



# From Reconstruction to Mitigation

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## Experience from Turkey

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Istanbul, August 15, 2006

# Turkey – Earthquake Risk

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- One of the most seismically active country in the world
- More than 95% of country's land is at risk of earthquakes
- 70% of population is vulnerable to seismic risk
- 75% of industrial facilities are located in earthquake-prone areas

# Turkey – Recent Major Earthquakes

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Date	Region	Magnitude (Richter)	Casualties
August 17, 1999	Marmara (North)	7.4	17,000
June 27, 1998	Adana (South)	6.3	140
October 1, 1995	Dinar (East)	6.0	100
March 13, 1992	Erzincan (East)	6.8	650
October 30, 1983	Erzurum/Kars (East)	6.9	1,160
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December 27, 1939	Erzincan (East)	7.9	45,000

# Evolution of Bank's Assistance

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- 1992 Erzincan Emergency Loan (\$285 M)

## ***Reconstruction***

- 1998 TEFER Project (\$369 M)

## ***Reconstruction + Some Mitigation***

- 1999 ERL (\$252 M)

## ***Budget Support***

- 1999 MEER Project (\$ 505 M)

## ***Reconstruction + Mitigation + Preparedness***

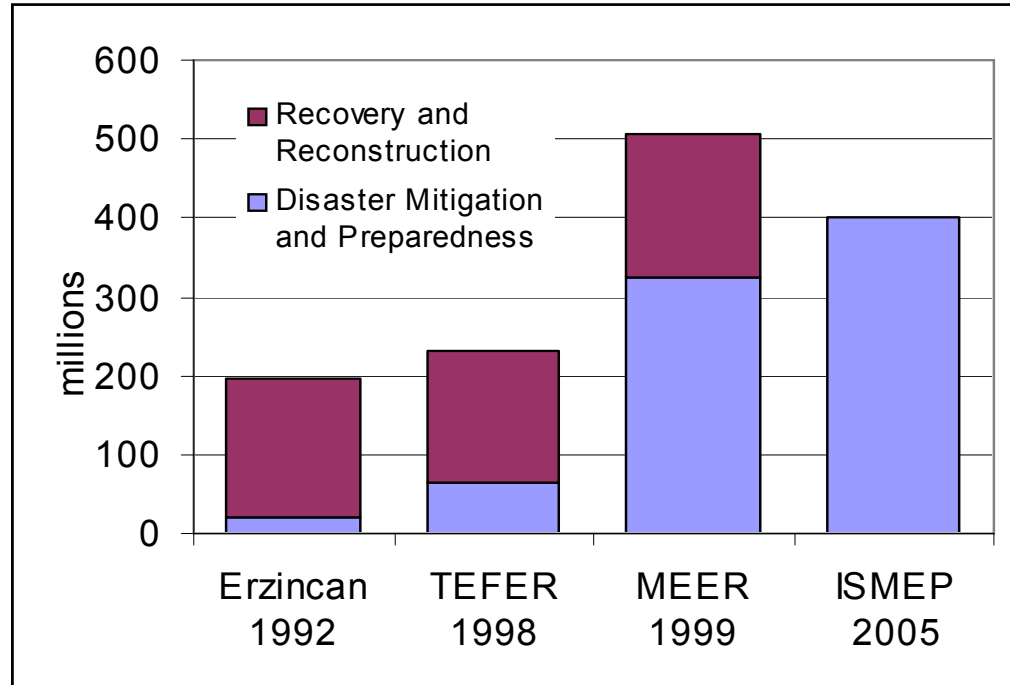
- 2005 ISMEP Project (\$ 400 million)

## ***Mitigation + Preparedness***

From Reconstruction to Mitigation  
- Experience from Turkey

# Evolution of Bank's Assistance cont.

- Larger proportion of Bank project funds has been spent on mitigation in each subsequent project



Source: OED, Turkey PPAR, May 2005

From Reconstruction to Mitigation  
- Experience from Turkey

# Marmara Earthquake (Aug. 1999)

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- 17,000 of lost lives
- 200,000 people homeless
- Up to \$3 B damage to housing
- Up to \$2.2 B of fiscal impact, etc.



# Comprehensive Approach MEER Project

- Reconstruction and recovery
- Institutional capacity building
- Preparedness
- Mitigation



# Comprehensive Approach MEER Project cont.

## Reconstruction and recovery

- 13,000 urban and rural housing units
- Social infrastructure
- Off-site infrastructure (utilities)
- Trauma program



# Comprehensive Approach MEER Project cont.

## Institutional Capacity Building

- Creation and support to the Turkish Emergency Management Agency - TEMAD
- Training and knowledge sharing
- Establishment of a national emergency management center

# Comprehensive Approach MEER Project cont.

## Preparedness

- Emergency management information system
- Emergency communication system
- Emergency response - medical equipment, search and rescue
- Public awareness



# Comprehensive Approach MEER Project cont.

## Mitigation

- Catastrophe insurance scheme
- Revision of building codes
- Preparation of retrofitting code
- Hazard mapping and microzonation



# Lessons from MEER

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- Institution building takes longer than any project life span
- Compliance with building codes is a long-term agenda
- Social considerations are extremely important for the reconstruction program (social infrastructure and amenities; diversified designs, etc.)

# Some Lessons from MEER cont.

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- Readiness of the client might be overestimated due to the pressure of the crisis (e.g., trauma program)
- Financial risk transfer (limited demand, penetration and enforcement)
- Reconstruction project implementation is smoother if financing is off-budget

# Investing in Risk Mitigation

## ISMEP Project

### Istanbul

- Economic, financial, cultural and industrial center of Turkey
- Highly vulnerable to earthquakes



# Istanbul – Risk Factors

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- Located on the North Anatolian Fault
- High population (15 m) and density
- Probability of earthquake within 30 years is 62%
- Potential economic losses due to major disaster estimated at \$20 B
- 87,000 potential fatalities
- 350,000 likely damaged buildings

# Istanbul – Seismicity Map

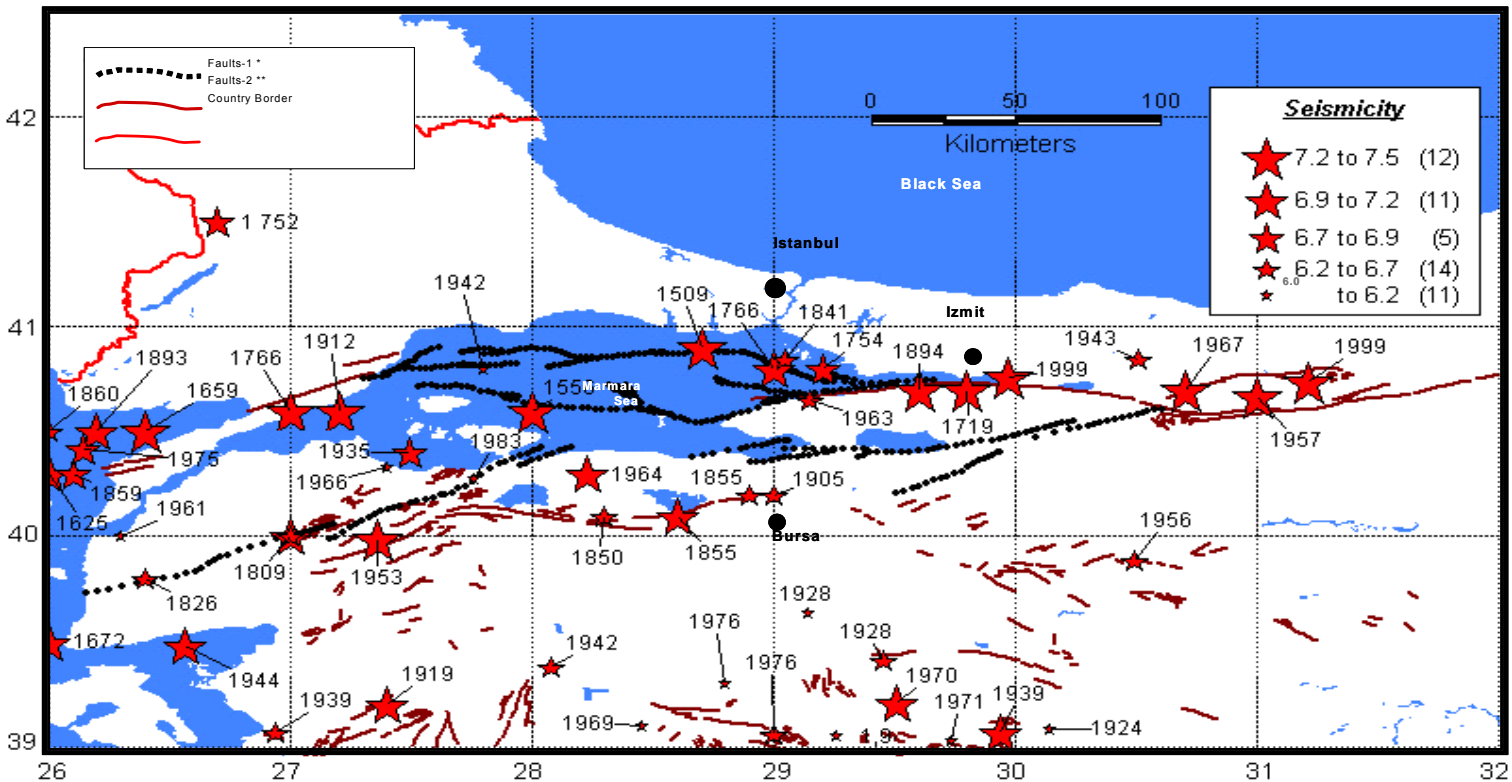


Figure 4.1. Locations of  $M_w = 6.0$  earthquakes (A.D. 1509-1999)

(Note: Parentheses denotes the number of earthquakes falling in that specific magnitude range; Category-1 faults has been recently explored by using bathymetric and seismic reflection data [1-4]; Category-2 faults indicates the previously known faults [MTA]).

# Istanbul Seismic Risk Mitigation and Emergency Preparedness Project (ISMEP)

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## Objectives

- The project will initiate the process of transforming Istanbul into a city resilient to major earthquake.
- The specific objective of the project is to improve Istanbul's preparedness for a potential earthquake through enhancing institutional and technical capacity for disaster management and emergency response, strengthening critical public facilities for earthquake resistance, and supporting measures for better enforcement of building codes and land use plans.

# Investing in Risk Mitigation

## ISMEP Project

### Main components

- Enhancing emergency preparedness
- Retrofitting of critical public facilities
- Enforcement of building codes and land use plans
- *Retrofitting of residential housing stock (dropped)*



# Investing in Risk Mitigation

## ISMEP Project

### Enhancing Emergency Preparedness

- Emergency communication systems
- Emergency management information system
- Upgrading emergency response capacity (equipment and training)
- Public awareness
- Support to community volunteer groups



# Investing in Risk Mitigation ISMEP Project

## Public Buildings Retrofitting

- Strengthening/reconstruction of priority public facilities – hospitals, schools, public administration buildings, etc. (about 840 buildings)
- Risk assessment and feasibility studies for cultural heritage buildings
- Risk assessment of lifelines and vital infrastructure

# Investing in Risk Mitigation

## ISMEP Project cont.

### Enforcement of Building Codes and Land Use Plans

- Public awareness campaigns
- Development of regulatory framework
- Accreditation program for engineers
- Improvements in building permits issuance and promoting transparency and accountability in selected district municipalities

# Key Challenges

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## *Retrofitting of Public Buildings*

- Original quality of construction
- Costs of retrofitting *vis a vis* replacement
- Need for reconstruction
- Sources of funding

# Key Challenges cont.

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## Strengthening of private buildings

### Pilot 1- Bakirköy - *Retrofitting*

- Affordability; access to financing; subsidies
- Consensus (social and legal aspects)
- Technical aspects (retrofitting methods)
- Economic feasibility

# Key Challenges cont.

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## Strengthening of private buildings

### Pilot 2 – Zeytinburnu – *Urban renewal*

- Possibly self-financing model
- Costs: demolition, new construction in situ, buildings for temporary resettlement
- Revenues: sale of additional units, mixed commercial and residential use; higher tax revenues
- Benefits: increased structural safety, rejuvenation of municipality

# Key Challenges cont.

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## Institutional Aspects

- Relationship between emergency management functions at the central and local levels
- Weak enforcement of building codes has deep roots (legal, social, institutional)

# Path of Evolution

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