/Reconstruction
- High level of accountability and transparency
- Easy to manage
- Uses salvage materials





ज्ञान नै शक्ति, श्रम नै भक्ति



# Owner Driven Re- construction (ODR)



- People will have their say in all the decision making except technology
- High level of Satisfaction
- Can be built with much lesser resources
- Individual Requirements are better addressed

- Combination of Needs + Status Symbol + Aspiration + many other considerations
- Cultural affinity
- Techno-Socio-Economic and cultural approach
- But not Techno-Managerial approach
- Proven in Gujrat - India, Srilanka, Indonesia, etc.





# Nepal Engineers' Association

## EXPRESSION OF INTEREST

### Design Competition for Rural Housing-2015

(With emphasis on Earthquake Resistant Housing that preserves local Heritage, Culture & Tradition using Local Construction materials and Resources)

**Nepal Engineers Association (NEA)**, in collaboration with **GON (MOUD)** and Comprehensive Disaster Risk Management Program of **UNDP**, hereby invites **Expression of Interest** from the individual or the Group of Individuals or the Organized Institutions to register as Prospective Participants in Design Competition for Rural Housing-2015. The registered Participants shall submit their Design Proposals as per the RFP issued (*will be mailed to Registered Participants*) to them that contains Instructions for Participation and the Terms of Reference.

#### Prizes:

##### Category A: Professionals (Practicing Architects & Engineers)

- a) First Prize – One -@ NRs. 200,000/-
- b) Second Prize – Three- @NRs. 100,000/- Each
- c) Consolation – Ten - @NRs. 75,000/- Each

##### Category B: Students (Final Years B. Arch / B.E. Students)

- a) First Prize – One -@NRs. 100,000/-
- b) Second Prize – One- @ NRs. 50,000/-
- c) Consolation – Two - @NRs. 25,000/- Each

#### Deadline:

Registration: **Dec-7, 2015, 4:00 PM**  
Submission of Design: **Dec-22, 2015, 4:00 PM**

**For Further Details:** Nepal Engineers' Association, Landline: +977-1-5010252, 5010253, Mobile: +977-9851187989, 9851129566, 9851166982 Email: [nea24@mail.com.np](mailto:nea24@mail.com.np), [www.neanepal.org.np](http://www.neanepal.org.np)

**Registration:** (Mail to [nea24@mail.com.np](mailto:nea24@mail.com.np), or Submit to NEA Office)  
<http://www.neanepal.org.np/showmodule.php?what=ruralhouse&under=home>



Professional Participant Winner list				Prize Money
SN	Code	Name	Status	
1	16	Sandip Puri & Suyog Kayastha	1st	200,000
2	35	Sudip Adhikari	2nd	100,000
3	26	Needle Weave Pvt. Ltd	2nd	100,000
4	36	Dibyasyor Lamichhane	2nd	100,000
5	42	Siphon Engineering Consultancy	Consolation	75,000
6	21	Mr./Mrs. M.L. Kayastha & Associates Pvt. Ltd	Consolation	75,000
7	6	Achut Bikram Thapa, Prasanna Ghimire	Consolation	75,000
8	49	Sustainable Mountain Architecture	Consolation	75,000
9	17	Design Inc. Pvt. Ltd	Consolation	75,000
10	34	Matrix Design Consult. Pvt. Ltd	Consolation	75,000
11	57	Srijana Koirala & Sanajaya Maharjan	Consolation	75,000
12	8	Surendra Khanal	Consolation	75,000
13	33	Anuja Rajkarnikar, Bipashana Tuladhar, Parikshya Singh, Pranisha Karmacharya	consolation	75,000
14	54	Yam Rai & Arjun Basnet	consolation	75,000



SN	Name	Code	Status	Prize Money
1	Pratik Lohani, Sanjay Neupane	DCRH-NEA-32	1st	100,000
2	Gaurab Dangol, Monila Pradhan	DCRH-NEA-24	2nd	50,000
3	Sandika Poudyal, Sadichchha Shrestha, Swornima Munankarmi	DCRH-NEA-19	consolation	25,000

**THANK YOU**

**ANY QUESTIONS...??**