

“NATURAL DISASTERS MITIGATION”

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1. Introduction to Natural Disasters

In 2013 the natural disasters:

- took the lives of more than 22,000 people,
- affected nearly 97 million others,
- and caused almost \$118 billion in economic damages.

Disaster risk reduction is a broad term that includes anything we do to prevent or reduce the damage caused by natural hazards like:

- earthquakes,
- floods,
- droughts,
- volcanoes and
- storms.

Investments in disaster risk reduction save lives, not just after the disaster occurs, but even as disaster strikes.

Here, we present you some examples of natural disasters, which took place in several countries over the world:

- **Disaster- Wind**



Winter 05 - Medhuber LEADING MEDICINE

- **Floods:**

a) New Orleans



b) Bangladesh



- **Tsunami: Sri Lanka**



- **Epidemics:**

ΕΠΙΔΗΜΙΕΣ

01 Τα επιβλαβή φίλτρα
 παραρροφωμένο από τον πόνο και τις φλύκτινες, παραδομένο στην (κάτω) αλέθρια επίθεση της ετιολογίας. Η εν λόγω φασματογραφία χρησιμοποιήθηκε το 1941 στο πλαίσιο της εκστρατείας ενημέρωσης για τον εμβολιασμό κατά της νόσου στη Νέα Υόρκη και άλλες αμερικανικές πολιτείες.

02

03

Τη συνόδευε η Λεζάντα:
 «Αυτός ο άνδρας δεν έκανε ποτέ εμβόλιο εμβολίου».

02 Τον «επιβλήσαν» του 1937
 οι υγειονομικές αρχές του Χονγκ Κονγκ μετέδωσαν αρρώστιες από άποιο για την εμφάνιση λοιμωδών νοσημάτων ορνιθοτροφείο

03
 για λοιμωδών νοσημάτων. Σε αυτή τη λογογραφία του 19ου αιώνα η κόλλα με τη μορφή λευκωμένων σκελετού αρσενικής νεκρής και απτημένου

ΕΠΙΔΗΜΙΕΣ

01
 που τον έφτασε ο 1882 που ίδρυσε τις κτηνοτροφικές βόσκεις (βοσκήματα) στην... Το 1818 που «κτενάσε» η γριπιά (αφαιρούσε) πάνω του 20 εκατομμύρια τετρακίς από τον ελεφαντί) το εν λόγω σκελετό έκανε βροχίτις.

02
 Νικολάου αρσενικό που... θανατοφόρο ή στον κύριο τις εργασίες τους

03
 φανταίες στην αρχή, οι βροχίτιδες δεν άφηναν, για να σπάρουν τον θάνατο, να βγαίνουν σε οποιαδήποτε μέρος του κορμιού».

Κάποιος πιστεύει ότι ο σκελετός
 από τις επιγείες αποκαλύπτει θα τους έδειξε από τον εναγκαλισμό του Μαίρη Θανάτου. Άλλοι επέλεξαν να καταδικασθούν σε σπέσις της ίδιας αποκαλύπτει, να επιβληθούν στην πιο απειρότατη ουσία. Οι εβραίοι σπέρθηκαν ελεύθερα βύματα - καταγορεύθηκαν ότι αυτοί έστησαν τη σφαγή και άρτησαν να θαυμάσιους κατά εναγκαλιστές. Ο ίδιος ο Πάπας Κλήμης ΣΤ' κατέβηκε προσπαθώντας για να τους προστατεύσει από το κτηνοτροφικό μένος. Σε όλη τη Γηρόκη Πάπας Θεωρητικά καταγορεύθηκαν με το κακό. Πολλοί φέρουν βόσκεις σε σέχνη νόμους, τις οποίες προηλάζουν με Εξή και αρμάτω και ελευθερώνουν τη μισοβία των βροχίτιων και τις αποσυνηθέμεντες

04
 Έχει ο θανατοφόρος για Εμπόλι που σάρωσε προ στον το ζήρι (φασματογραφία) σπέρθηκε με τον ελεφαντίνο ελεφαντολόγο Πάπας Κλήμη. Ο Άπρος που έπαιξε την Αθήνα το μακροβίον του 19ου αιώνα κέρρισε το ίδιο σκελετό σπέρθηκε τεταρτάκι ποταμοκάλας, φιλίγγια και σφαιρίων, φασματογραφία, βόσκεις, ερετόση, σκελετό της ίδιας

- **Avalanches:** In some countries the authorities monitor avalanche conditions and estimate risk levels. Specialists also intentionally trigger small snowslides with explosives so that the snow does not build up and is brought down the mountain in a controlled way when people are not present.



- **Earthquakes:**
 - a) San Adreas Fault, California



b) Kobe 1995



- Fires



- **Landslides**



- **Tornados**



- **Hurricanes**



- **Volcanos**



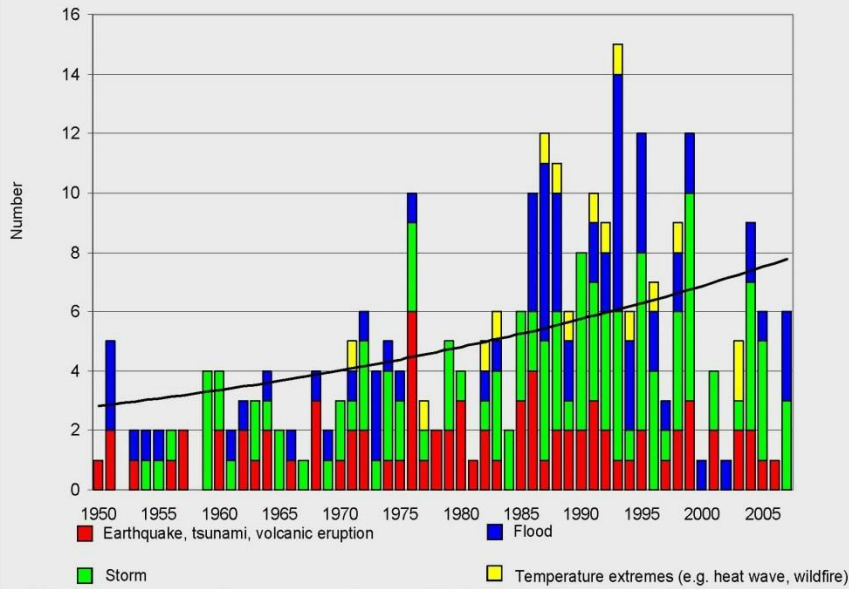


2. Number of natural disasters over the years

In the following section, we present you the number of natural disasters happened in the world among the years.

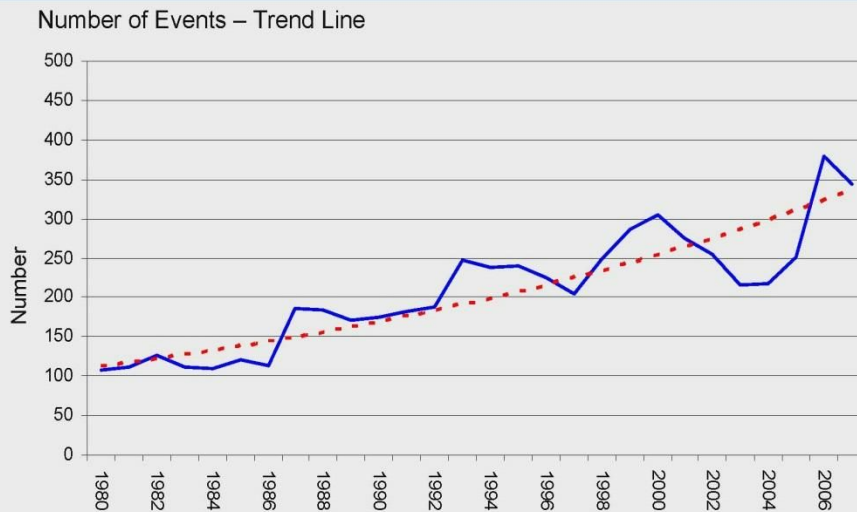
Great Natural Disasters 1950 – 2007

Number of events



Hydrological events globally 1980 – 2007

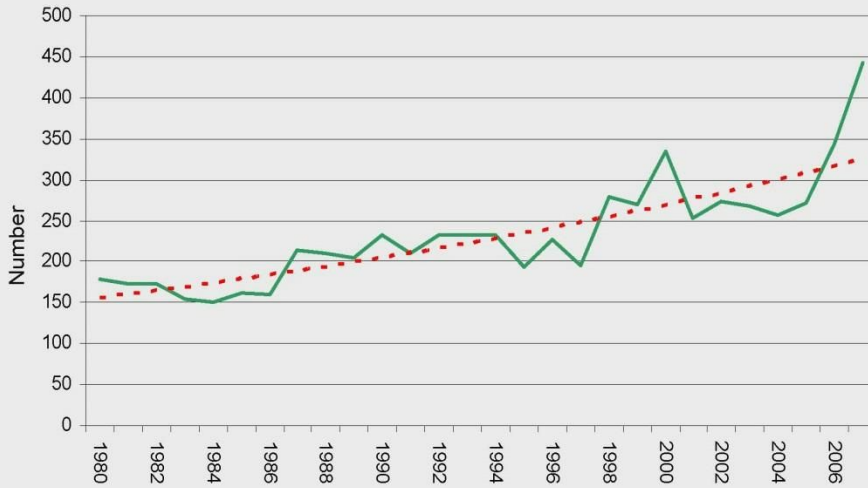
(Floods, Mass Movement)



Storm events globally 1980 – 2007
(Tropical Storms, Winter Storms, Tornadoes, Hail)



Number of Events – Trend Line

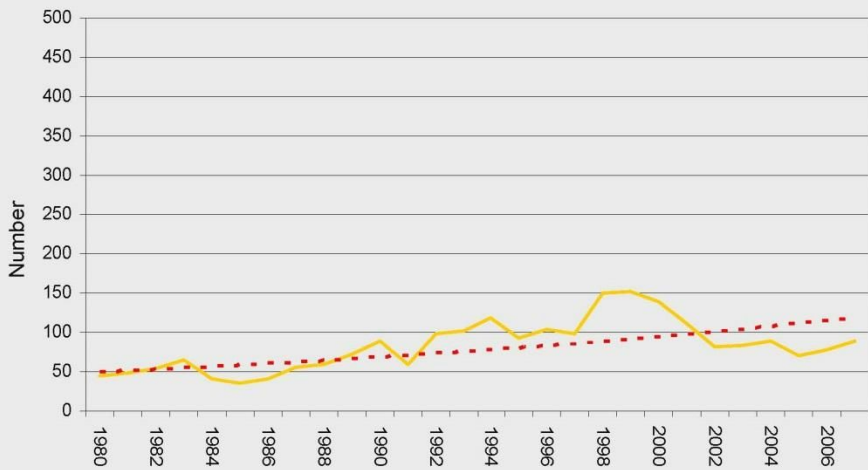


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Other Weather Related Events (globally) 1980 - 2007
(Extreme temperatures, forest fires, drought)



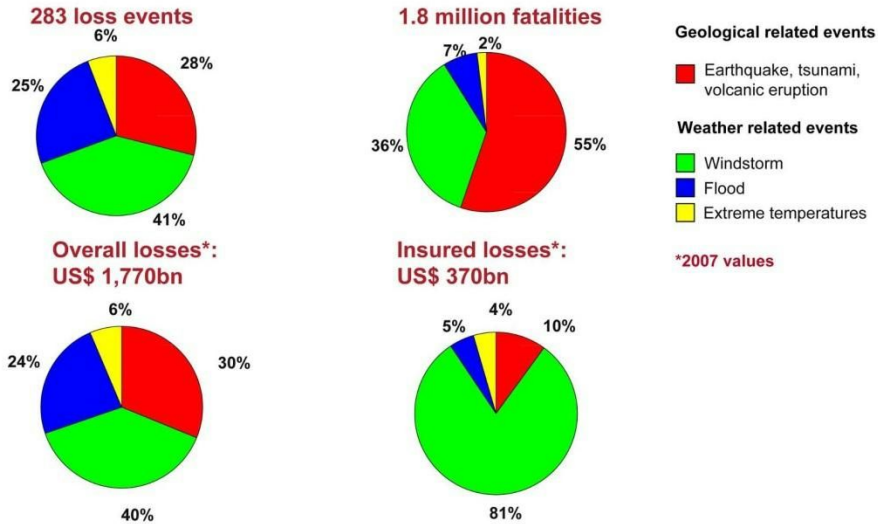
Number of Events – Trend Line



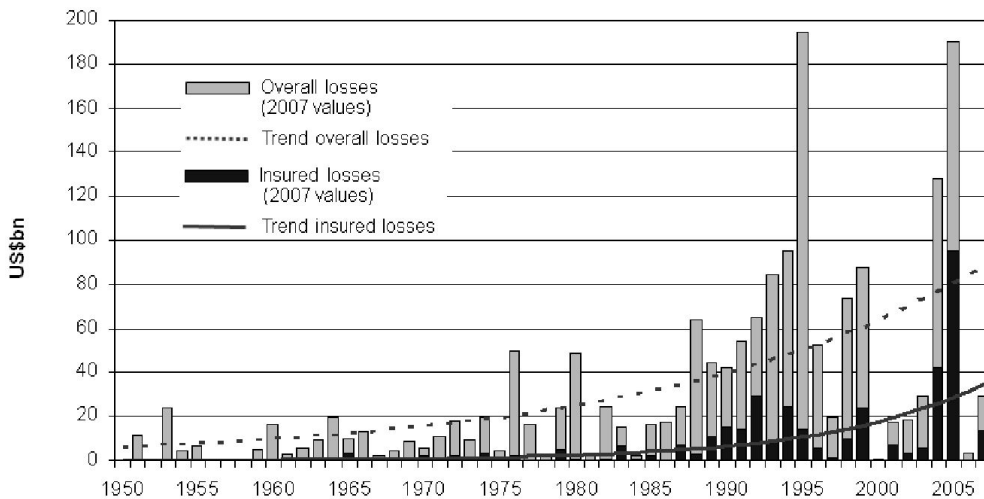
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Great natural disasters 1950 – 2007

Percentage distribution worldwide



3. Natural Disasters Affects Economies



In the above diagram each vertical bar represents the total economic losses. The darker zone represents the insured portion of it.

Comparison of these economic losses over time reveals a huge increase:

- \$53.6 billion (1950-59),
- \$93.3 billion (1960-69),
- \$161.7 billion (1970-79),
- \$262.9 billion (1980-89) and

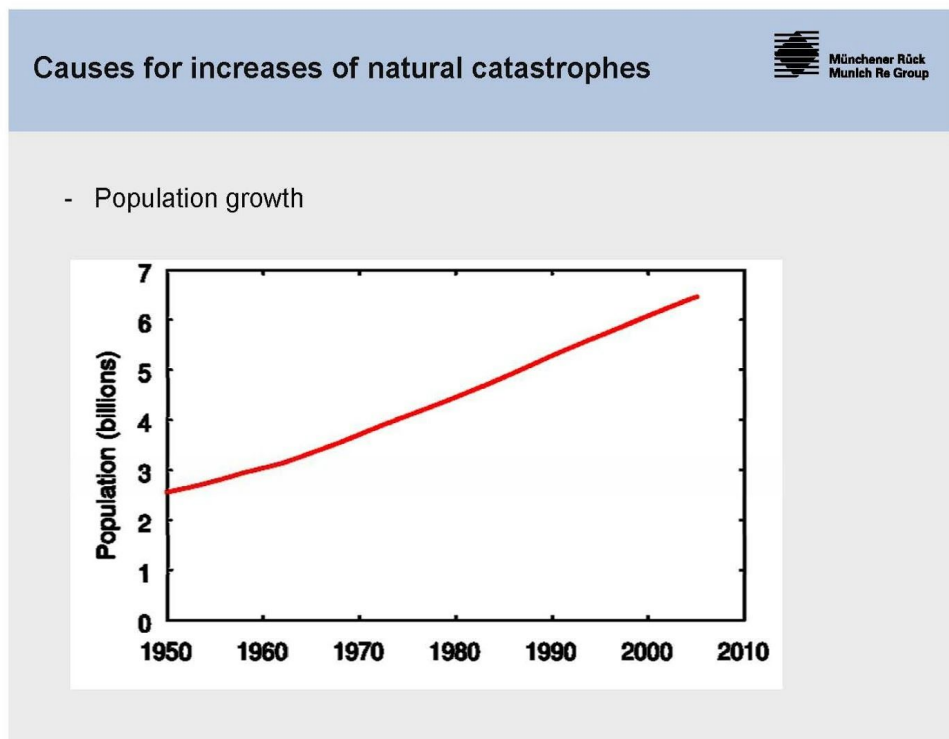
- \$778.3 billion (1990-99)

The last decade (2000-10) in the middle of it had already seen \$420.6 billion in losses, principally due to the 2004 and 2005 hurricane seasons, which produced historic records.

4. Causes for Increase of Natural Disasters

The Role of the Insurance Industry

Ref. Prof. Dr. Peter Hoeppe, Head of Geo Risks Research



Causes for increases of natural catastrophes



- Population growth
- Increasing standard of living
- Concentration of population and values in mega cities

1950 30% of world population live in cities

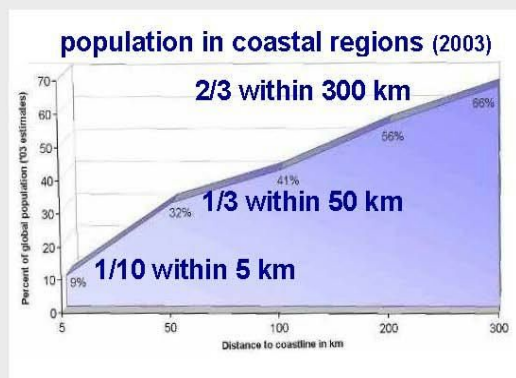
2005 50% of world population live in cities

2030 60% of world population live in cities

Most mega cities are located at the coast



**15 of the world's
20 largest cities
are on coastal
plains.**



Causes for increases of natural catastrophes

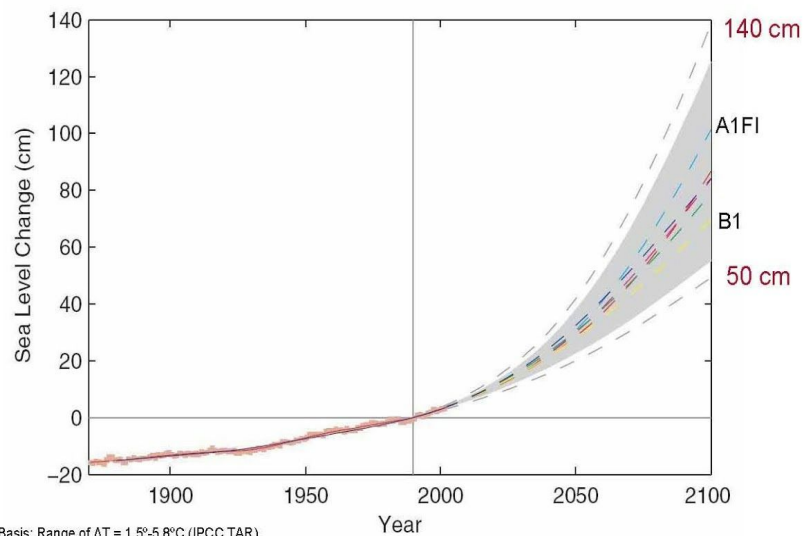


- Population growth
- Increasing standard of living
- Concentration of population and values in mega cities
- More and more people settling in highly exposed regions
- Increased vulnerability of modern societies
- Changes of environmental conditions

Changes in sea level rise and projection for different scenarios



Temperature-dependent approach*





5. What can be done

In 2013, according to World Disasters Report, natural disasters:

- took the lives of more than 22,000 people,
- affected nearly 97 million others, and
- caused almost \$118 billion in economic damages.

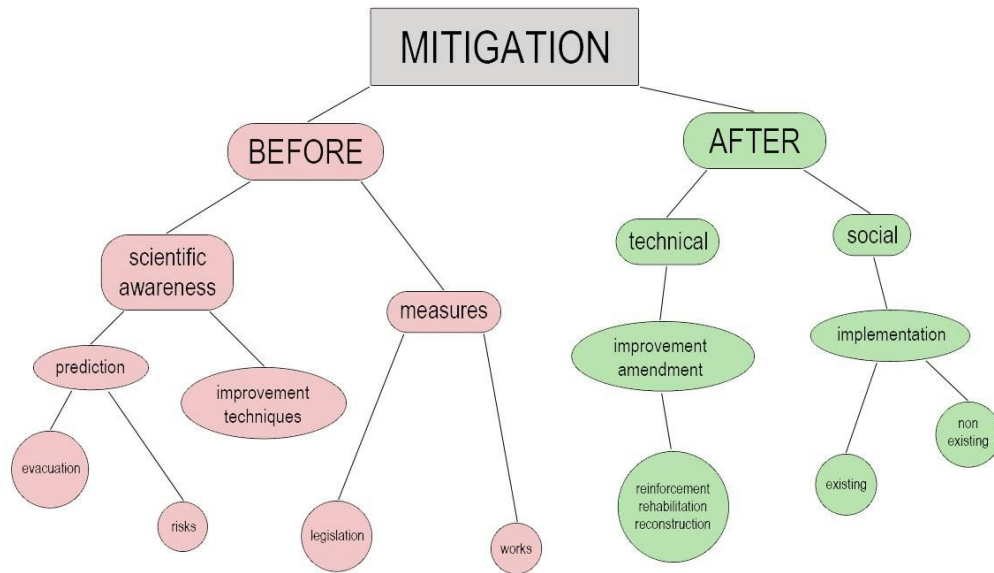
The impact of future disasters is likely to be even more devastating. Disasters are expected to become more frequent in the future and to take a greater toll due to:

- climate change
- growing world population
- more people settling in hazard-prone areas.

With each disaster, development gains may be lost as:

- infrastructure is destroyed,
- poverty increases, and
- economic opportunities and livelihoods are interrupted or lost.

Disaster **risk reduction** is a broad term that includes anything we do to **prevent or reduce the damage** caused by natural hazards like earthquakes, floods, droughts, and storms. Investments in disaster risk reduction save lives, not just after the disaster occurs, but even as disaster strikes.

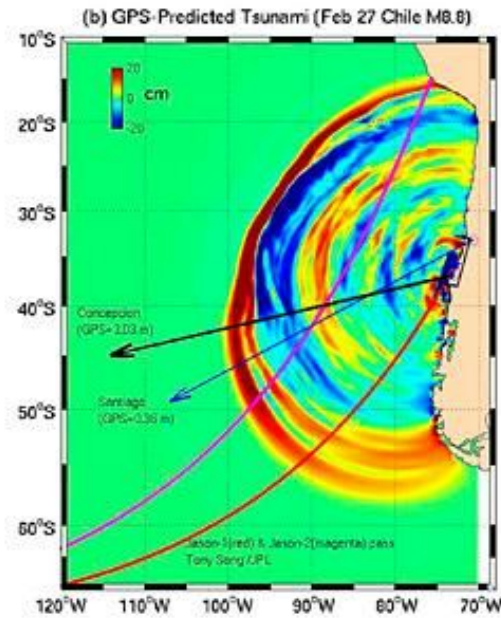


USAID supports a range of disaster risk reduction activities:

- a) Early warning systems notify people before a tsunami hits or before a volcano erupts, giving them time to move out of harm's way.
- b) Analysis of hazards and vulnerabilities can help communities plan where and how to build.
- c) Establishment and enforcement of building codes means structures are likely to withstand damage.
- d) Trained first responders can immediately act to rescue trapped or injured persons.
- e) A family with more than one means of support can be better protected against poverty in the event that its primary livelihood

Predictions

- Scientists Develop New Way to Accurately Predict Tsunami Size



- Attempts to predict earthquakes may do more harm than good.



Damaged buildings in Cavezzo, Italy, on Tuesday. The mechanics of earthquakes make accurate predictions unlikely. Photograph: Rex Features

An inaccurate earthquake prediction is likely to have worse consequences than if there had been no prediction at all.

First, we should be clear about what is meant by prediction. In this context we mean that in advance of an earthquake a correct estimate is made of its magnitude, location and time of occurrence. To be useful an earthquake prediction needs to include all three.



As reported by ABC, the BBC, the Wall Street Journal, the New York Times, and elsewhere, an Italian court has convicted seven earthquake experts of failing to appropriately sound the alarm bell for an earthquake that wound up killing more than 300 people in L'Aquila in 2009. The experts received long prison sentences and fines of more than \$10 million. (Addendum: Roger Pielke Jr. discusses the "mischaracterizations" of the verdict.)

Establishment and enforcement

Even if prediction became the exact science it clearly isn't, we would still need evacuation plans and earthquake-proof buildings – and these measures do not depend on prediction.

"...By mitigating existing and new homes with structural easures (e.g., better designed roofs) one could reduce future disaster losses significantly. If all residential homes in Florida were fully mitigated, the damage from a 100-year hurricane would be reduced from \$84 billion to \$33 billion, a decrease of 61 %."

"Reducing Losses from Catastrophic Risks Through Long-term Insurance and Mitigation",
By Howard Kunreuther Social Research

Most natural hazard specialists believe the key to reducing losses is to use our existing knowledge of the ways earthquakes occur, and where, to implement measures that increase awareness,

preparedness and resilience. The real focus needs to be on dealing with the social, political and economic barriers that prevent effective disaster risk reduction.

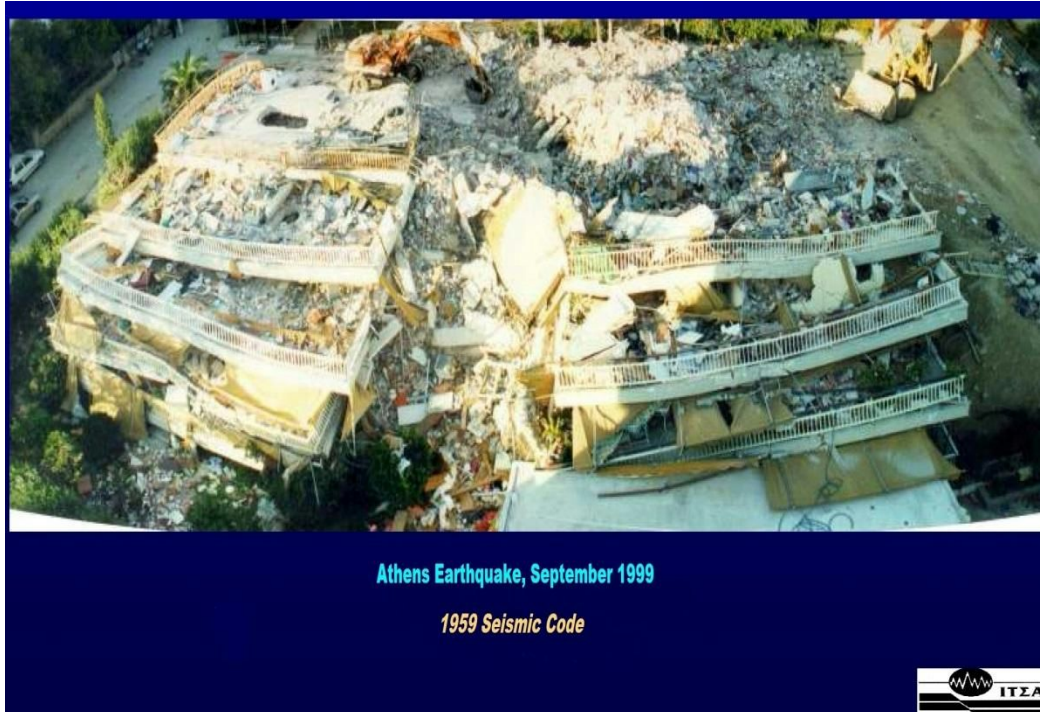
David Petley , executive director of the Institute of Hazard, Risk and Resilience, University of Durham

The question is how to enforce the application of all these.
The Greek example and the contribution of anti-seismic regulations on seismic earthquake disasters:

Events that changed the anti-seismic regulation

- 1959: First anti-seismic regulation (Royal decree 19-2-1959).
- **1978: Earthquake 6.5 Richter in Thessaloniki**, 49 dead.
Creation of a local seismographic network in Macedonia.
- 1979: The Institute of Engineering Seismology and anti-seismic construction (ITSAK) founded in Thessaloniki.
- **1981: Earthquake 6.7 Richter in Alkyonides**, 20 dead.
The state decides to strengthen networks and seismological research by setting up specialized services in the Ministry of Public Works.
- 1983 Establishment of the Earthquake Planning & Protection Agency (OASP).
- 1985: Update of the anti-seismic regulation with strict specifications. Establishment of the first prospective assessment.
- **1986: Earthquake 6.0 Richter in Kalamata**, 20 dead.
- 1992: Establishment of the seismic risk assessment. New anti-seismic regulation (NEAK)
- **1995: Earthquake 6.1 Richter at Aigio Peloponese**, 26 dead
Earthquake 6.6 Richter in Kozani, victimless
- **1999: Earthquake 5.9 Richter in Parnitha Athens**, 143 dead.
3.8 million items
- 2000 New anti-seismic regulation (EAK2000)
- 2003 Update of the new anti-seismic regulation (EAK2003)
- 2009 Eurocodes

Vulnerability of Buildings in Greece according to seismic codes





1985 Seismic Code

1995 Seismic Code

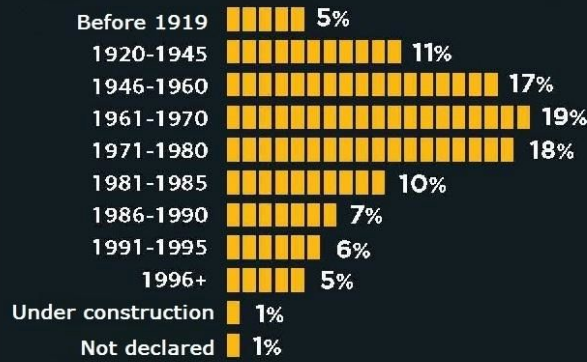


Athens Earthquake, September 1999

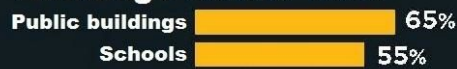


The Greek Example:

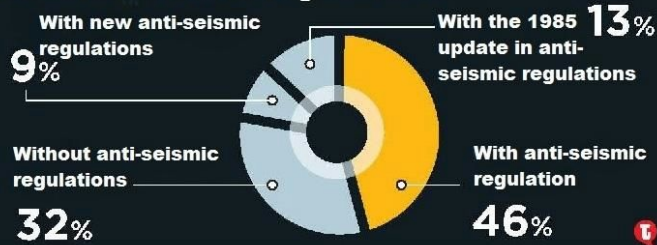
Classification of buildings according to time period of construction



Buildings before 1985



Classification of buildings according to anti-seismic regulations



Top 20 high-risk regions



6. Conclusion

“We should instead tell the public and the government to prepare for the unexpected”

Prof. Robert Geller concerns

Think in advance and plan ahead. Exercise, educate, inform and also take preventive measures.

