

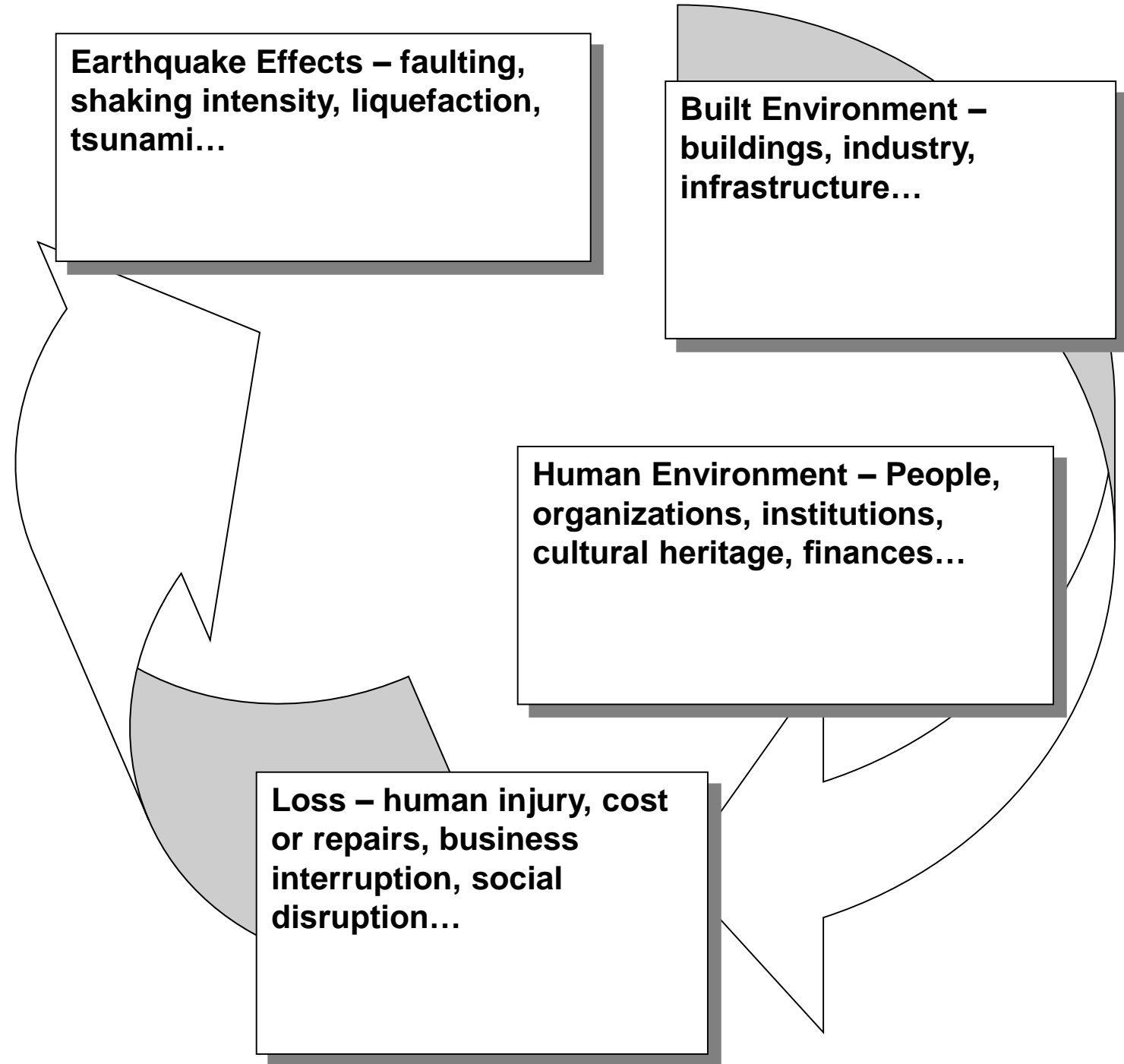


EARTHQUAKE RISK

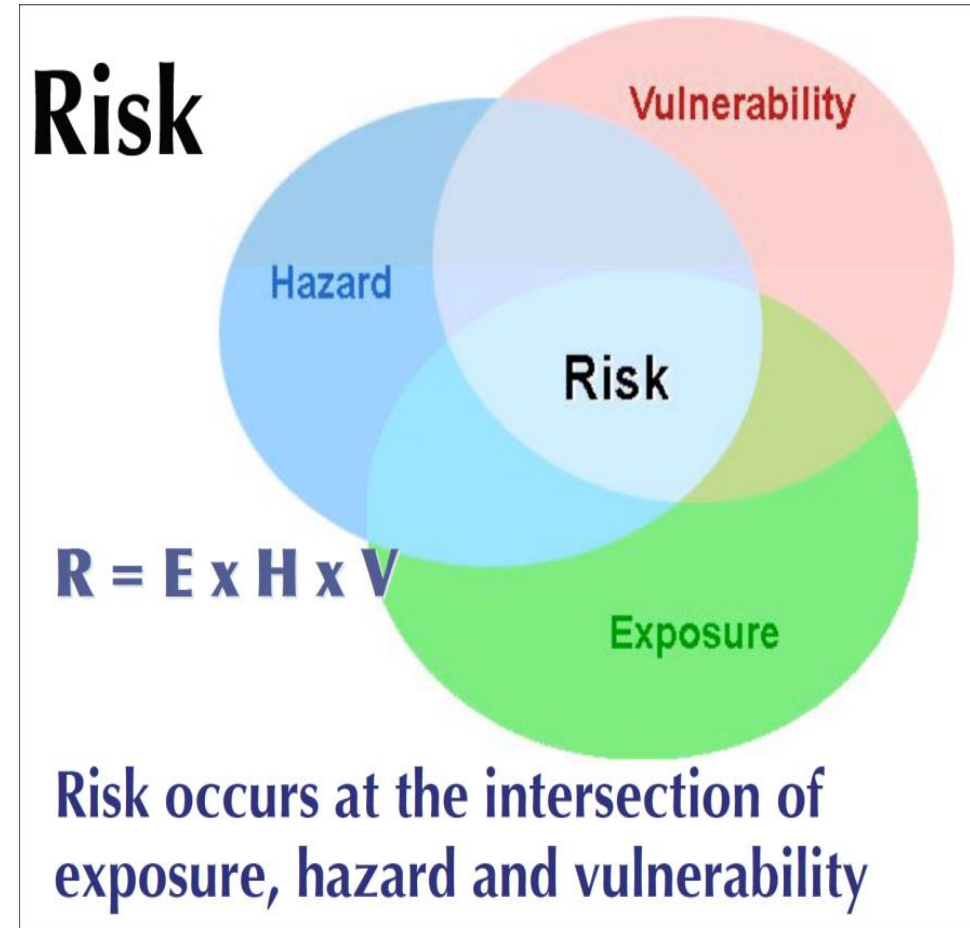
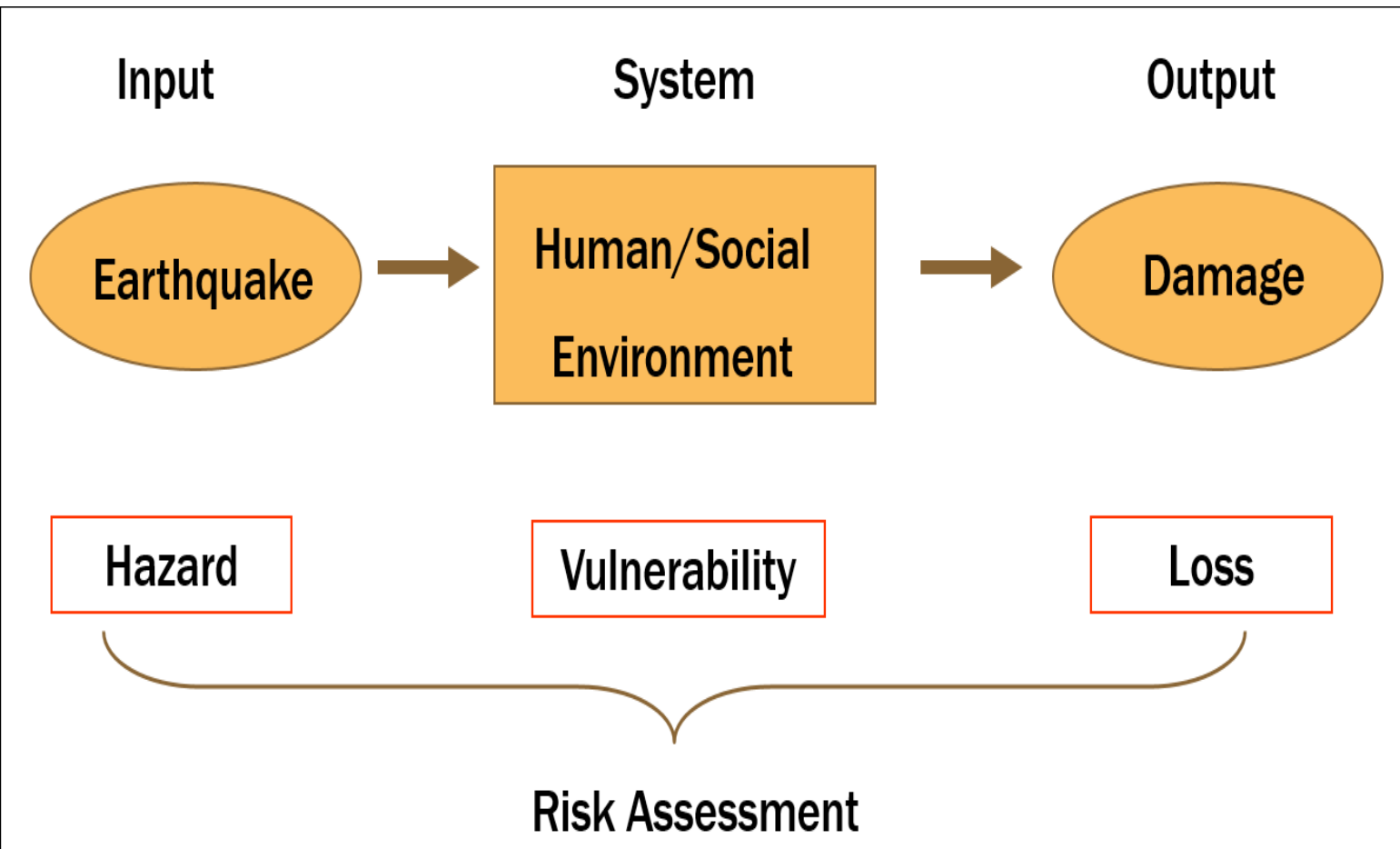
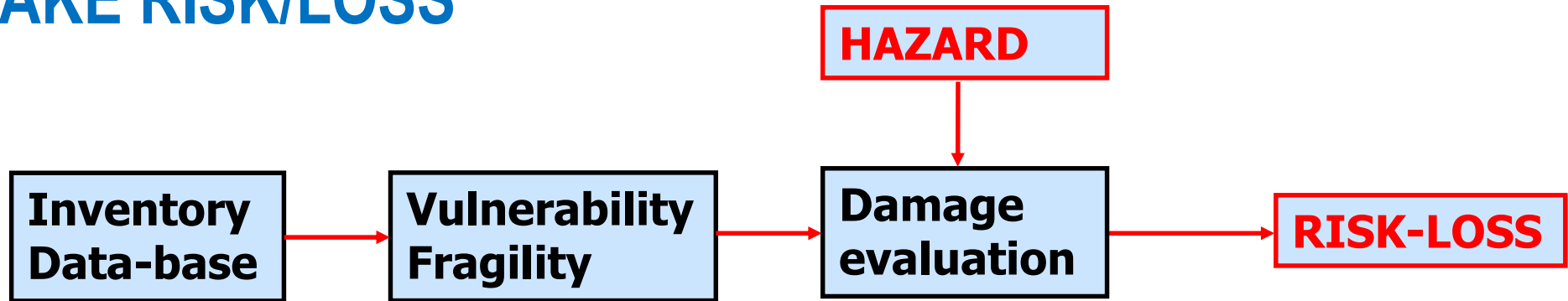
Mustafa Erdik

EARTHQUAKE RISK/LOSS

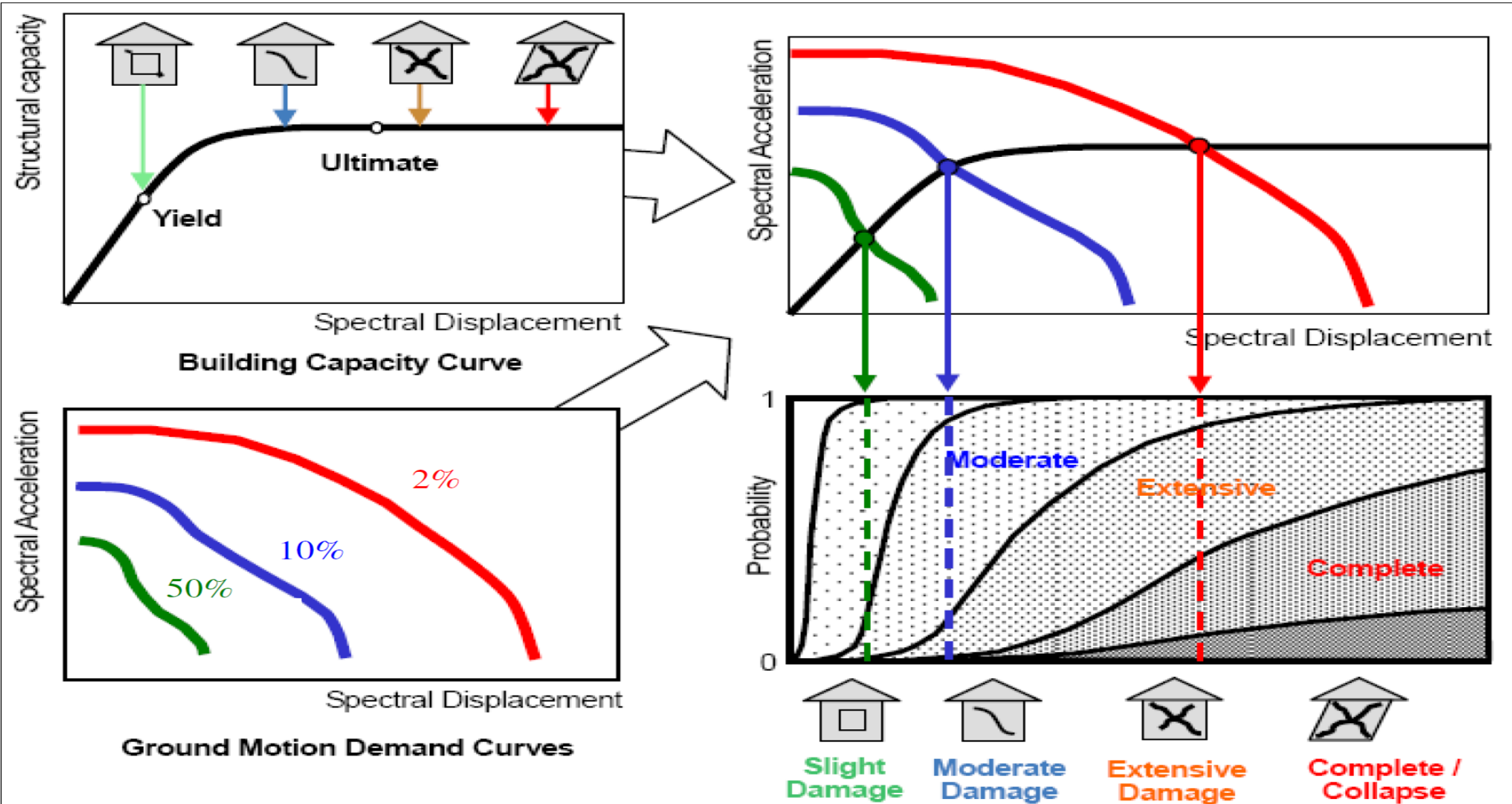
- **Loss** is the reduction in value of an asset due to damage..
 - **Risk** is the uncertainty of loss.
 - **Risk or Loss estimation** is the quantification of the earthquake loss.
- It is a basic first step in managing earthquake risk.



EARTHQUAKE RISK/LOSS

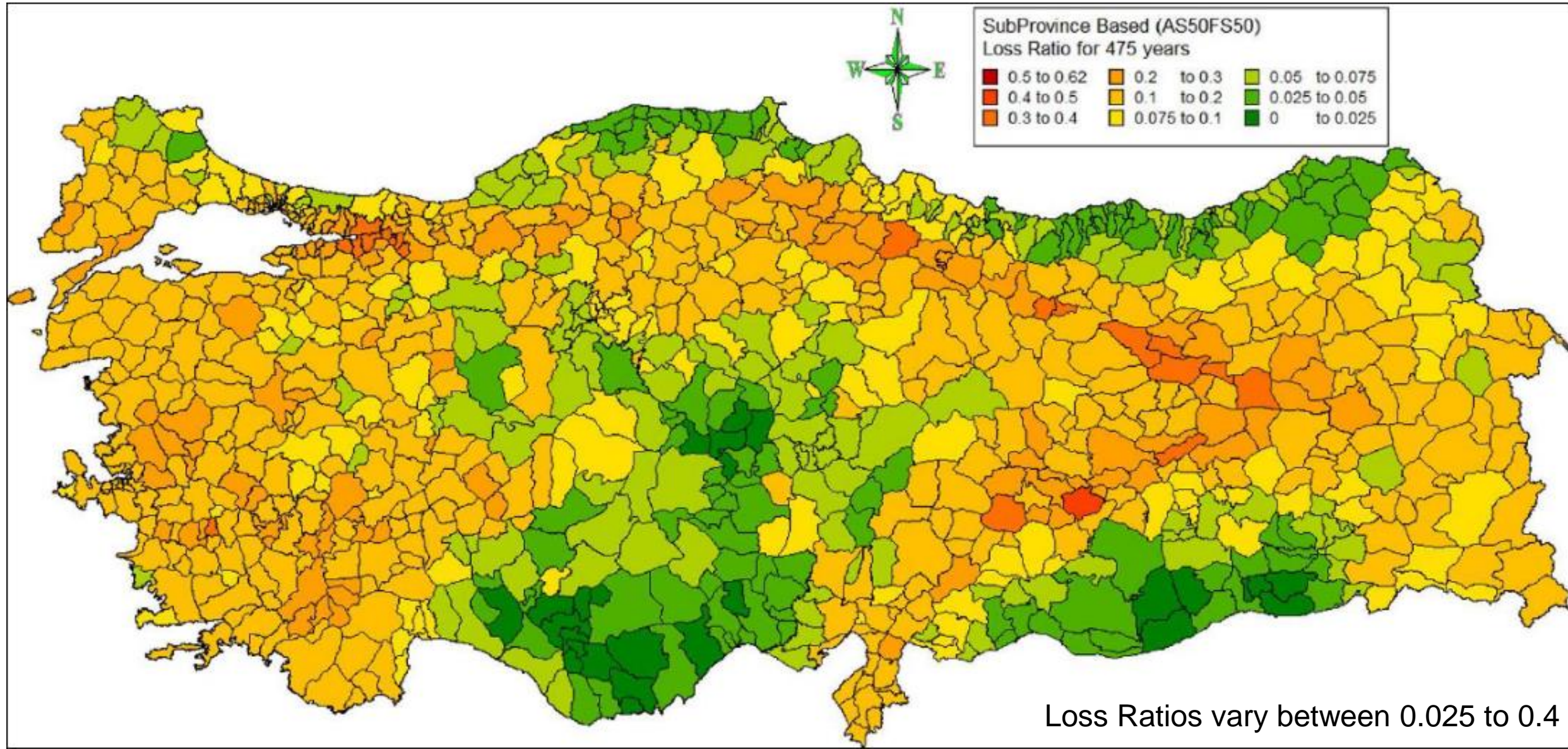


SEISMIC FRAGILITY

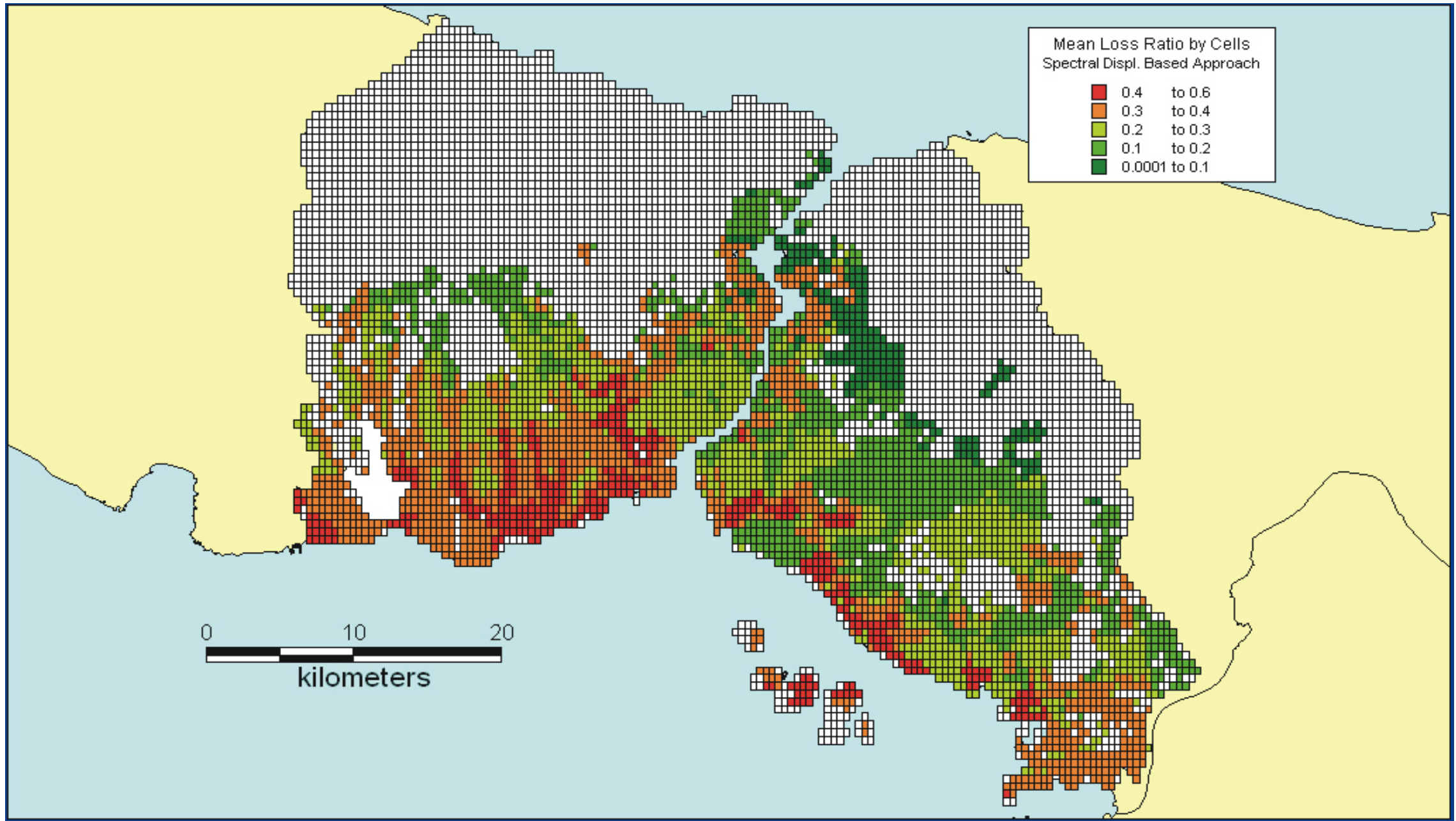


EARTHQUAKE RISK ASSESSMENT IN TURKEY

DISTRICT BASED LOSS RATIOS FOR 475-YEAR RETURN PERIOD

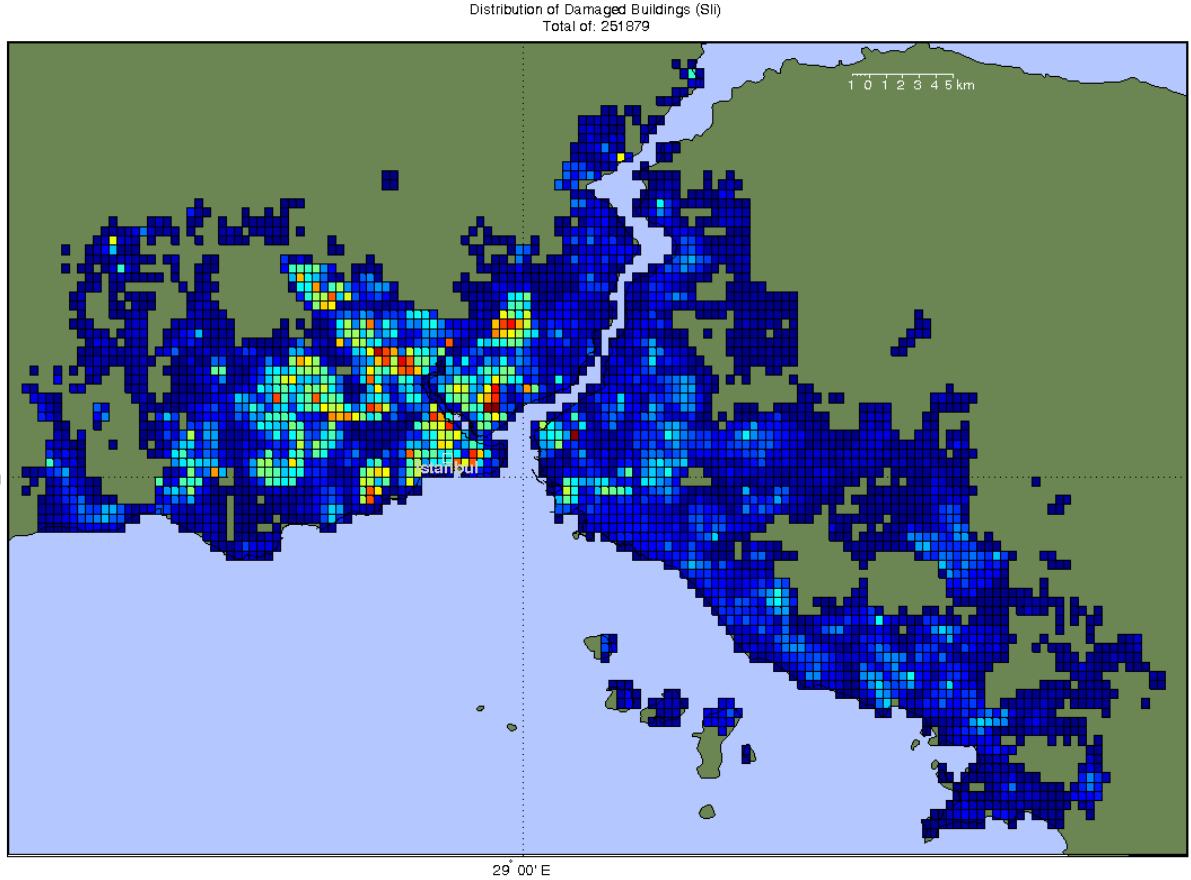


BUILDING LOSS RATIO DISTRIBUTION IN ISTANBUL (Mw7.5 Earthquake)

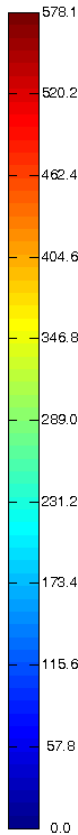


BUILDING DAMAGE ESTIMATION in ISTANBUL

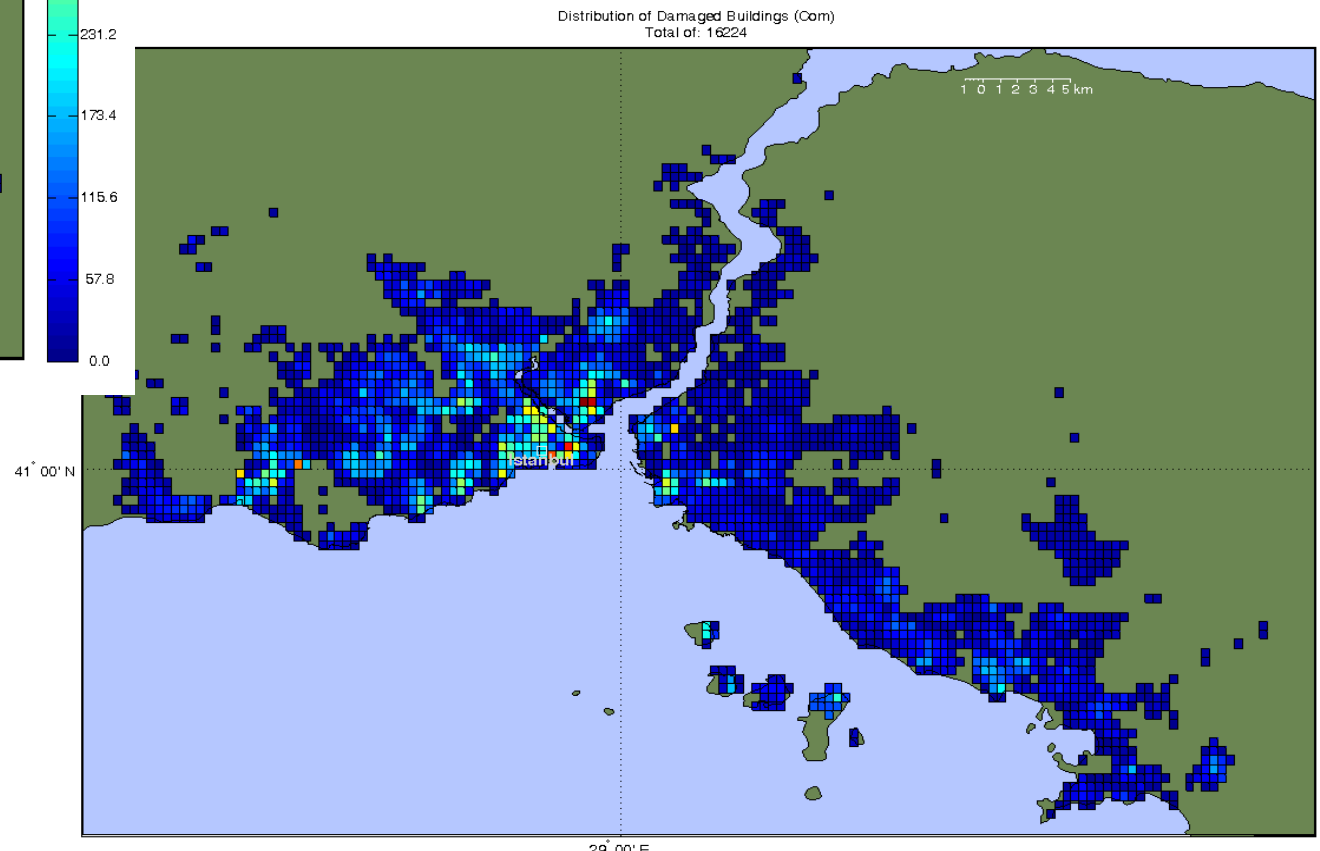
Istanbul Earthquake
Mw=7.25 and $\varepsilon=0$



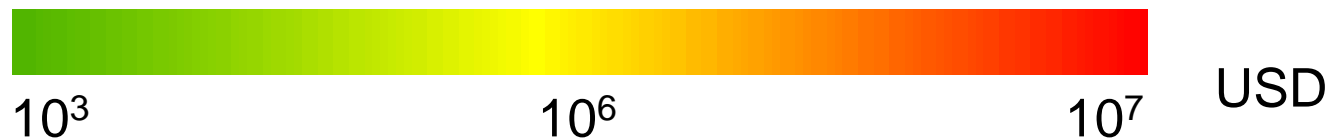
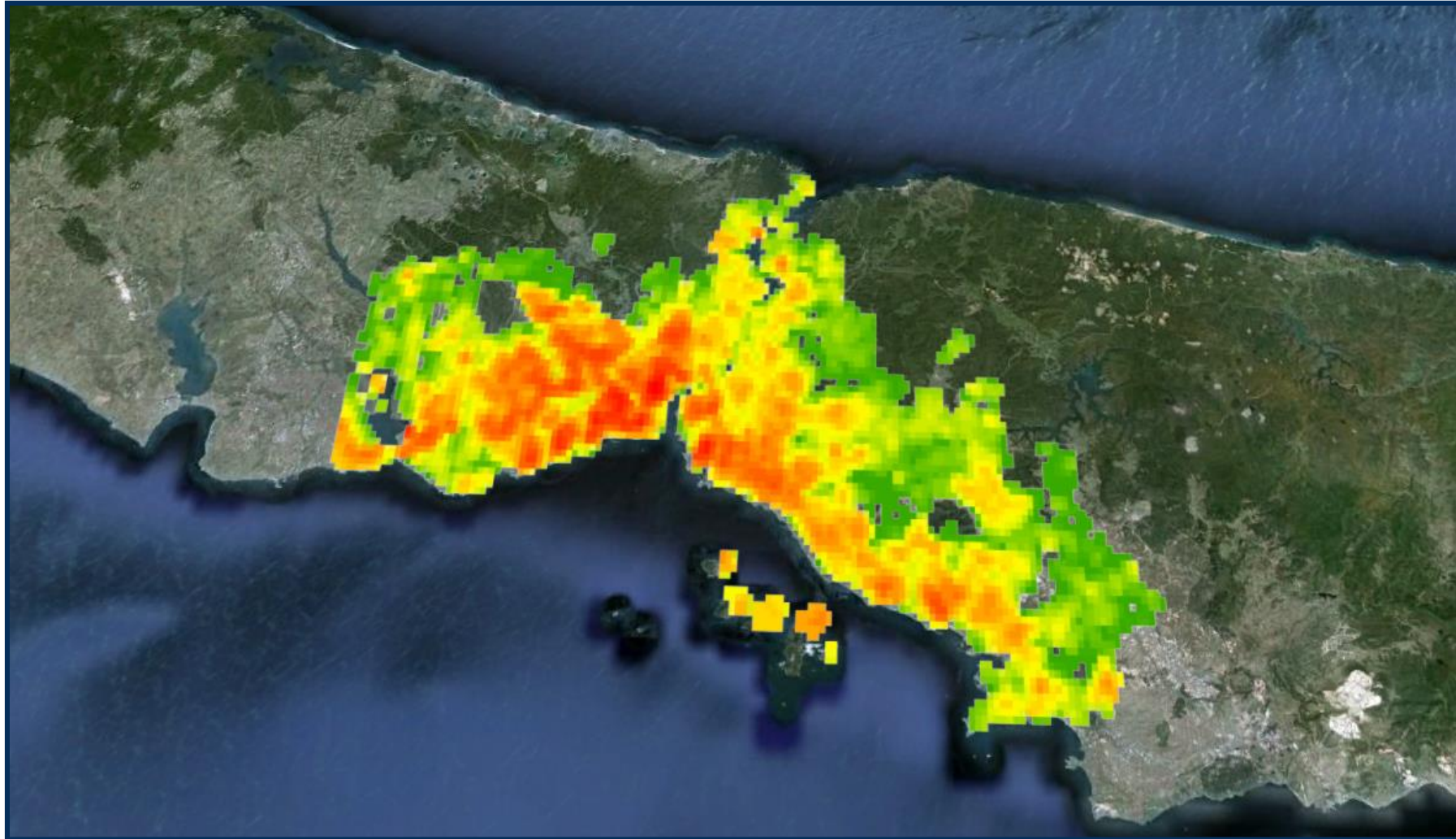
LIGHT
DAMAGE



HEAVY
DAMAGE



FINANCIAL LOSS ASSESSMENT in ISTANBUL (Mw=7.25 Earthquake)



Total direct economic building losses: USD 5.42 Bn with a standard deviation of USD 1.04 Bn

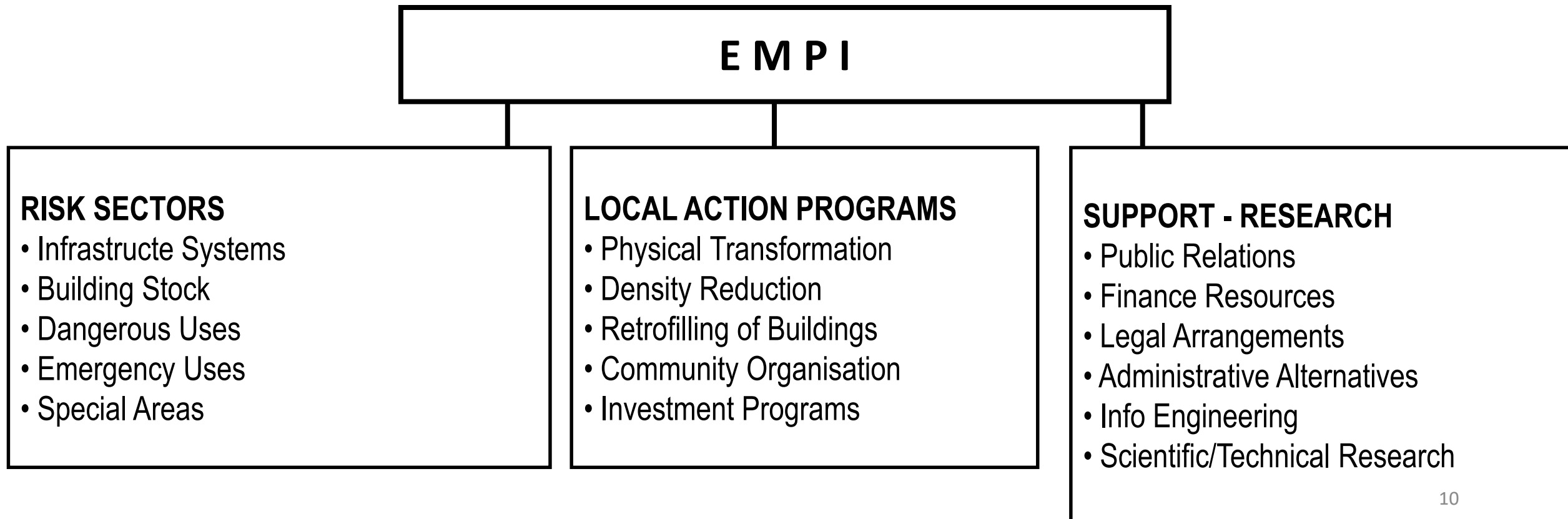
BASIC TENETS OF EARTHQUAKE RISK MANAGEMENT

(Prepare an Earthquake Masterplan)

- Quantify and Understand the Existing Risk (*earthquake risk assessment*)
 - Do not Increase the Existing Risk (*i.e. build properly*)
 - Decrease the Existing Risk (*i.e. retrofit, urban renewal*)
 - Transfer the Risk (*i.e. insurance, cat-bond*)
- Improve Disaster/Emergency Management (*EEW, rapid response systems*)

EARTHQUAKE MASTERPLAN FOR ISTANBUL (EMPI)

The Masterplan assessed the seismic vulnerability of the existing building stock in Istanbul and identified the technical, social, administrative, legal, and financial measures needed to implement such methods. It further provided a strategy for sustained progress in a range of areas, including seismic assessment and rehabilitation of existing buildings, urban planning, education, and risk and disaster management.



ISTANBUL SEISMIC RISK MITIGATION AND EMERGENCY PREPAREDNESS (ISMEP) PROJECT

The ISMEP project spent so far EUR 2.2 Billion

The project consists of the following components and activities:

Component A: Enhancing Emergency Preparedness

Component B: Seismic Risk Mitigation for Public Facilities

Component C: Enforcement of Building Codes

Component D: Project Management

Under Component B: 7% of about 12,000 Public Buildings in Istanbul will be retrofitted (About 30% of this stock needs to be retrofitted).

As of Jan 2018,

800 school buildings were retrofitted, 300 reconstructed

5 Major Seismic Isolated hospitals under construction (4800 Beds)

URBAN RENEWAL PROGRAM

The plan entails the demolition of a third of the country's approximately 20 Million residential buildings and re-building within 20 years at a cost of \$400 Billion.

**URBAN RENEWAL
AT FİKİRTEPE
50,000 Housing
Units at a cost of 12
Billion USD**



TURKISH CATASTROPHE INSURANCE POOL

BASIC FACTS OF COVERAGE

- Compulsory for household owner's
- Only residential buildings
- Only earthquake risk.
- Only building coverage, no contents, no business interruption, etc
- Earthquake cover to households up to Sum Insured 70.000 €

BASIC FIGURES

● Total No of policies	8 Million
● Total coverage	160 Billion €
● Annual premium	300 Million €
● Avg. Sum insured	30,000 €
● Avg. Premium	40 €
● Pool	0.9 Billion €
● Re-Insurance	2.8 Billion €
● Cat-Bond	0.4 Billion €

(Almost) the Largest Compulsory Earthquake Insurance Program in the World

In Istanbul the penetration is 60% (Nationwide penetration is 45%).
Total TCIP coverage in Istanbul is about 70 Billion € (Jan. 2018)

THANK YOU