

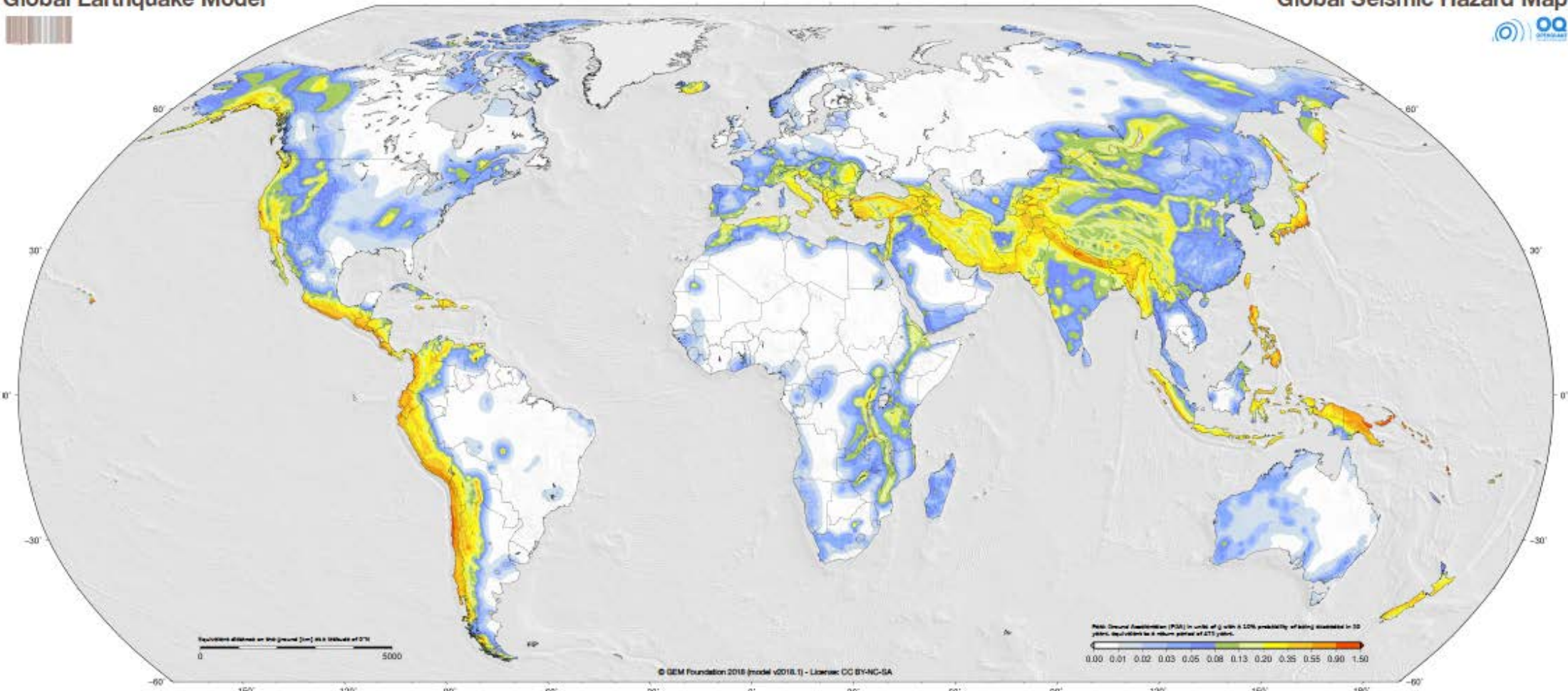
24th Earthquake Safety Day 2022

Interaction on "Role of Civil Society Organizations (CSOs) in Earthquake Safety Campaign"

January 18, 2022

Scenario of earthquakes in Nepal and the Role of Civil Society Organizations (CSO) in Earthquake Safety Promotion

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Executive Director, NSET



Global Earthquake Model (GEM) Global Seismic Hazard Map

The Global Earthquake Model (GEM) Global Seismic Hazard Map (version 2018.1) depicts the geographic distribution of the Peak Ground Acceleration (PGA) with a 10% probability of being exceeded in 50 years, computed for reference soil conditions (linear wave velocity, V_s of 760-820 m/s). The map was created by collating maps computed using uniform and regional probabilistic seismic hazard models developed by various institutions and projects, and by GEM Foundation scientists. The OpenQuake engine, an open-source seismic hazard and risk calculation software developed primarily by the GEM Foundation, was used to validate the hazard values. A smoothing methodology was applied to homogenize hazard values along the model borders. The map is based on a database of hazard models developed using the OpenQuake engine data format (OSM). These models originally implemented in other software formats were converted into OSM. While translating these models, certain details were performed to test the compatibility between the original results and the new results computed using the OpenQuake engine. Details of the differences between the original and translated model results are given, introducing some diversity in modeling methodologies implemented in different hazard modeling software. The hazard areas in this map (e.g., boundaries) are currently not covered by a hazard model. The map and the underlying database of models are a dynamic framework, capable to incorporate newly released input models. Due to possible model distribution, regions populated with low hazard may still experience potentially damaging earthquakes. The GEM Foundation plans to release future updates of this map on a regular basis as new information becomes available. Technical details on the compilation of the hazard and risk maps and the underlying models are available at <http://www.globalquakeearthquake.org/>.

How to use and cite this work:
Please cite this work as: M. Poggi, J. Garcia-Prados, R. Diaz, K. Johnson, V. Poggi, R. Ripoli, G. Woodruff, M. Stokich, D. Vignali, L. Davoli, G. Muscat (2018), Global Earthquake Model (GEM) Seismic Hazard Map (version 2018.1). December 2018, DOI: 10.13111/OSM-GEM-HAZARD-MAP-2018.1. This work is licensed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (CC BY-NC-SA). <https://creativecommons.org/licenses/by-nc-sa/4.0/>

Acknowledgements:
This map is the result of a collaborative effort and extensively relies on the contribution and commitment of various organizations and projects to openly share and collaborate. The creation of this map would not have been possible without the support provided by many public and private organizations during GEM's second implementation phase (2014-2018). These key contributions are particularly acknowledged. None of the world have been provided without the substantial support of all GEM Stakeholder. The map was plotted using the Sharc Mapping Tools website (Poggi et al., 2017).

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Via Paravia, 1 - 37129, Pavia, Italy
info@globalquakeearthquake.org
More information available at: <http://www.globalquakeearthquake.org/>



Contributing models

- 1. Global Earthquake Model (GEM) Foundation**
The GEM Foundation is a non-profit organization that provides the infrastructure and support for the GEM project. It is a global network of scientists and engineers working together to improve our understanding of earthquakes and to reduce the risk to society.
- 2. International Seismological Centre (ISC)**
The ISC is a global network of national seismic agencies that provides the world's most complete and reliable seismicity data. It is a key component of the GEM project.
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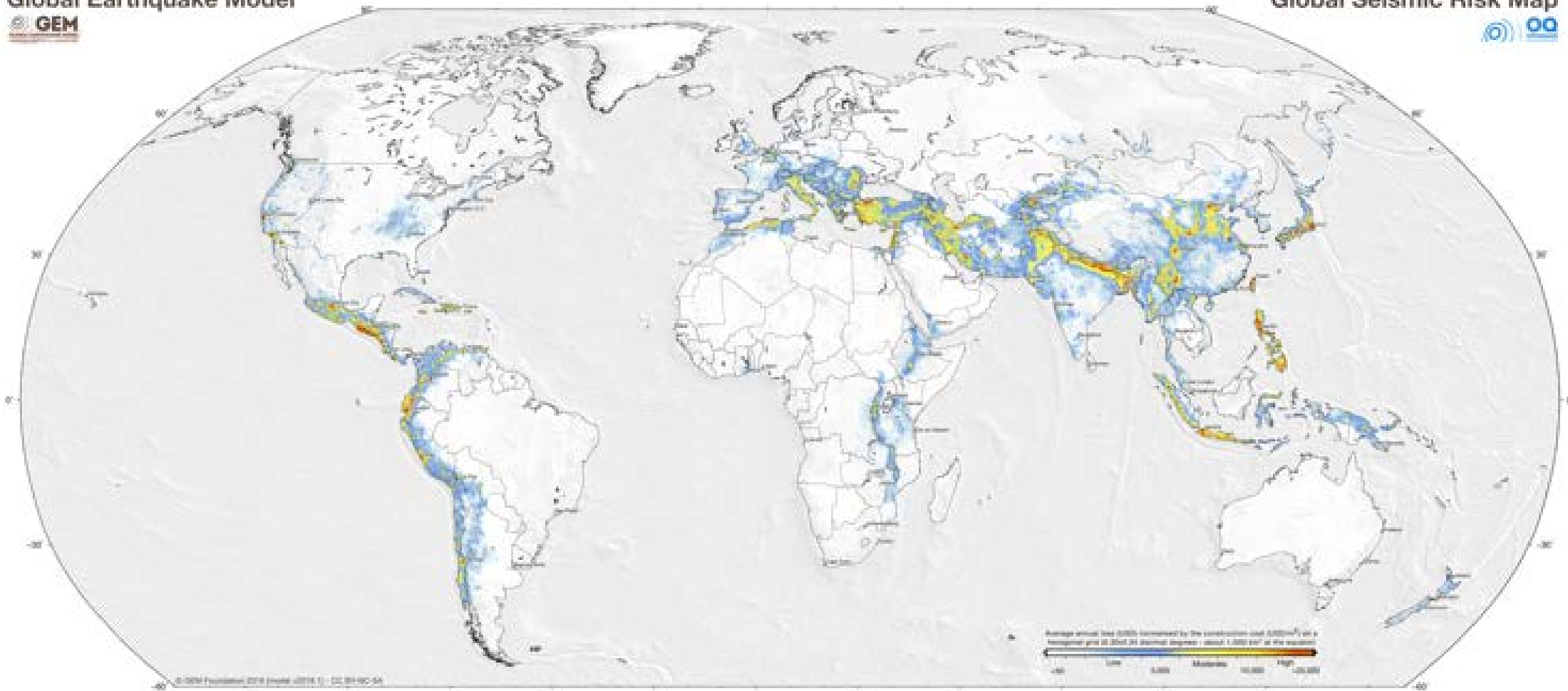


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Legal statements

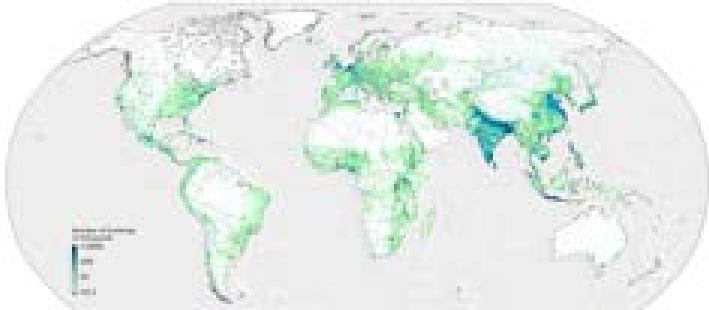
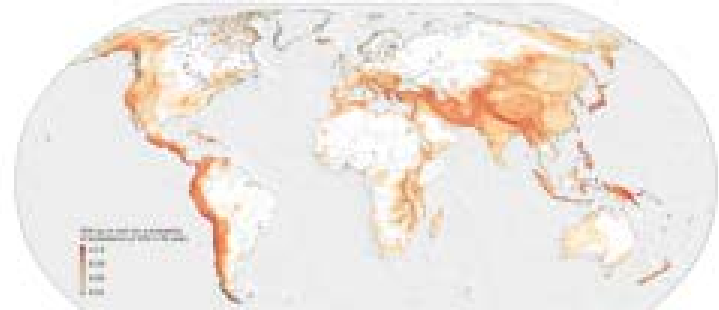
This map was created for dissemination purposes. The information included in this map may not be used for the design of earthquake-resistant structures or to suggest any important decision involving human life, capital and economic investment. The value of seismic hazard in this map is not considered an alternative nor do they replace building actions defined in national building codes. Readers seeking this information should consult national legislation. The hazard map is the combination of results computed using 20 hazard input models covering the world majority of countries. These models represent the best information publicly accessible, and the GEM Foundation recognizes their variability and uncertainties. This hazard map results from an integration process that is using the responsibility of the GEM Foundation.



Global Seismic Hazard Map

Global Exposure Map

Global Seismic Fatalities Map



Global Earthquake Model (GEM) Global Hazard Map
 The Global Hazard Map (GEM-HM) provides the global hazard... The hazard levels are based on the average annual loss (2025) of a 1000 km² of the world... The hazard levels are based on the average annual loss (2025) of a 1000 km² of the world... The hazard levels are based on the average annual loss (2025) of a 1000 km² of the world...

Global Earthquake Model (GEM) Exposure Map
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Global Earthquake Model (GEM) Fatalities Map
 The Global Fatalities Map (GEM-FM) provides the global fatalities... The fatality levels are based on the average annual loss (2025) of a 1000 km² of the world... The fatality levels are based on the average annual loss (2025) of a 1000 km² of the world... The fatality levels are based on the average annual loss (2025) of a 1000 km² of the world...

How to use the maps
 The maps are available in various formats... The maps are available in various formats... The maps are available in various formats... The maps are available in various formats... The maps are available in various formats...

Disclaimer
 The maps are an information product created by the GEM Foundation... The maps are an information product created by the GEM Foundation... The maps are an information product created by the GEM Foundation... The maps are an information product created by the GEM Foundation... The maps are an information product created by the GEM Foundation...

Sponsors and major contributors
 The GEM Foundation is supported by various organizations... The GEM Foundation is supported by various organizations... The GEM Foundation is supported by various organizations... The GEM Foundation is supported by various organizations... The GEM Foundation is supported by various organizations...

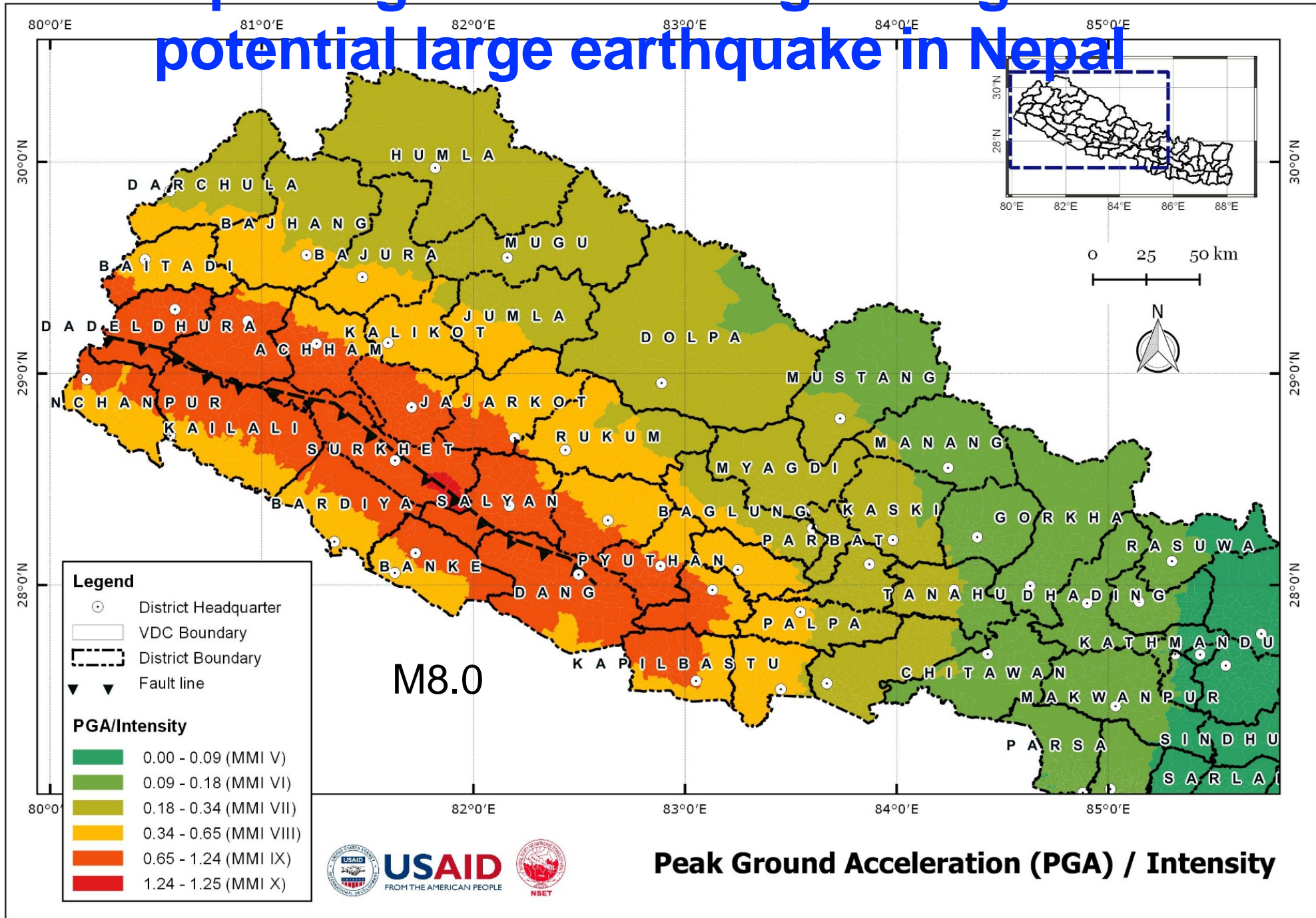
Continue existence of high hazard and risks

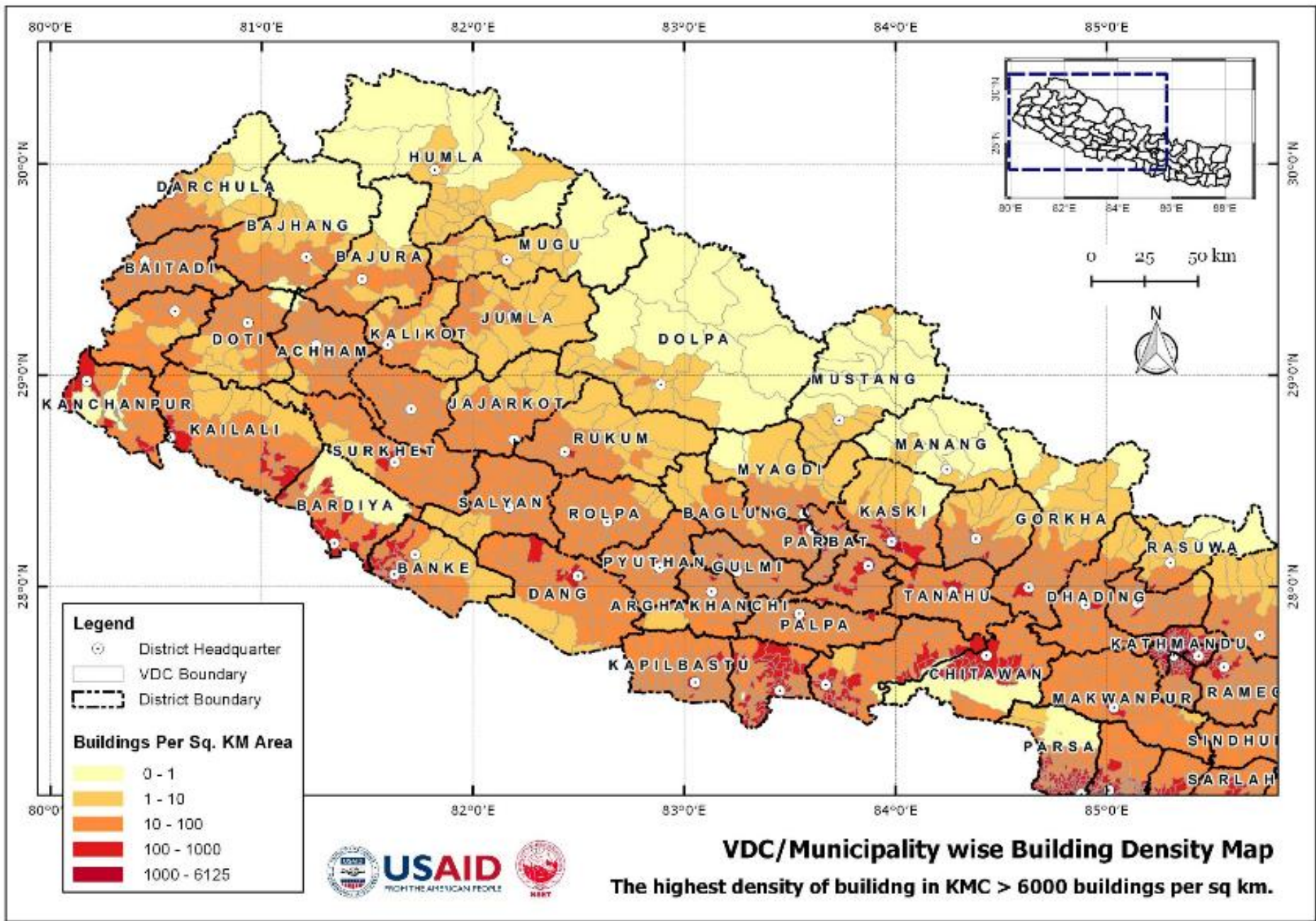
- **The hazard is still there**
- **We have high vulnerabilities (buildings, structures, urban planning), and lower level of preparedness**
 - We are continuously increasing the vulnerabilities
- **Hence, the risk is still very high, and risk is increasing day by day**

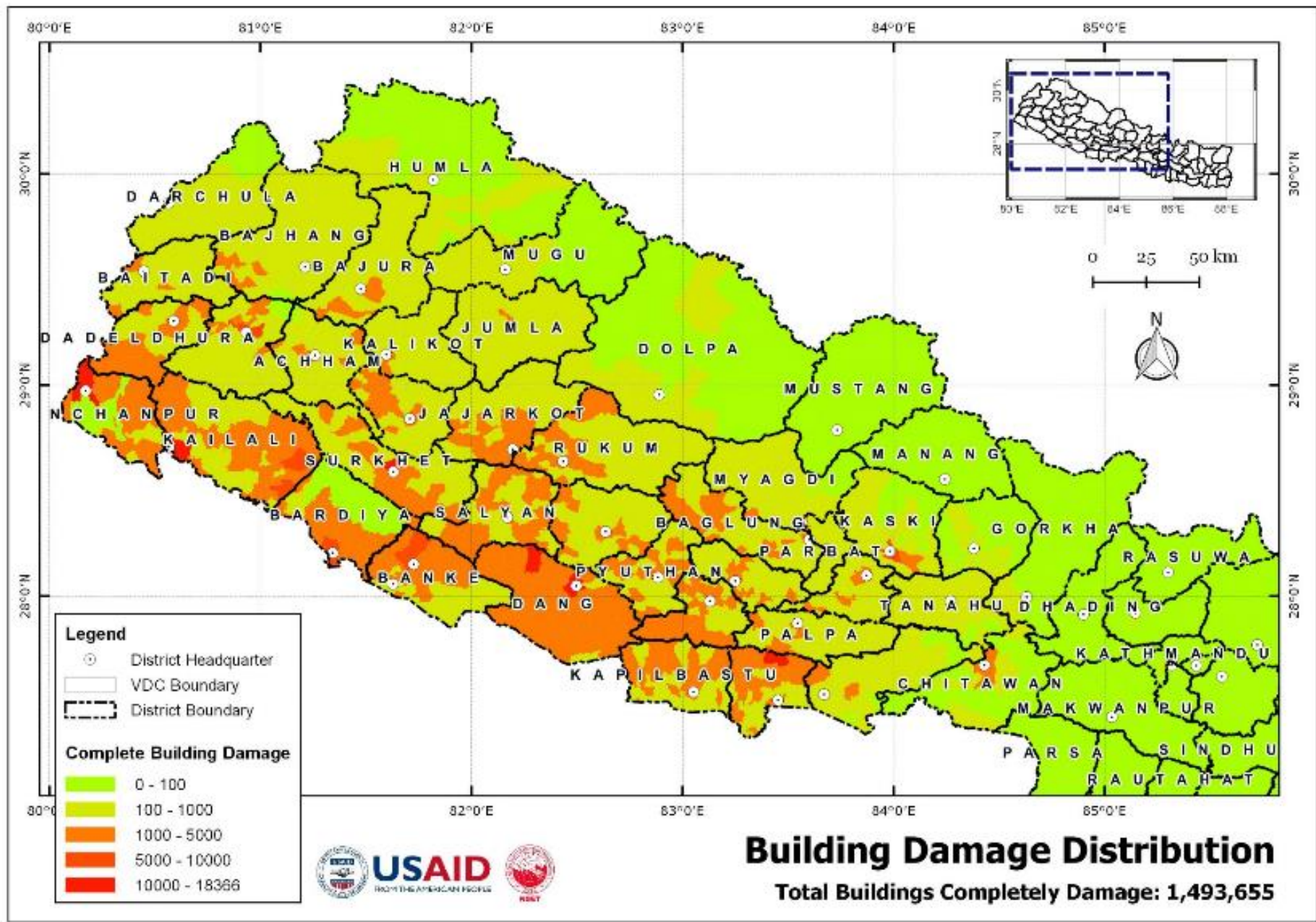
Potential of large earthquakes - 2015 Earthquake was just an alarm

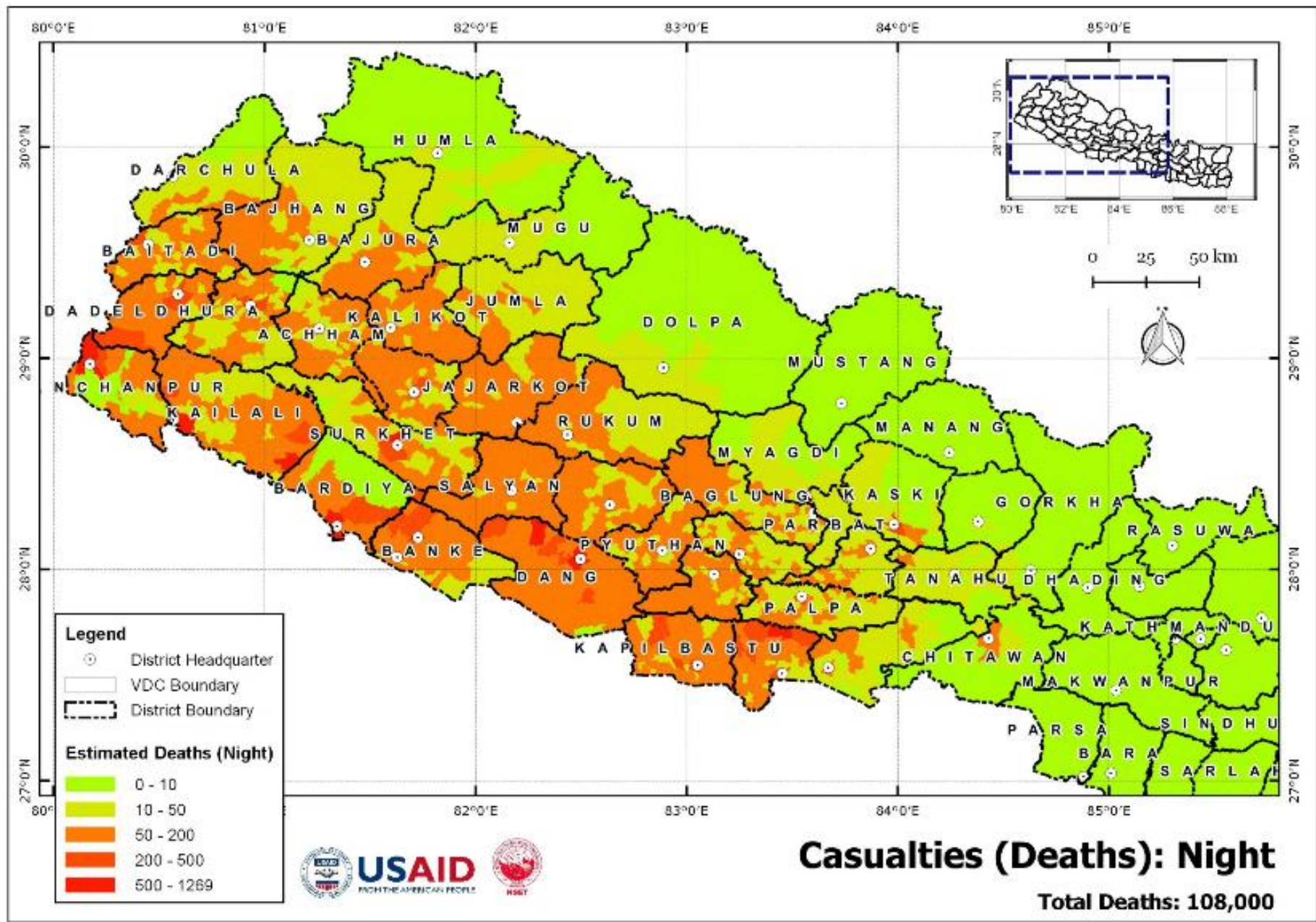
Potential of many day-to-day hazards

Earthquake ground shaking during a future potential large earthquake in Nepal

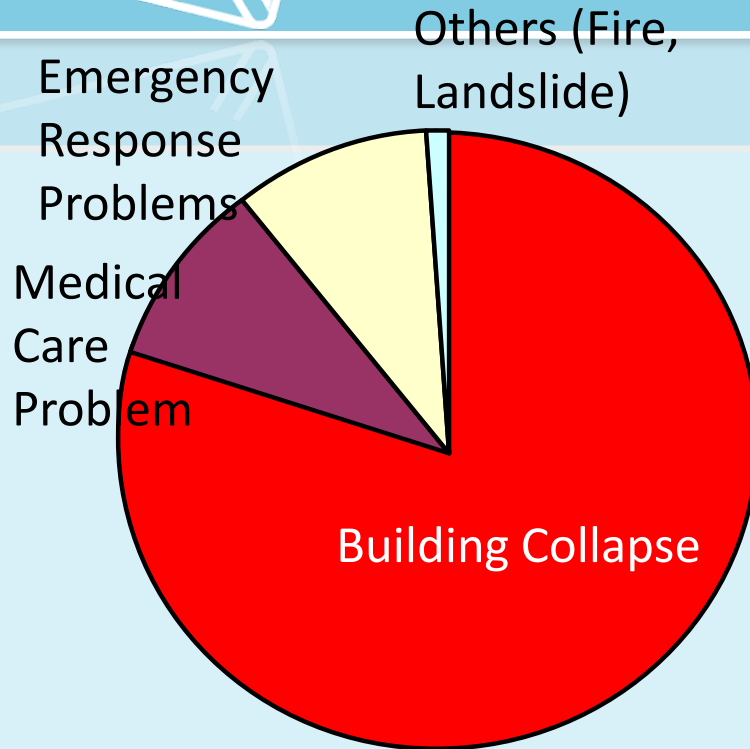








Sources of Earthquake Risk



(GESI, 2003)



(April 25, 2016 Gorkha Earthquake)



Only way of Reducing Casualty: Safe Buildings



Earthquake Risk Reduction

Why Risk Reduction?

- For a city ward of approx. 20,000 households and 72,000 population, and considering moderate size earthquake

Option	Property cost	Death	Injury	Equivalent death*	Live saved
No retrofit	\$142.67 mil	162.35	250.94	167	-
Minor retrofit	\$67.87 mil	33.08	53.46	34	133
Major Retrofit	\$112.84 mil	3.21	13.14	4	163

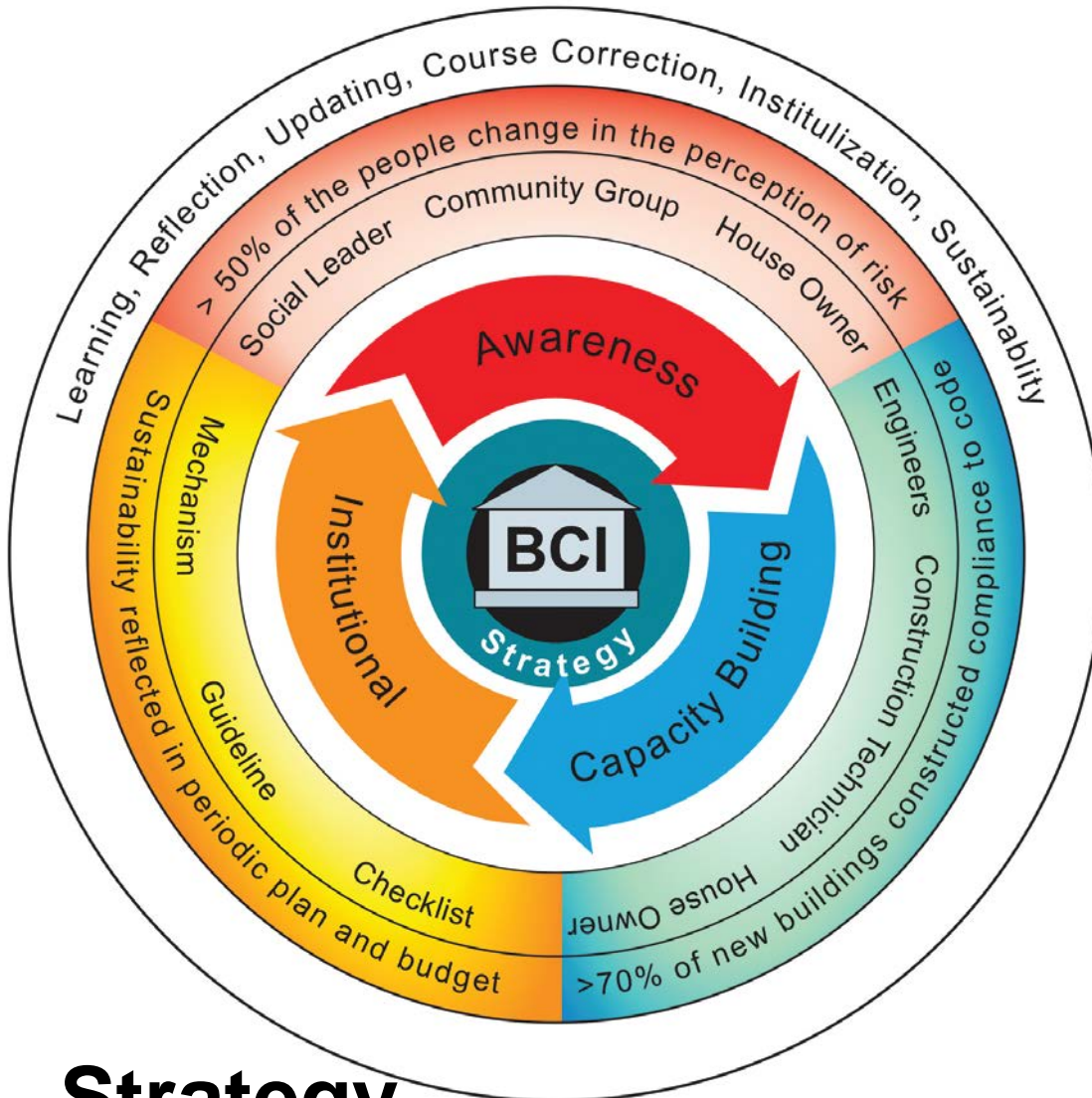
Based on working Paper, Pandey et al, 2018

- **Cost of per life saved with minor retrofit = \$0.51 million (Approx. 3 crores)** with total cost of \$67.87 million (Approx. 4 Arab Rs.)
- **Cost of per life saved with major retrofit = \$0.7 million (Approx. 7 crores Rs.)** with total cost of \$112.84 million (Approx. 7 Arab Rs.)
- **If no retrofit, 167 life lost, and replacement value = \$ 142.67 million (Approx. 9 Arab Rs.)**
- **Cost of per life saving in Canada = \$3.6 million (Approx. 21.6 crores)**



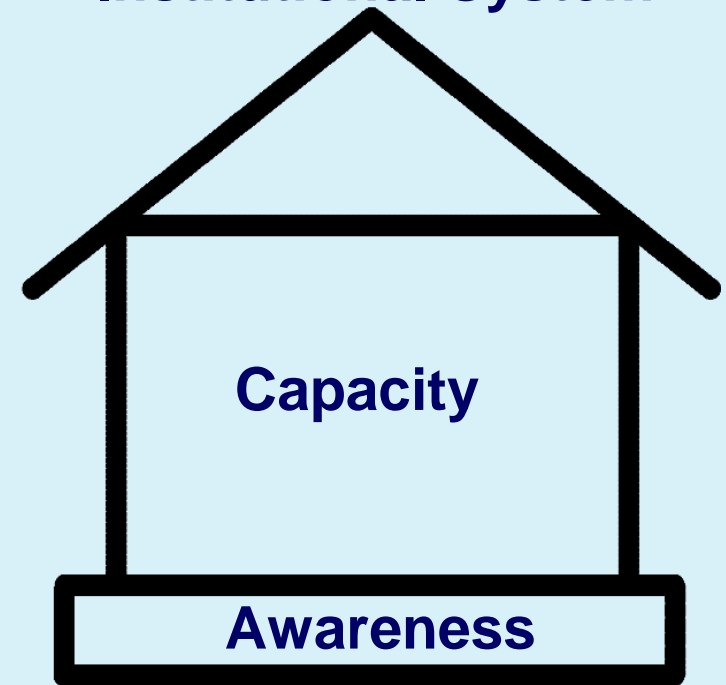
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Approach of Earthquake/Disaster Risk Reduction



Strategy

Institutional System



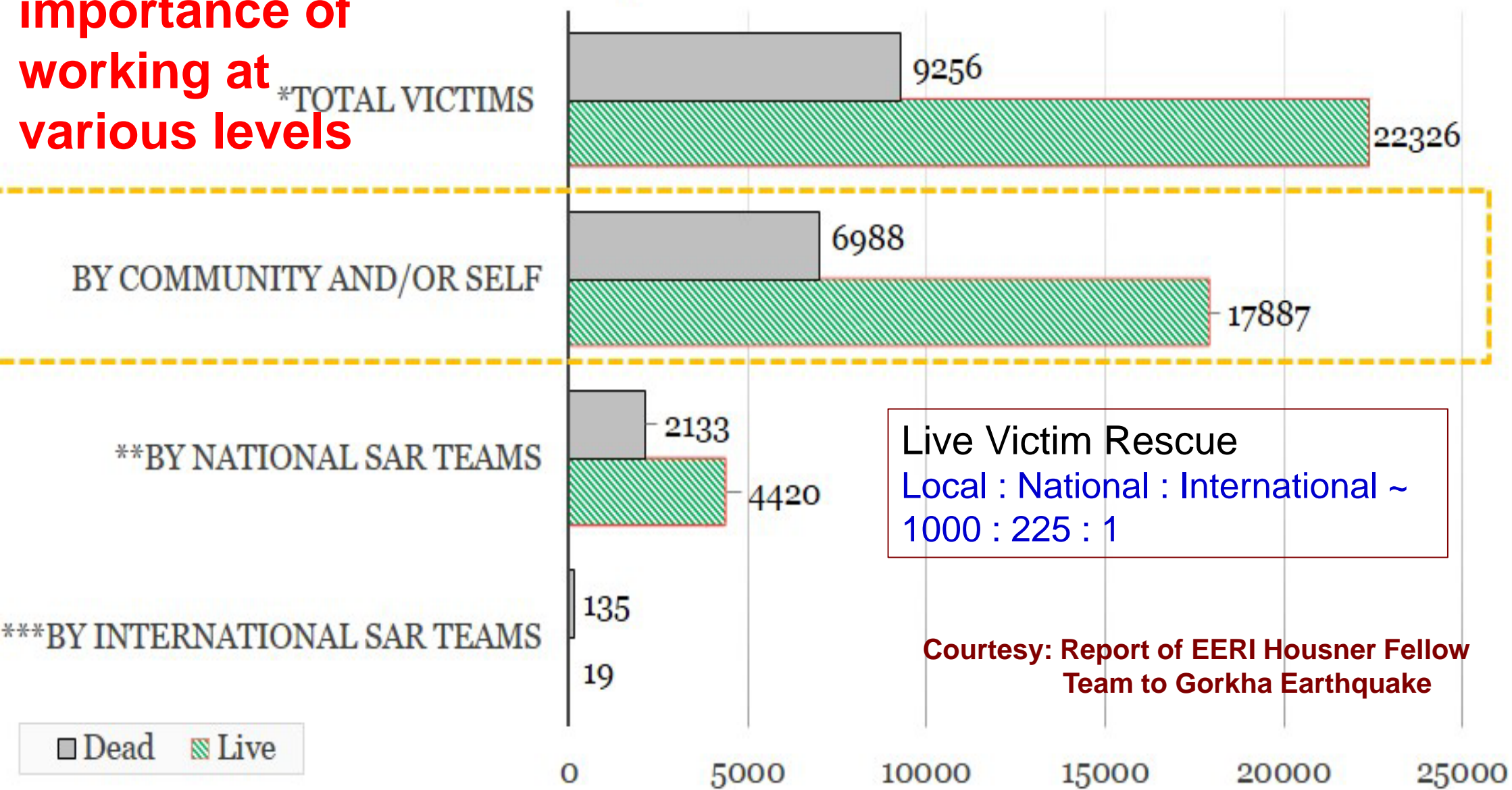
Awareness and Capacity Building

- **CSOs can support, cost effectively, the government system in awareness and capacity building**
- **Enforcement vs. Compliance..**
 - In a context like Nepal enhancing compliance is more proactive approach than enforcement
- **After a certain level of success, enforcement is required to achieve more success**

Improving Emergency Response Capacity

Lesson - the importance of working at various levels

Rescued/ Recovered Victims



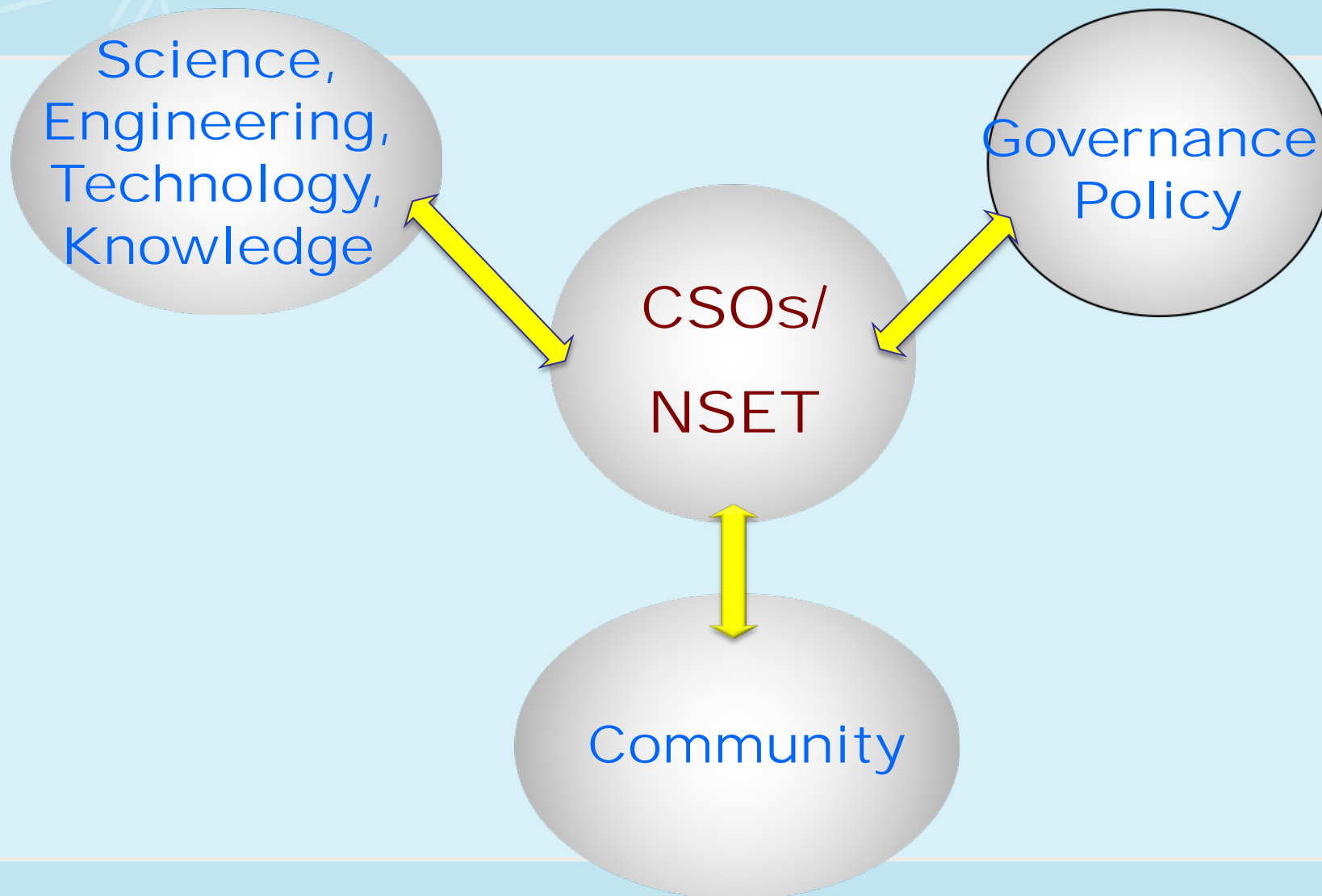


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Support Disaster Preparedness and Planning

- **Support emergency preparedness at municipalities and communities as a facilitator**
- **Support in Policy formulation and developing disaster preparedness plans at various levels**
- **DPNet can/should coordinate to develop national program to support disaster risk reduction and preparedness**
 - Similar to what I/NGOs supported for socio-technical assistance during recent reconstruction

CSO's ROLE





NSET
Earthquake Safe Communities in Nepal

Concept of Innovative Funding Mechanism

- **Global CSO initiative – Grand Bargain** launched during World Humanitarian Summit, May 2016, Istanbul
 - More transparent and increased direct funding to local and national responders/CSOs (as much as 25% by 2020)
- **Network of Empowered Aid Response (NEAR)** facilitated and supported the implementation of agreements of the Grand Bargain
- **Part of NEAR, 10 Nepali NGOs – developed a concept of Innovative Funding Mechanism (Pooled Funding Mechanism - PFM)**
 - where Nepali local CSOs can access to the fund for humanitarian actionsA pool of fund from
 - More consultation needed to make it workable

Way forward

- We need critical / innovative approaches and collective actions to reduce the risks drastically
- Continuity and sustainability of efforts



Thank You!