

Emergency Response Preparedness: Earthquake and Flood Contingency Planning

Based on HCT Presentation on 21st February at UN House

Emergency Response Preparedness: Earthquake contingency planning

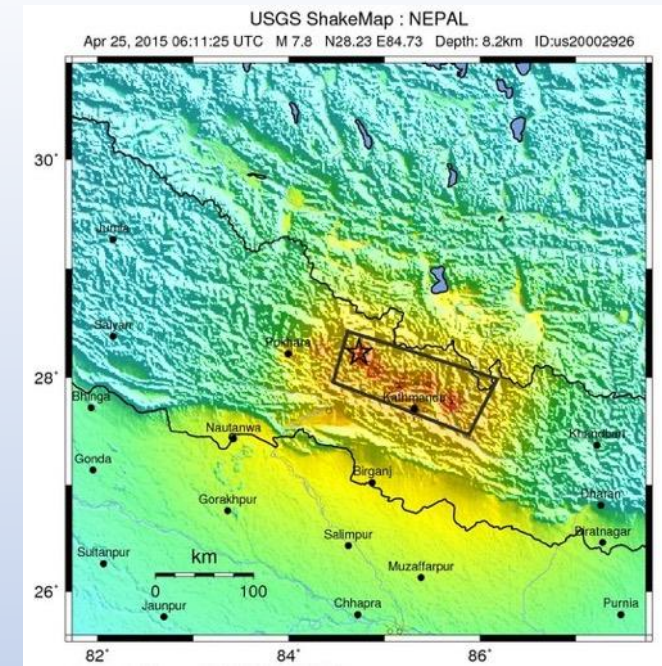


Collapsed stone and mud mortar house in Duna, Sindhupalchok, following 2015 Gorkha earthquake

**Tom Robinson, Nick Rosser, Alex Densmore, Katie Oven,
Surya Shrestha, Ramesh Guragain**

Overview

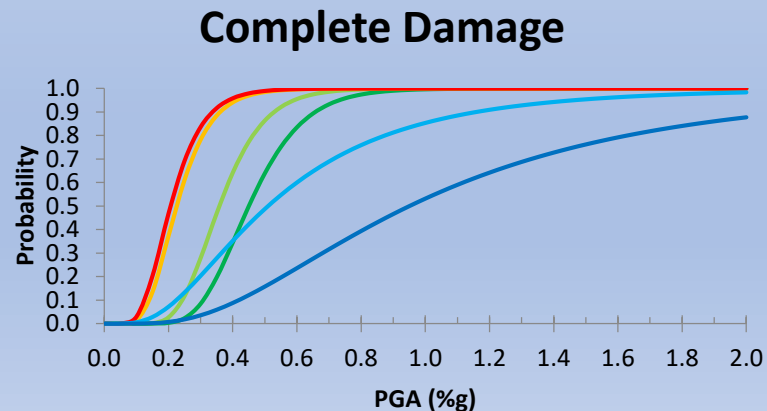
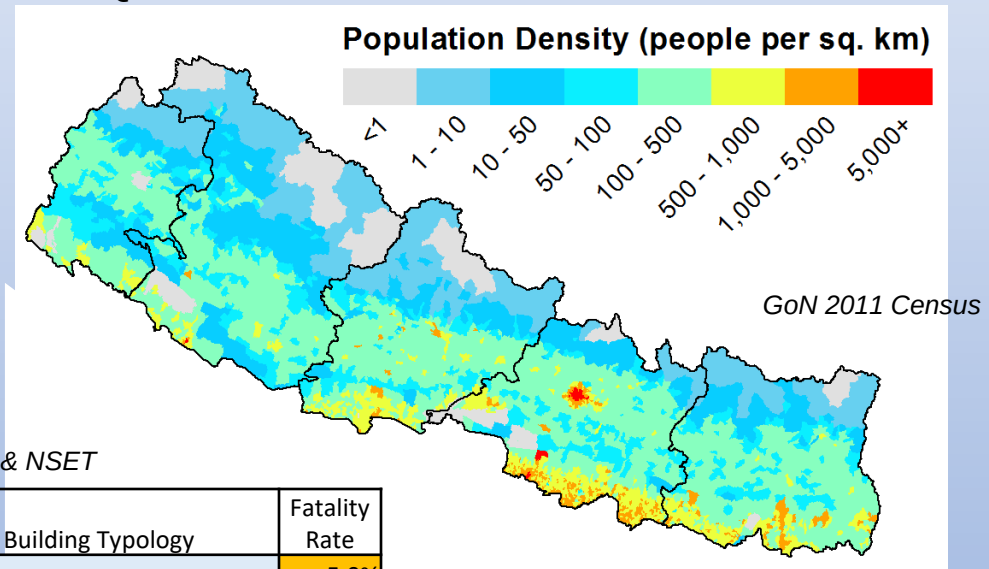
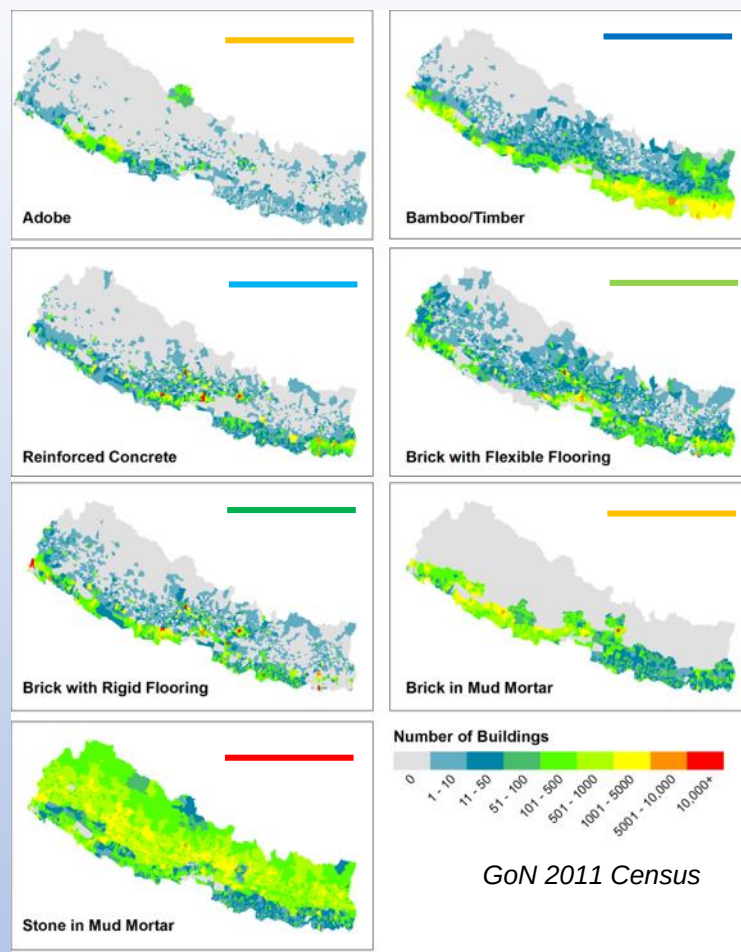
- 2015 Gorkha earthquake was worst in 90 years
- 9000 fatalities, 22,000 injuries, 3.5 million displaced
- Not as large as had been expected – M_w 8.5+ earthquake anticipated with 100,000+ fatalities (Dixit et al 2014; Bilham et al. 2001, Wyss, 2005)
- Scope of this study:
 - Inform contingency planning, not training
 - Absolute impacts to residential buildings:
 - Fatalities
 - Injuries
 - Building Collapse
 - Displaced population
 - Focus on large EQs requiring International response
 - M7.0 – M8.6
 - Results at all Administrative levels



Rockfall damage in Kodari

Earthquake Loss Modelling

- Population and building data from 2011 National Census
- Fragility curves and fatality rates from global empirical data** (Guragain, 2012; HAZUS, GEMECD)
- Verified on the 2015 earthquake
- 30 EQs for 3 different times = **90 scenarios**

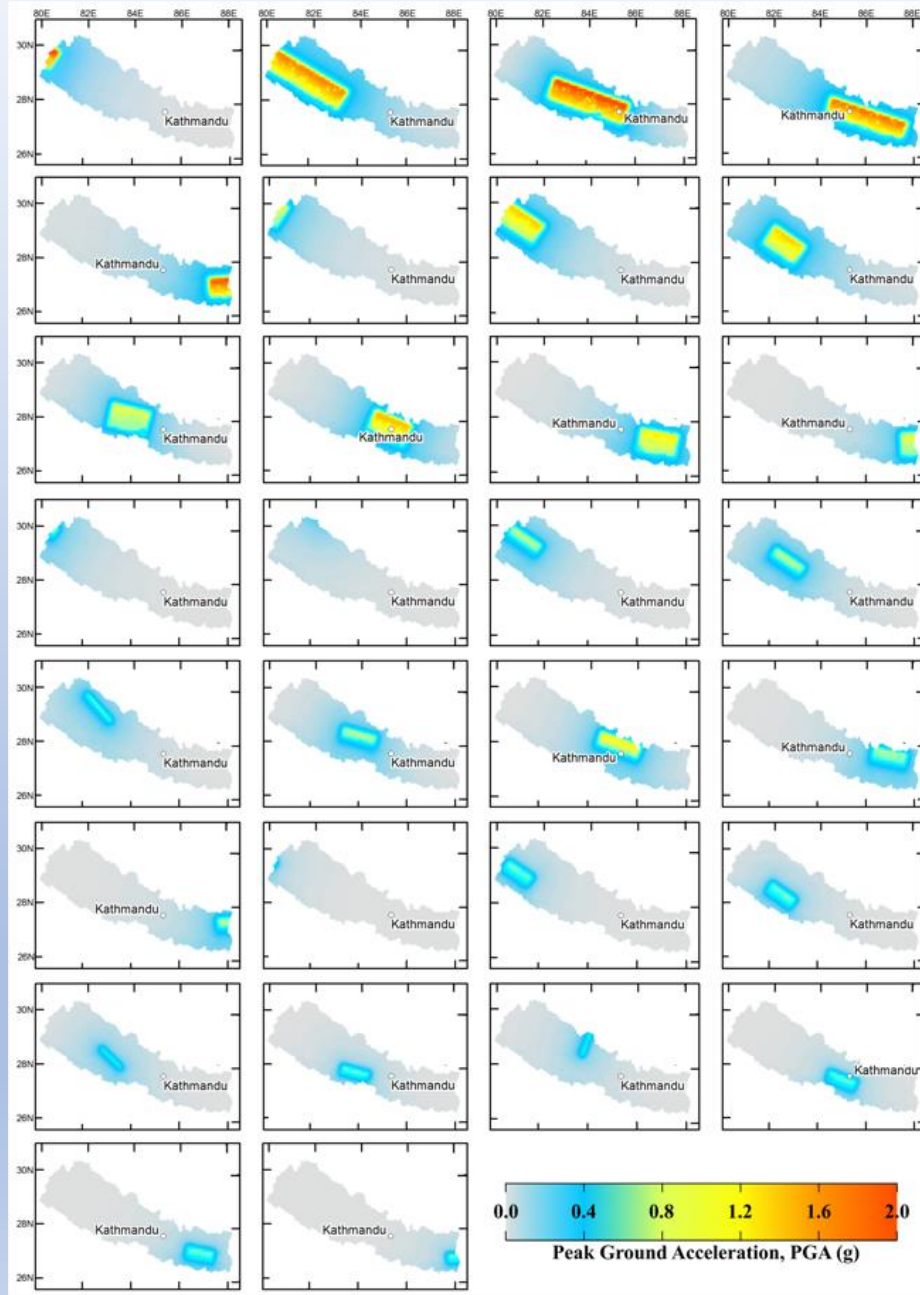


GEM & NSET

Building Typology	Fatality Rate
Adobe	5.0%
Bamboo	0.5%
Timber	2.0%
Reinforced Concrete	10.0%
Brick with flexible flooring	5.0%
Brick with rigid flooring	15.0%
Brick in mud mortar	5.0%
Stone in mud mortar	5.0%

HAZUS & Emily So

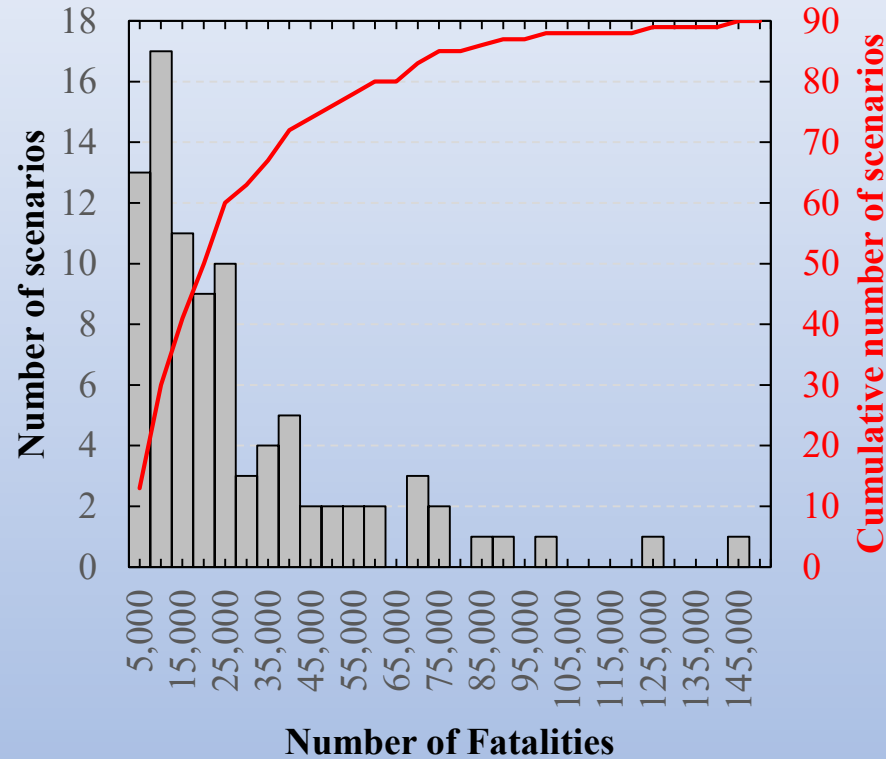
Scenario Ensembles



Scenario (Location-Fault_Mag)	Time of Day		
	Work Day	Non-work Day	Night
Wind-MFT_8.6	10,631	16,023	24,137
FWMW-MFT_8.6	36,770	53,175	81,434
WC-MFT_8.6	74,256	85,299	144,394
CE-MFT_8.6	65,946	71,960	124,942
Eind-MFT_8.6	15,231	20,321	32,665
W-Ind-MFT_8.3	5,908	8,956	13,458
FW-MFT_8.3	15,907	24,490	36,544
MW-MFT_8.3	24,404	37,559	56,089
W-MFT_8.3	32,200	43,013	68,178
C-MFT_8.3	53,025	55,444	98,375
E-MFT_8.3	23,731	30,196	49,265
Eind-MFT_8.3	7,536	10,608	16,679
WInd-MFT_7.8	3,100	5,070	7,429
FW-MFT_7.8	8,561	14,070	20,491
MW-MFT_7.8	12,796	21,050	30,638
W-MFT_7.8	19,644	26,476	41,891
C-MFT_7.8	38,333	36,876	68,301
E-MFT_7.8	9,739	14,316	22,200
Eind-MFT_7.8	3,791	5,911	8,902
WInd-MFT_7.0	856	1,298	1,958
FW-MFT_7.0	6,474	10,338	15,259
MW-MFT_7.0	8,518	13,645	20,090
W-MFT_7.0	11,369	16,400	25,114
C-MFT_7.0	28,038	23,261	46,414
E-MFT_7.0	6,882	9,916	15,537
Eind-MFT_7.0	2,267	3,372	5,134
SChn-KKM_7.8	166	323	523
MW-WFSN_7.8	5,292	9,023	13,042
MW-WFSS_7.3	7,361	12,134	17,727
W-TKG_7.3	1,560	2,531	3,798

Scenario Results

Distribution of modelled earthquake fatalities in Nepal

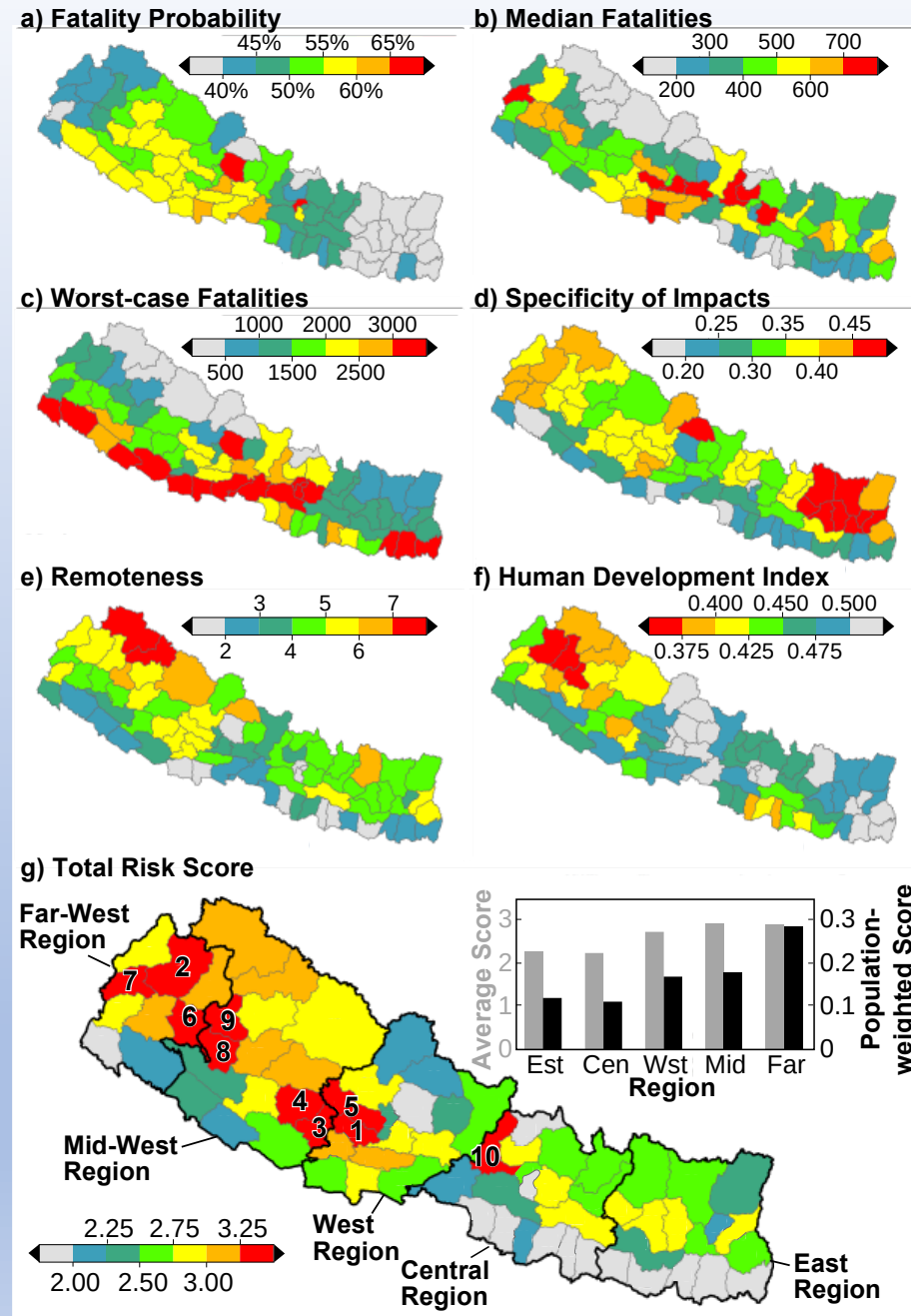


Worst-case - 144,394

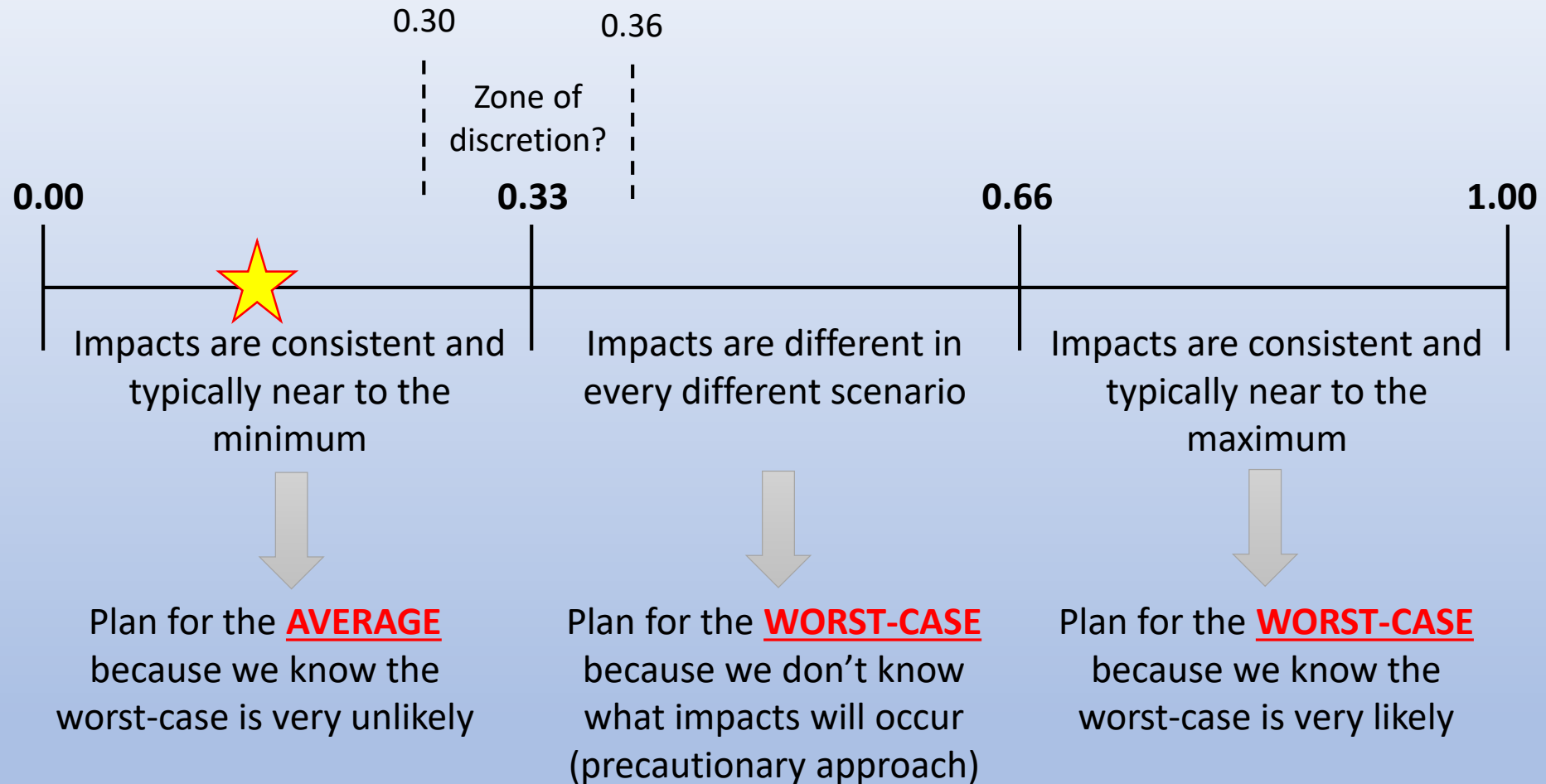
Average (median) – 25,932

Most common – 5,000→10,000

Variability – 0.180



Variability



Province 1

Fatalities:

Likelihood: 43%

Average: 5,500

Worst-case: 20,000

Variability: 0.329 - Avg

Injuries:

Likelihood: 64%

Average: 18,000

Worst-case: 138,000

Variability: 0.295 - Avg

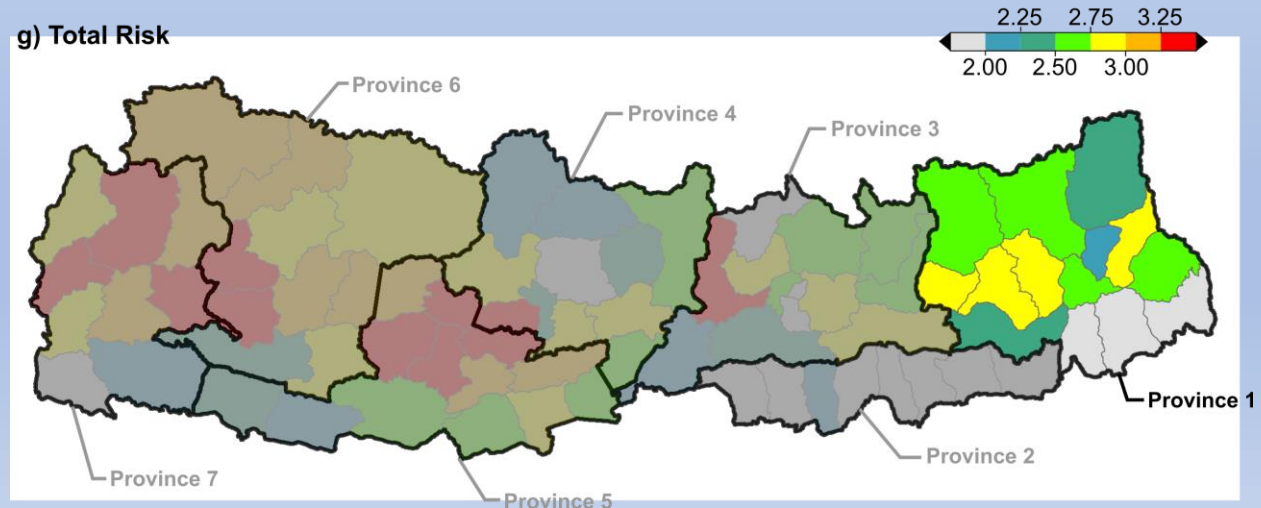
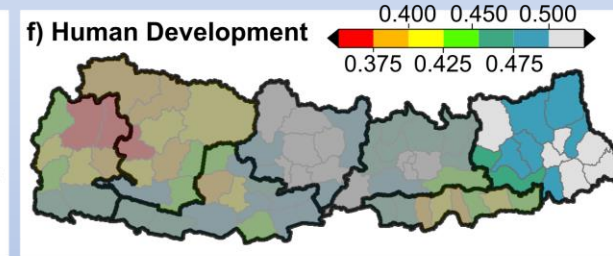
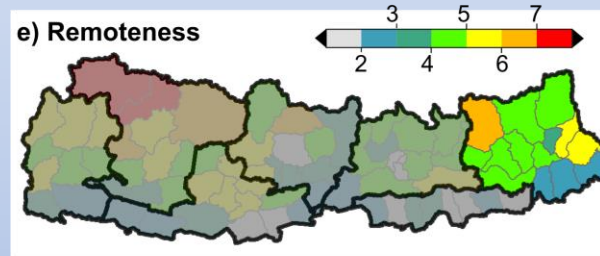
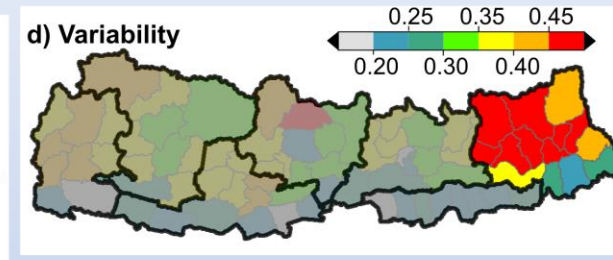
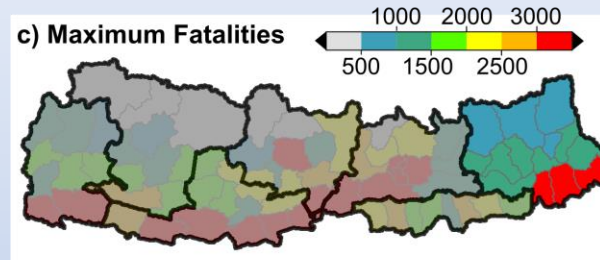
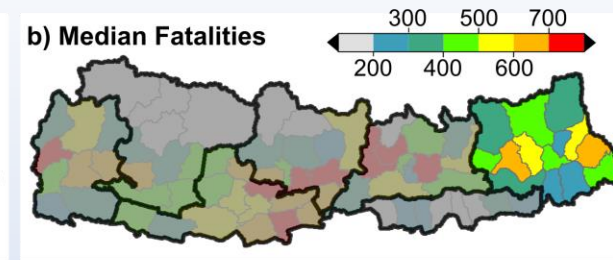
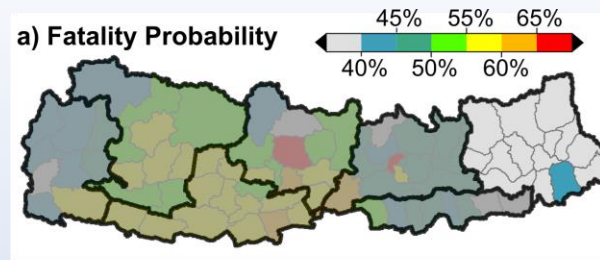
Building Damage:

Likelihood: 50%

Average: 24,000

Worst-case: 79,000

Variability: 0.423 - Max



Province 2

Fatalities:

Likelihood: 59%

Average: 800

Worst-case: 17,000

Variability: 0.176 - Avg

Injuries:

Likelihood: 89%

Average: 3,000

Worst-case: 89,000

Variability: 0.165 - Avg

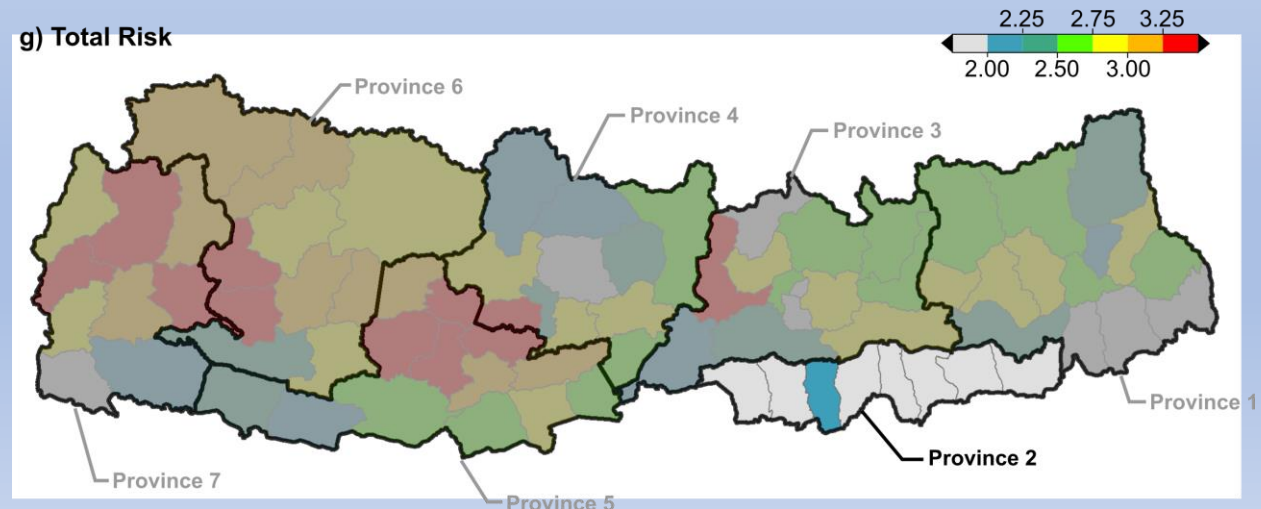
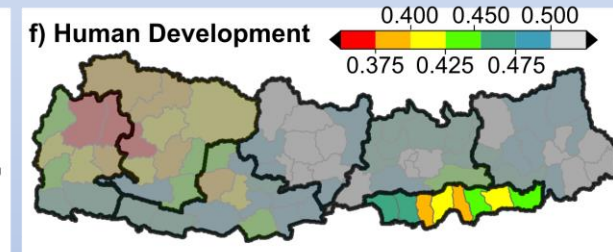
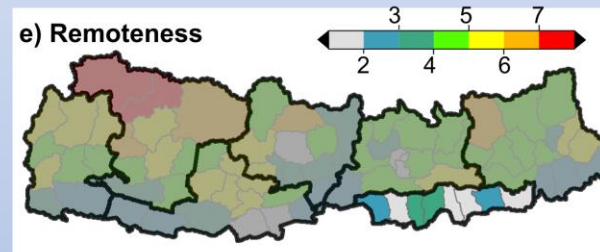
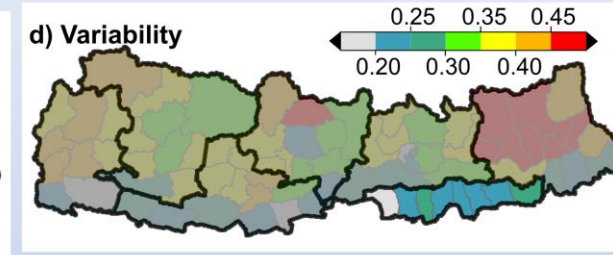
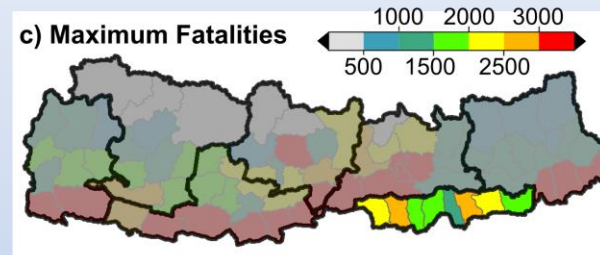
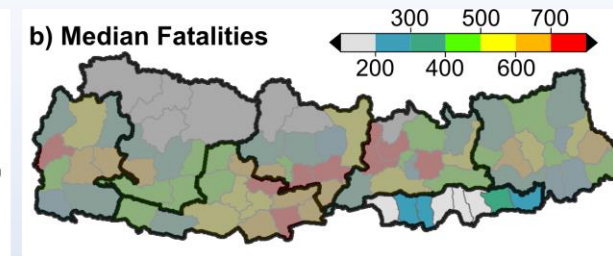
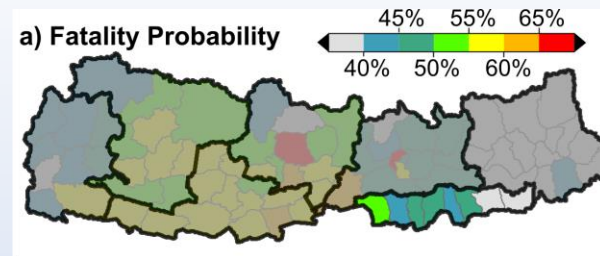
Building Damage:

Likelihood: 70%

Average: 3,000

Worst-case: 39,000

Variability: 0.231 - Avg



Province 3

Fatalities:

Likelihood: 72%

Average: 3,000

Worst-case: 58,000

Variability: 0.205 - Avg

Injuries:

Likelihood: 92%

Average: 10,000

Worst-case: 274,000

Variability: 0.217 - Avg

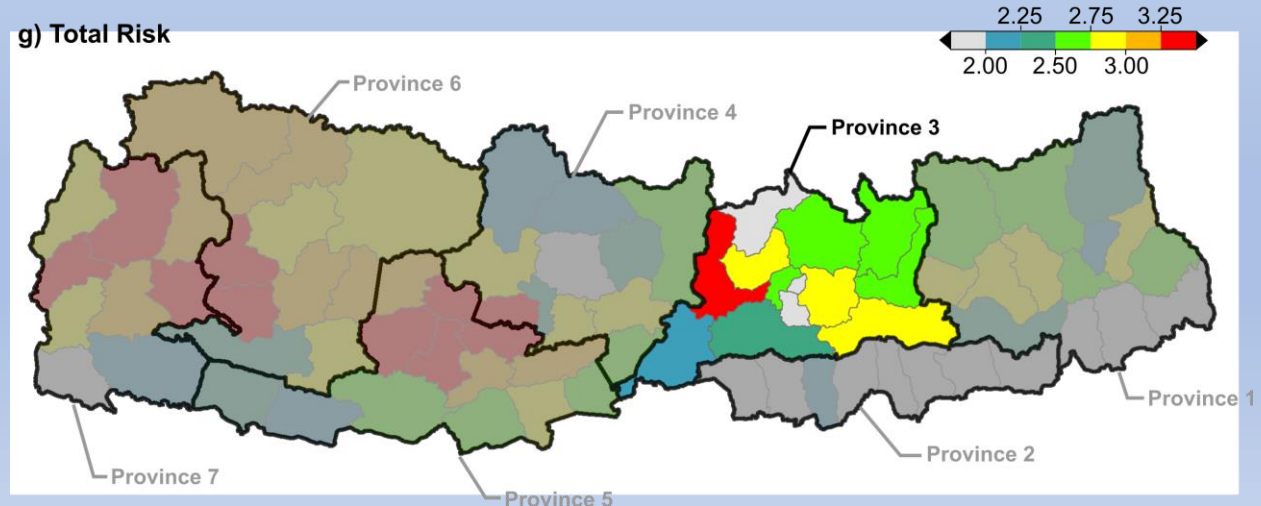
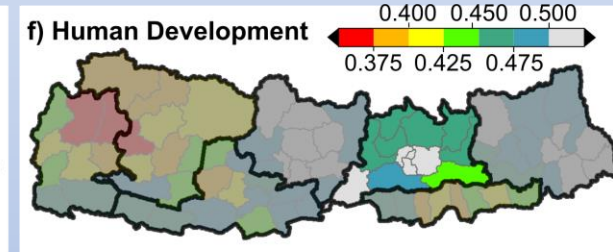
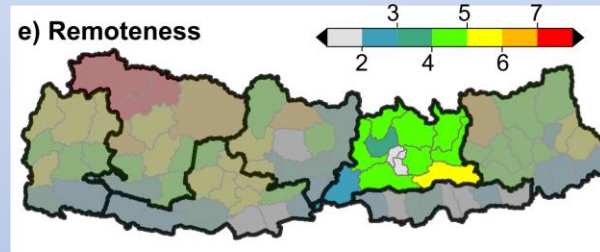
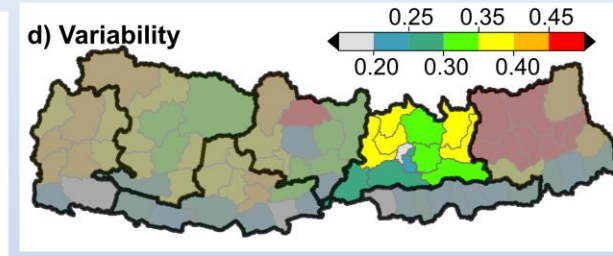
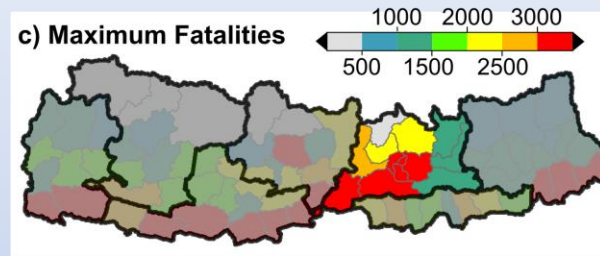
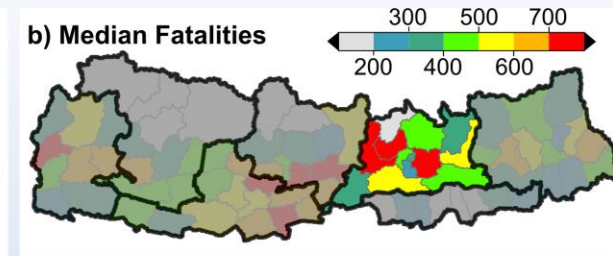
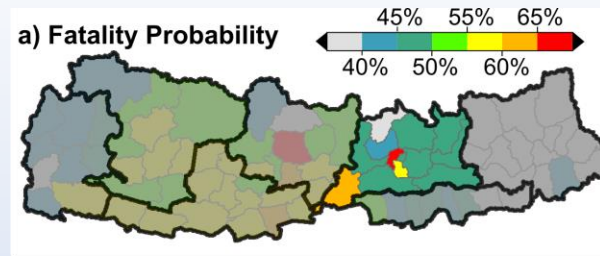
Building Damage:

Likelihood: 77%

Average: 11,000

Worst-case: 172,000

Variability: 0.289 - Avg



Province 4

Fatalities:

Likelihood: 84%

Average: 1,400

Worst-case: 20,000

Variability: 0.222 - Avg

Injuries:

Likelihood: 97%

Average: 8,000

Worst-case: 122,000

Variability: 0.249 - Avg

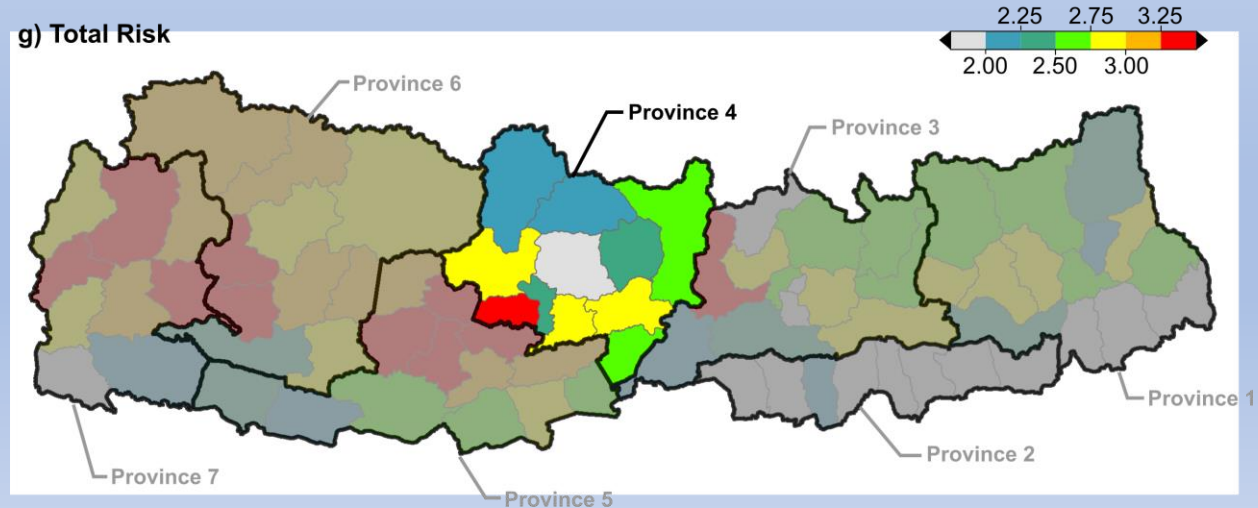
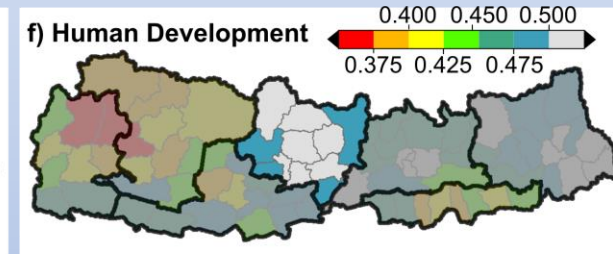
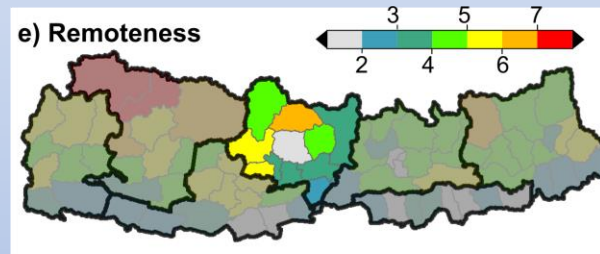
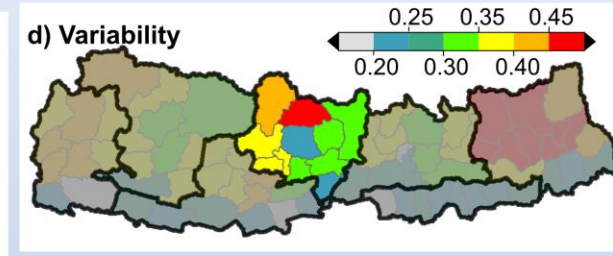
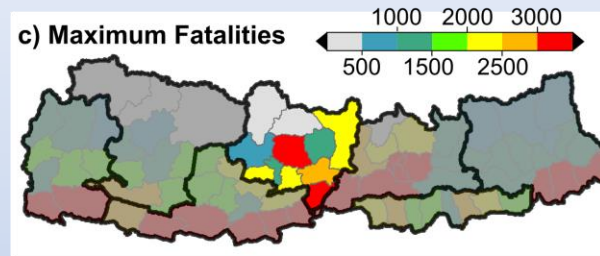
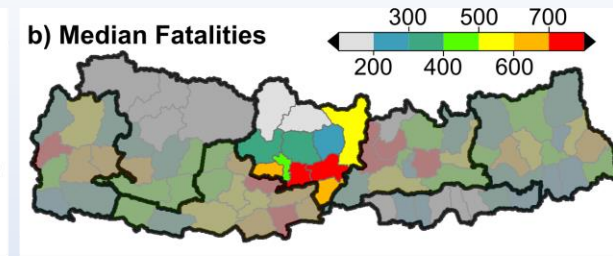
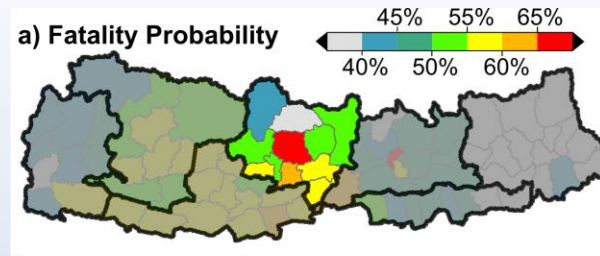
Building Damage:

Likelihood: 87%

Average: 11,000

Worst-case: 79,000

Variability: 0.319 - Avg



Province 5

Fatalities:

Likelihood: 77%

Average: 4,500

Worst-case: 35,000

Variability: 0.218 - Avg

Injuries:

Likelihood: 96%

Average: 25,000

Worst-case: 202,000

Variability: 0.236 - Avg

Building Damage:

Likelihood: 87%

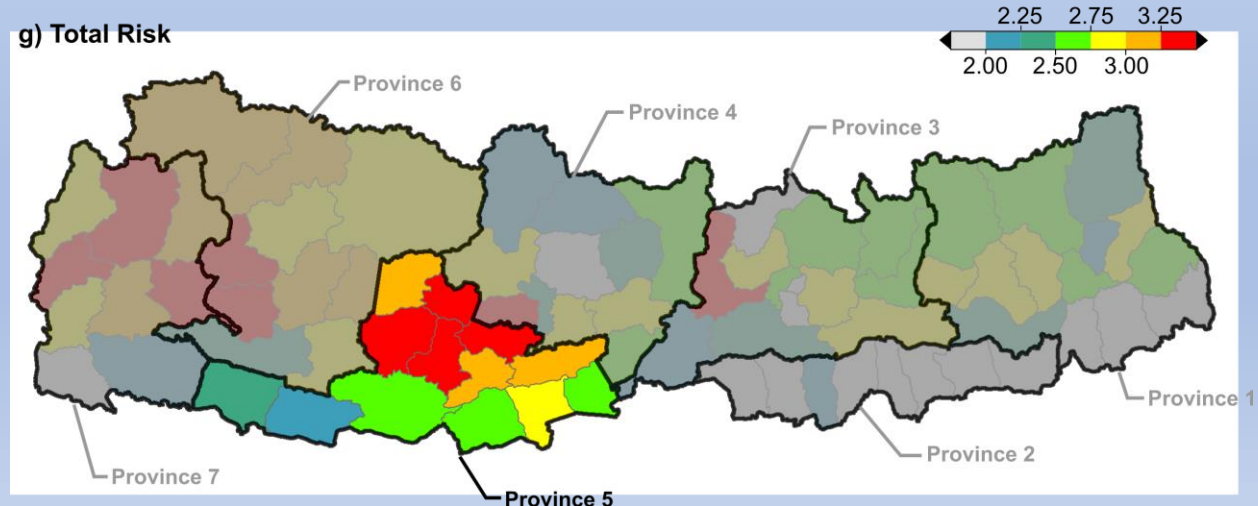
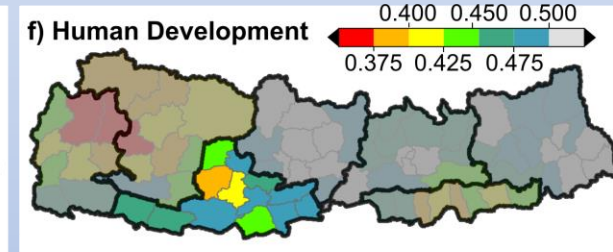
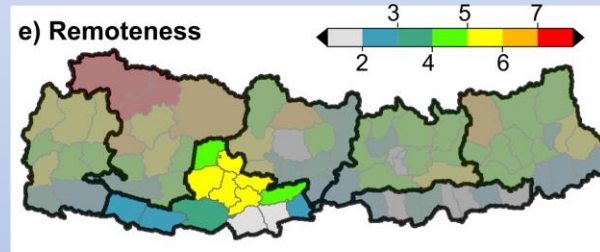
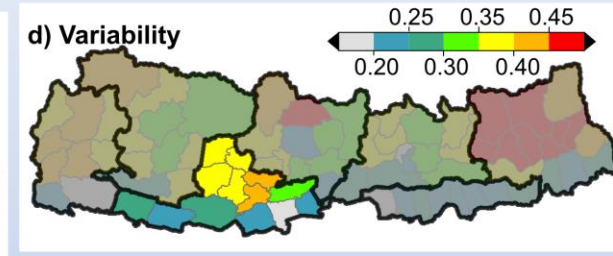
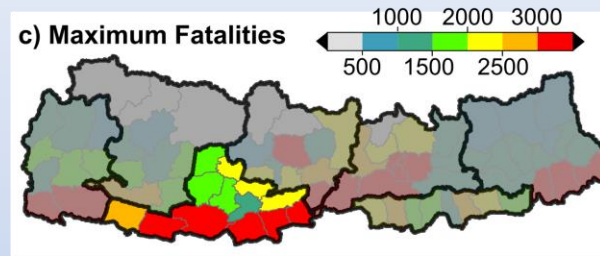
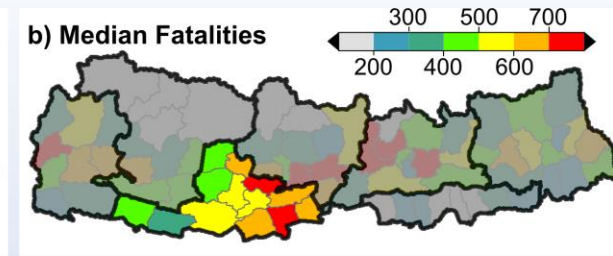
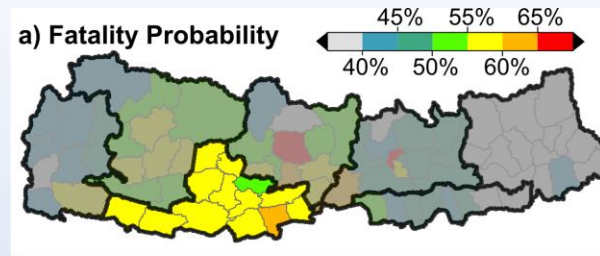
Average: 17,000

Worst-case: 107,000

Variability: 0.308 – Avg

* Worst-case in hills – 44,000

* Average in terai – 3,000



Province 6

Fatalities:

Likelihood: 64%

Average: 2,200

Worst-case: 11,000

Variability: 0.288 - Avg

Injuries:

Likelihood: 82%

Average: 11,000

Worst-case: 84,000

Variability: 0.278 - Avg

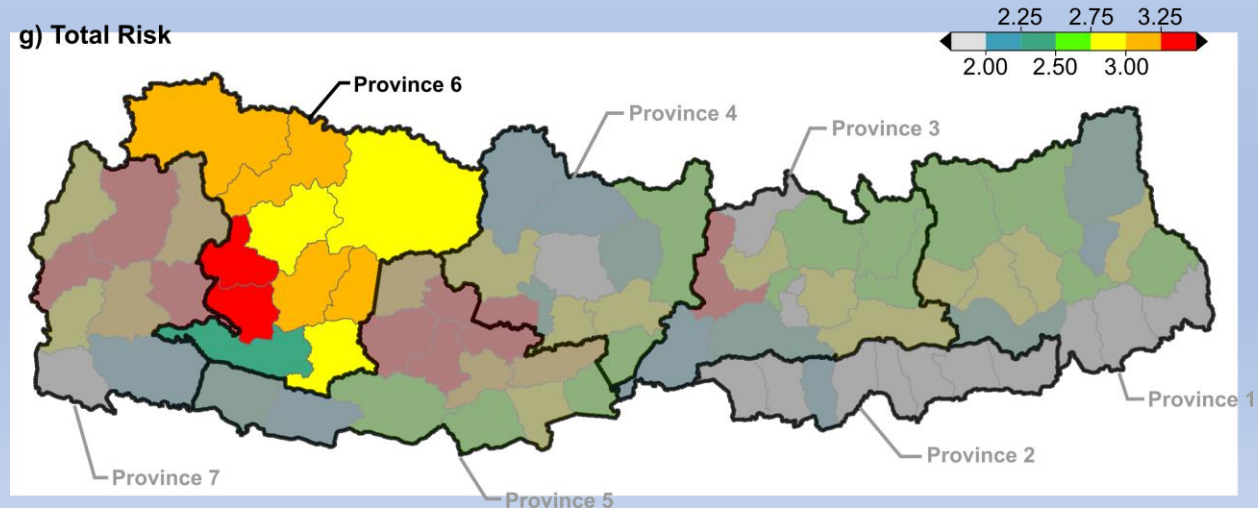
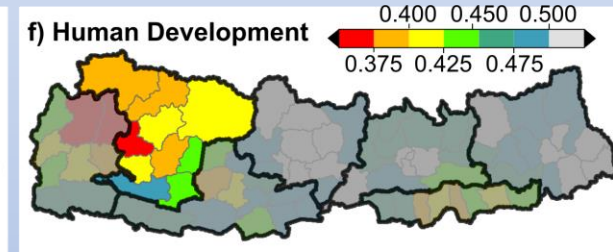
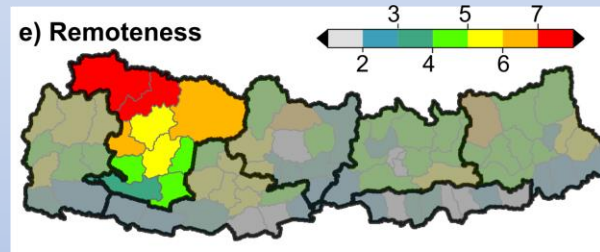
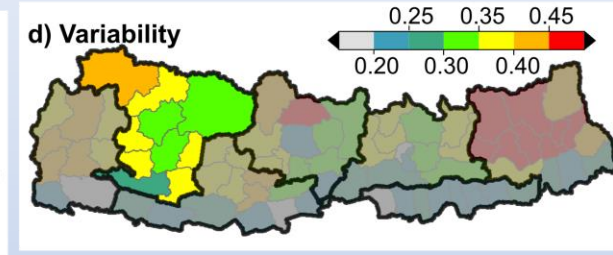
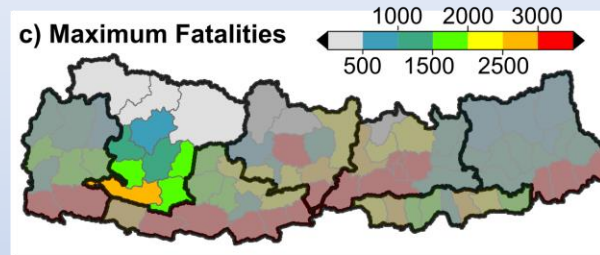
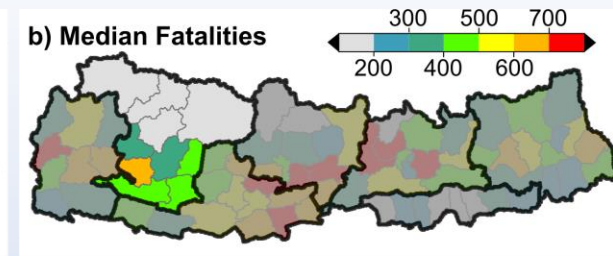
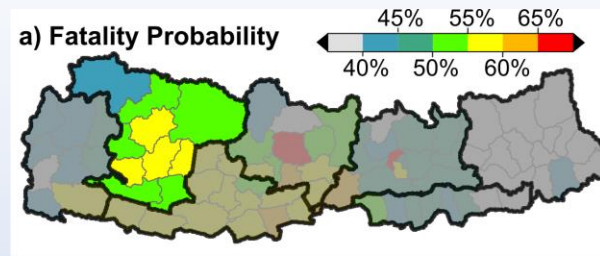
Building Damage:

Likelihood: 70%

Average: 10,000

Worst-case: 42,000

Variability: 0.388 - Max



Province 7

Fatalities:

Likelihood: 61%

Average: 2,000

Worst-case: 17,000

Variability: 0.250 - Avg

Injuries:

Likelihood: 80%

Average: 6,000

Worst-case: 109,000

Variability: 0.253 - Avg

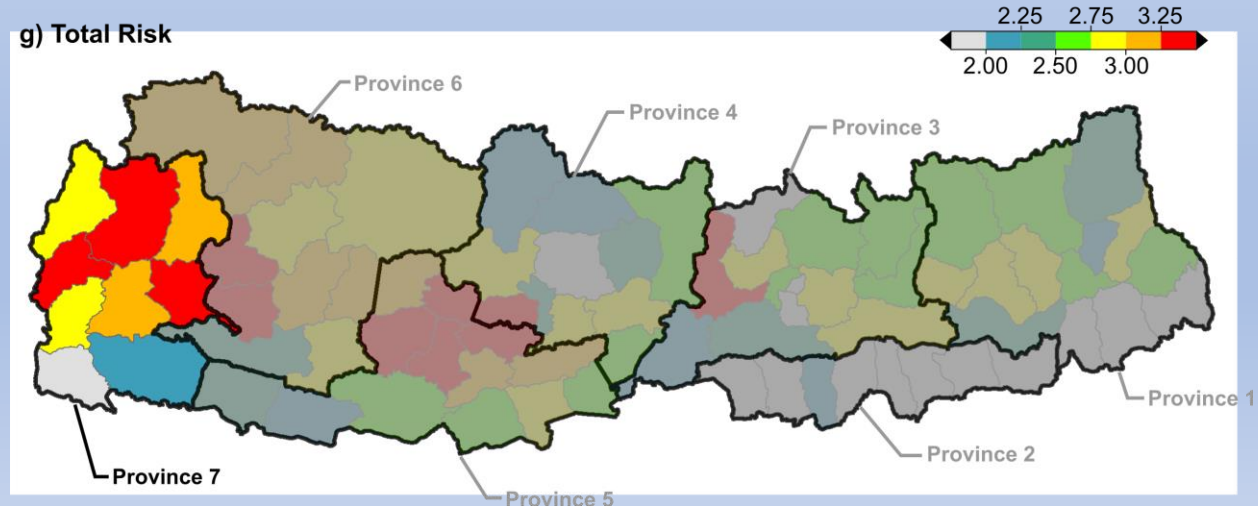
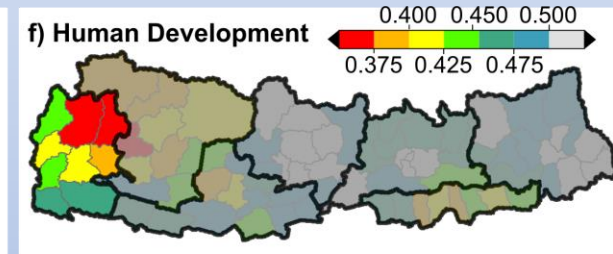
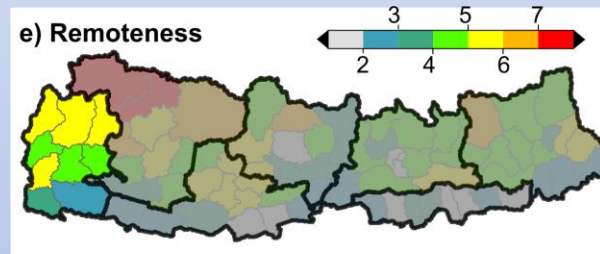
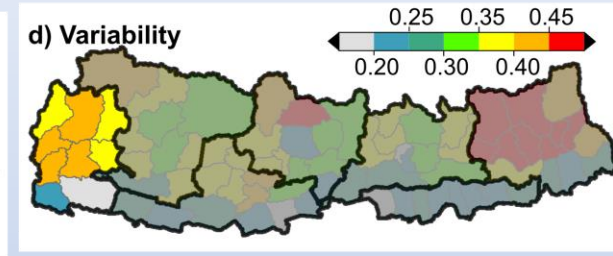
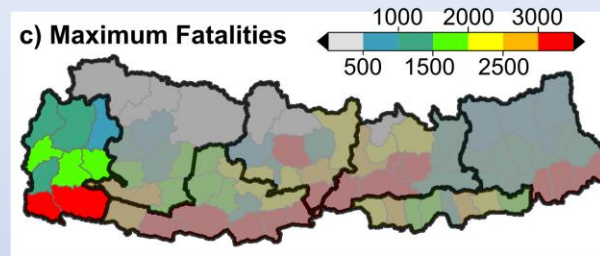
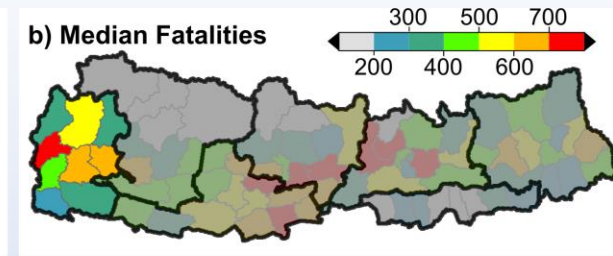
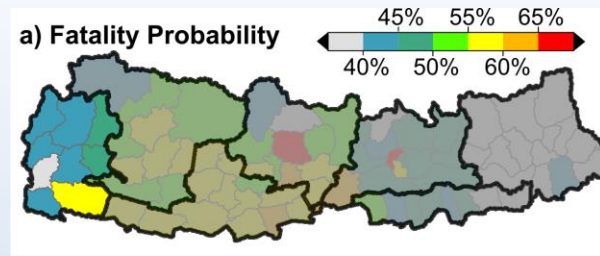
Building Damage:

Likelihood: 63%

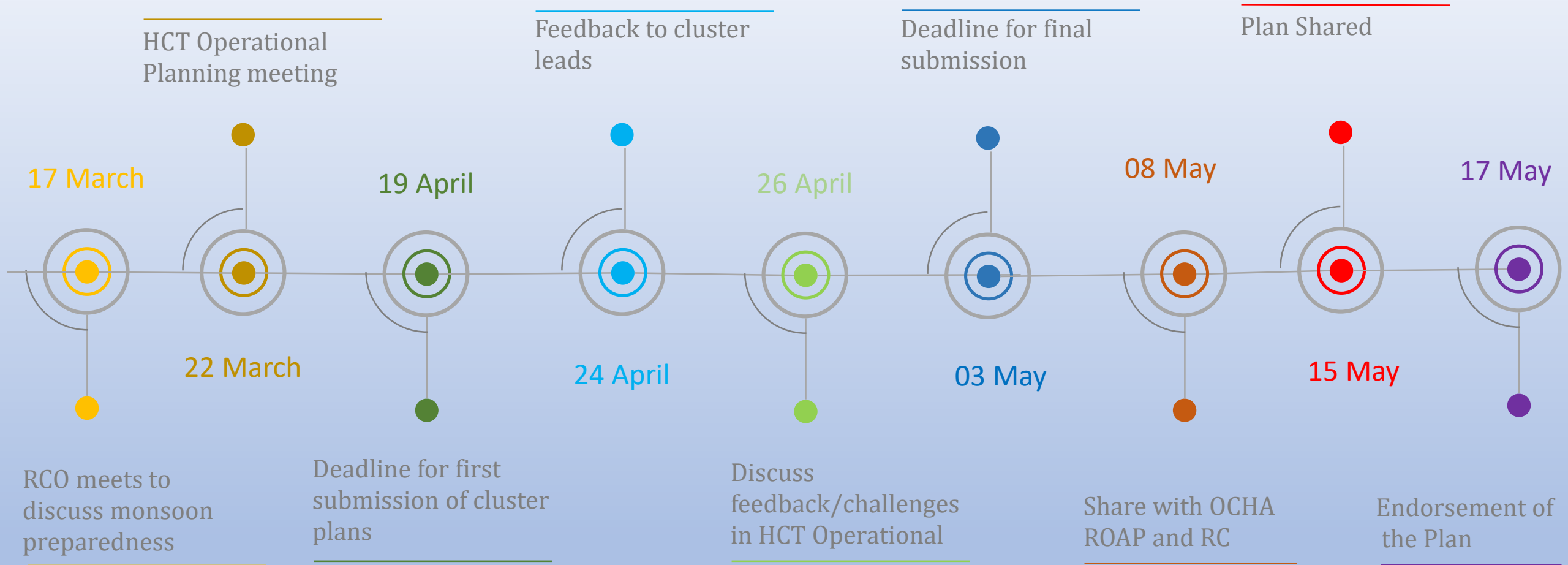
Average: 10,000

Worst-case: 53,000

Variability: 0.376 - Max



Emergency Response Preparedness Schedule (Flood)



CLUSTERS FOR EMERGENCY



Key Planning
Figures

xxx,000

People
affected

xxx,000

people
displaced

XX

districts/areas
affected

xxx,000

deaths

xxx,000

injured

xxx,000

houses
destroyed

MAP TITLE

Affected areas

XXX, XXX, XXX,

XXX, XXX, XXX

SCENARIO OVERVIEW

Every year, between June and September, flooding in the Terai warrants for increased preparedness by the Government and the Humanitarian Country Team (HCT). To optimize the speed and volume of critical assistance, the HCT has developed a contingency plan to 1) Reach a common understanding of the flood risk and how to monitor potential flooding in the Terai to ensure early action is taken when required; 2) Establish a minimum level of multi-hazard preparedness across core clusters; and to 3) Build the basis for a joint HCT response strategy to meet the needs of affected people in the first 30 days of a humanitarian emergency

PLANNING ASSUMPTIONS

- | | |
|------------|----------|
| i. xxxxx | iv. xxxx |
| ii. Xxxxx | v. xxxx |
| iii. xxxxx | |

RESPONSE OBJECTIVES

- | | |
|---|-----------|
| i. Alleviate human suffering by providing | iv. xxxxx |
| ii. Facilitate | v. xxxx |
| iii. Strengthen | |

Country: Disaster Type Contingency Plan (Month-Month Year)

STANDARD OPERATING PROCEDURES

Early Warning/Preparedness		
Phase	Procedure	Lead
-5		RCO
-4		Gov
-3		RC
-2		OCHA
-1		UN



Response – First 24 hours		
Phase	Procedure	Lead
+3		RCO
+6		Gov
+12		OCHA
+24		All

Response from first day onwards		
Phase	Procedure	Lead
D1		RCO
D2		Gov
D3		xxx
D4		xxx
D5		
D6		
W1		
W2		
W3		
M1		
M3		
M6		

RESPONSE BY SECTOR



WATER SANITATION AND HYGIENE

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....



EDUCATION

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....



SHELTER

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....

RESPONSE BY SECTOR



HEALTH

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....



FOOD SECURITY

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....



PROTECTION

Government Lead: Ministry of ..

Sector Lead: AGENCY/NAME/EMAIL

Members: AGENCY NAME, AGENCY
NAME

Priority Preparedness

Activities

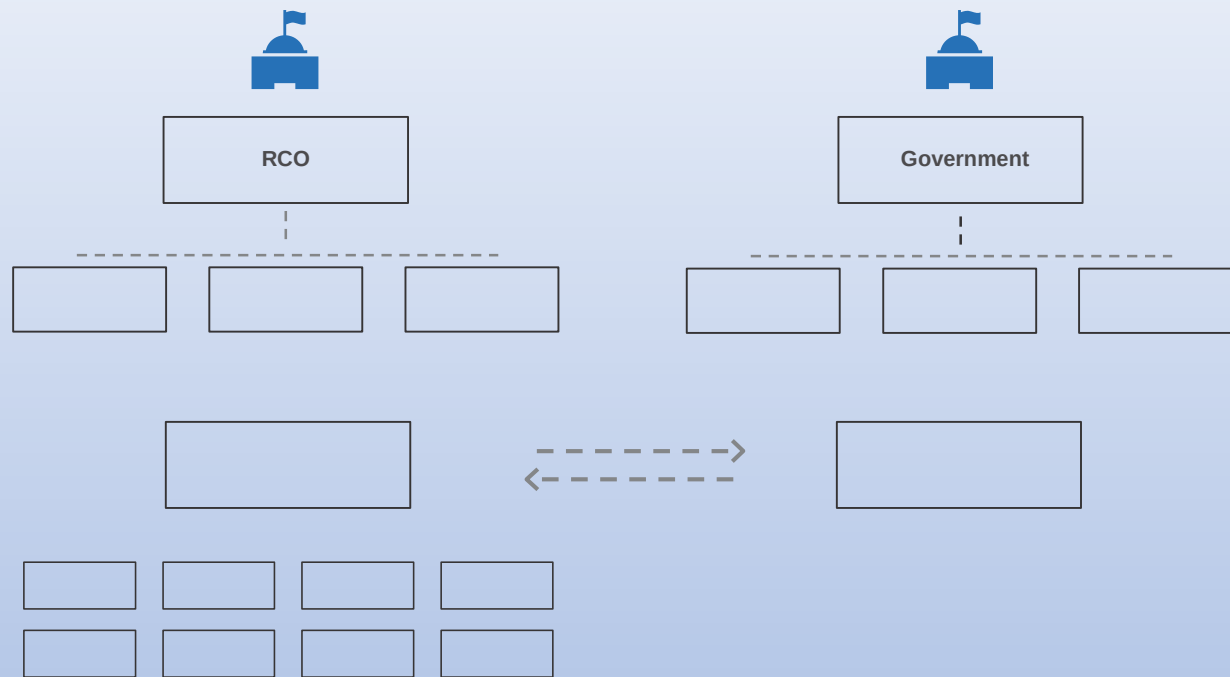
- Strengthen..
- ..
- Develop....
- Support....

Priority Response

Activities

- Strengthen..
- ..
- Ensure....
- Address....

COORDINATION STRUCTURE



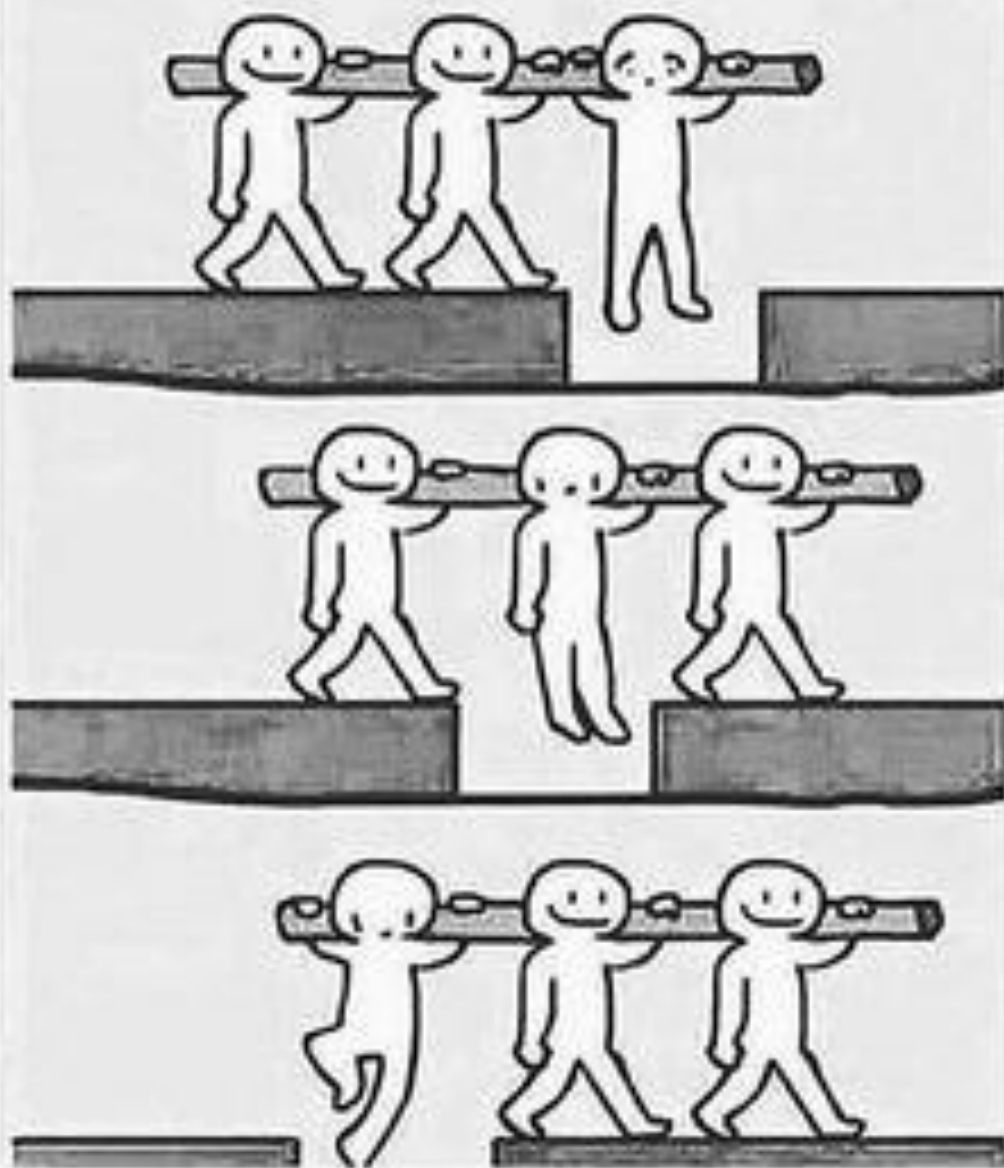
Alignment of emergency sectors and government functions

KEY CONTACTS

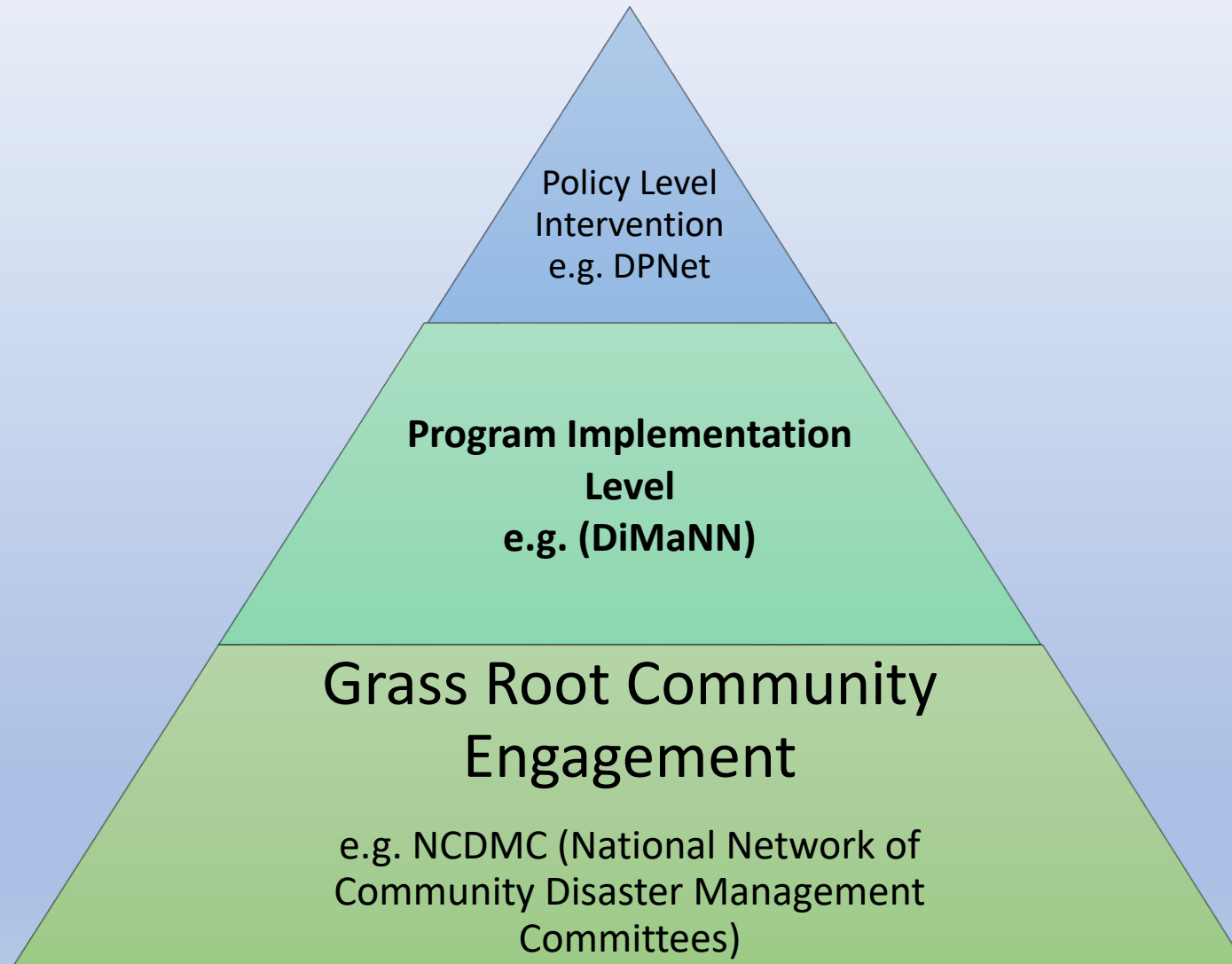
Office of the Resident Coordinator (RCO)
xxx, UN Resident Coordinator (RC)
xxx@one.un.org, +xxx xxx 1000
National Disaster Management Centre
xxx, Deputy Minister for
xxx xxx@.gov, +xxx xxx 1000
OCHA Regional Office for Asia and the Pacific
Mr. Markus Werne, Head of Office
xxx@un.org, +66 xxx xxx
xxx

Need of Collaboration and Partnership
with National Level DM Network

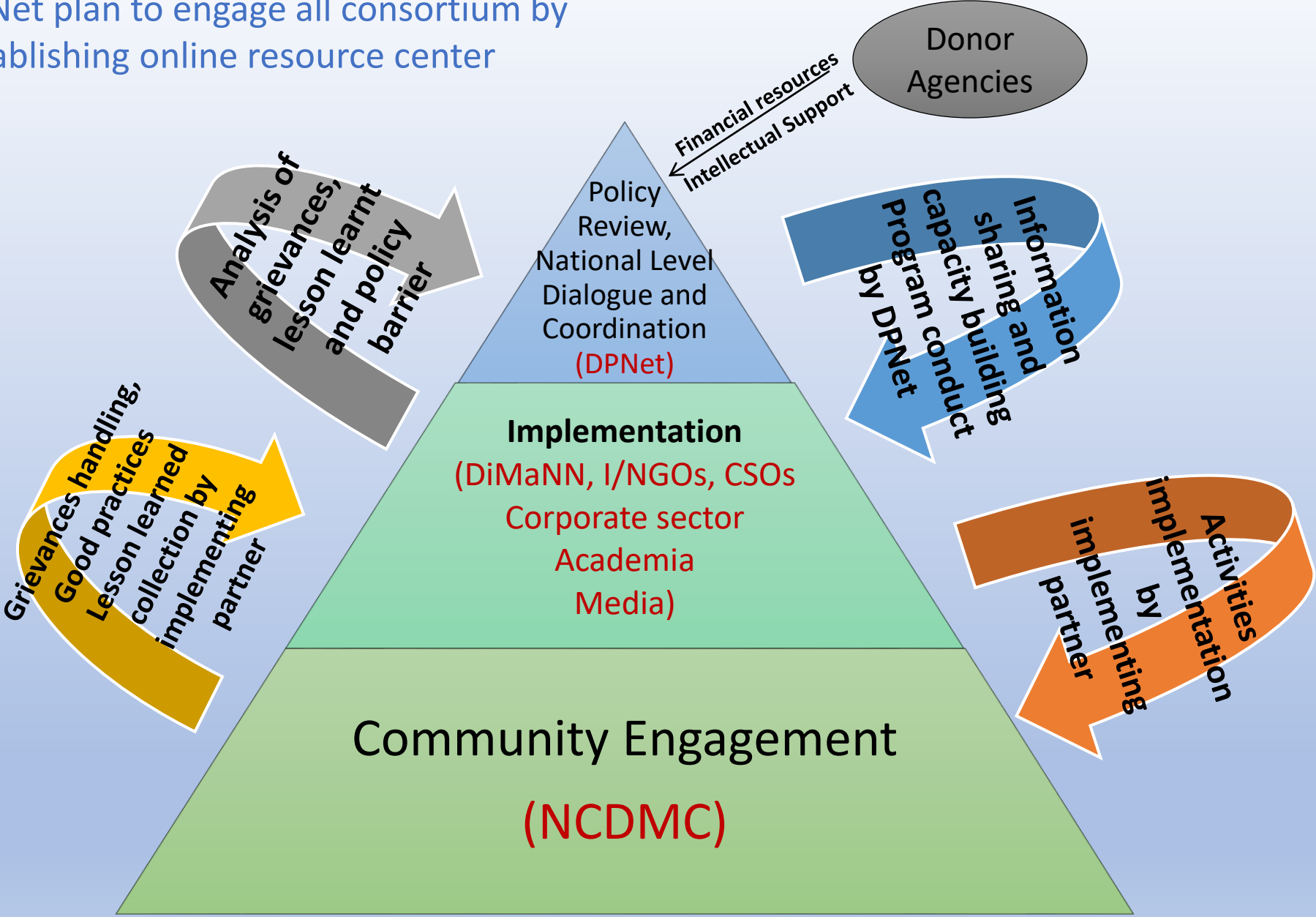
If we unite nobody falls



Example of Existing Consortium on DRRM



DPNet plan to engage all consortium by establishing online resource center



Thank you!