



ACADEMIC HUBS: USING APPLIED RESEARCH AND COMMUNITY SERVICES TO BUILD RESILIENCE OF NATIONS AND COMMUNITIES TO DISASTERS

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**Urban Planning and Disaster Risk Reduction Center
An Najah National University. Palestine.**

**Mitigation of Disasters due to Severe Natural Events: From Policy to
Practice'. Sri Lanka. 10-13 March 2016**

1. INTRODUCTION

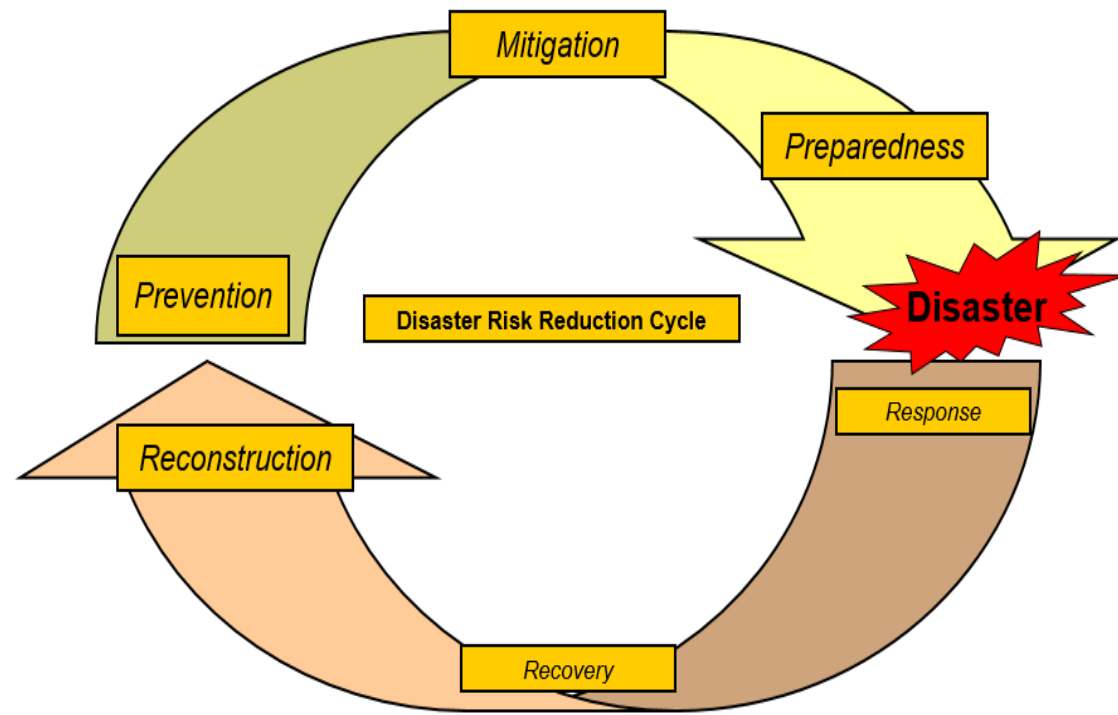
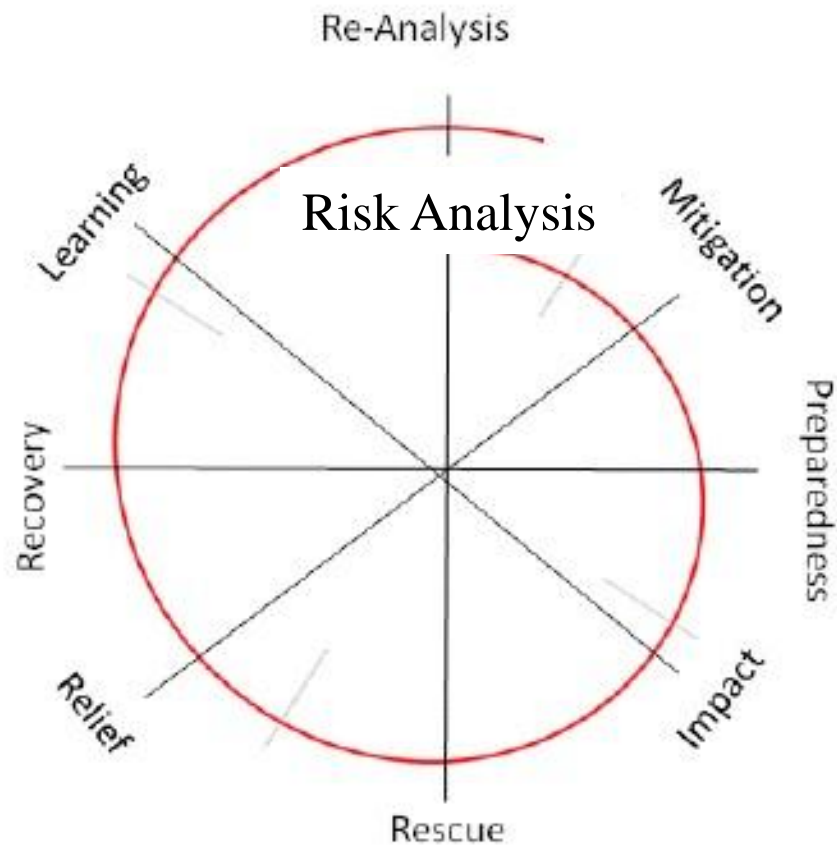
- The concept of DRR
- DDR Cycle
- Problem Statement–Seismic Hazard
- Academic Hubs: Using Science and Technology to build resilience -is fundamentally an interdisciplinary concept
- Support Action for Strengthening Palestine capabilities for seismic Risk Mitigation (SASPARM 2 - Project).



Disaster Risk Reduction

The conceptual framework of elements considered with the possibilities to minimize Vulnerabilities and Disaster Risk throughout a society, to avoid (**Prevention**) or to limit (**Mitigation** and **Preparedness**) the adverse impacts of the hazards (UNISDR).

Disaster Risk Reduction Cycle



Risk (R)

Probability of harmful consequences, or expected losses resulting from interactions between natural or human actions (hazards) and vulnerable conditions

Hazard Exposure (H)

Exposure to a potentially damaging physical event, phenomenon or human activity.

Vulnerability (V)

Conditions and processes resulting from physical, social, economical and environmental factors, which increase susceptibility to impact of hazards.

$$\text{Disaster risk (R)} = \frac{\text{Vulnerability (V)} \times \text{Hazard (H)}}{\text{Capacity (C)}}$$

Disaster Risk “R” = The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.



Risk (R)

Probability of harmful
consequences or

Hazard Exposure (H)

Exposure to a
.....

Vulnerability (V)

Conditions and
...

$$R = \frac{\text{HAZARD} \times \text{VULNERABILITY (exposure)}}{\text{CAPACITY}}$$



community or a society over some specified
future time period.

$$R = F(H, V, C)$$

R = Risk

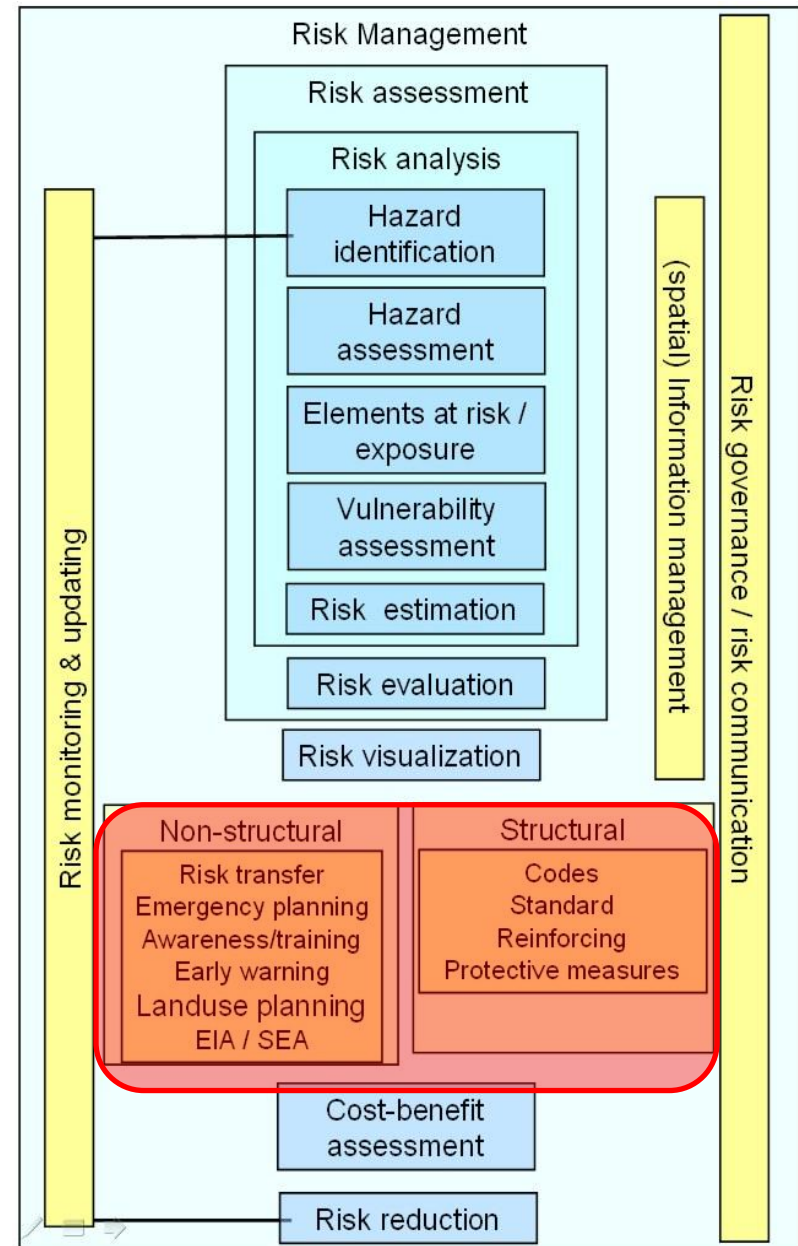
H = Hazard

V = Vulnerability

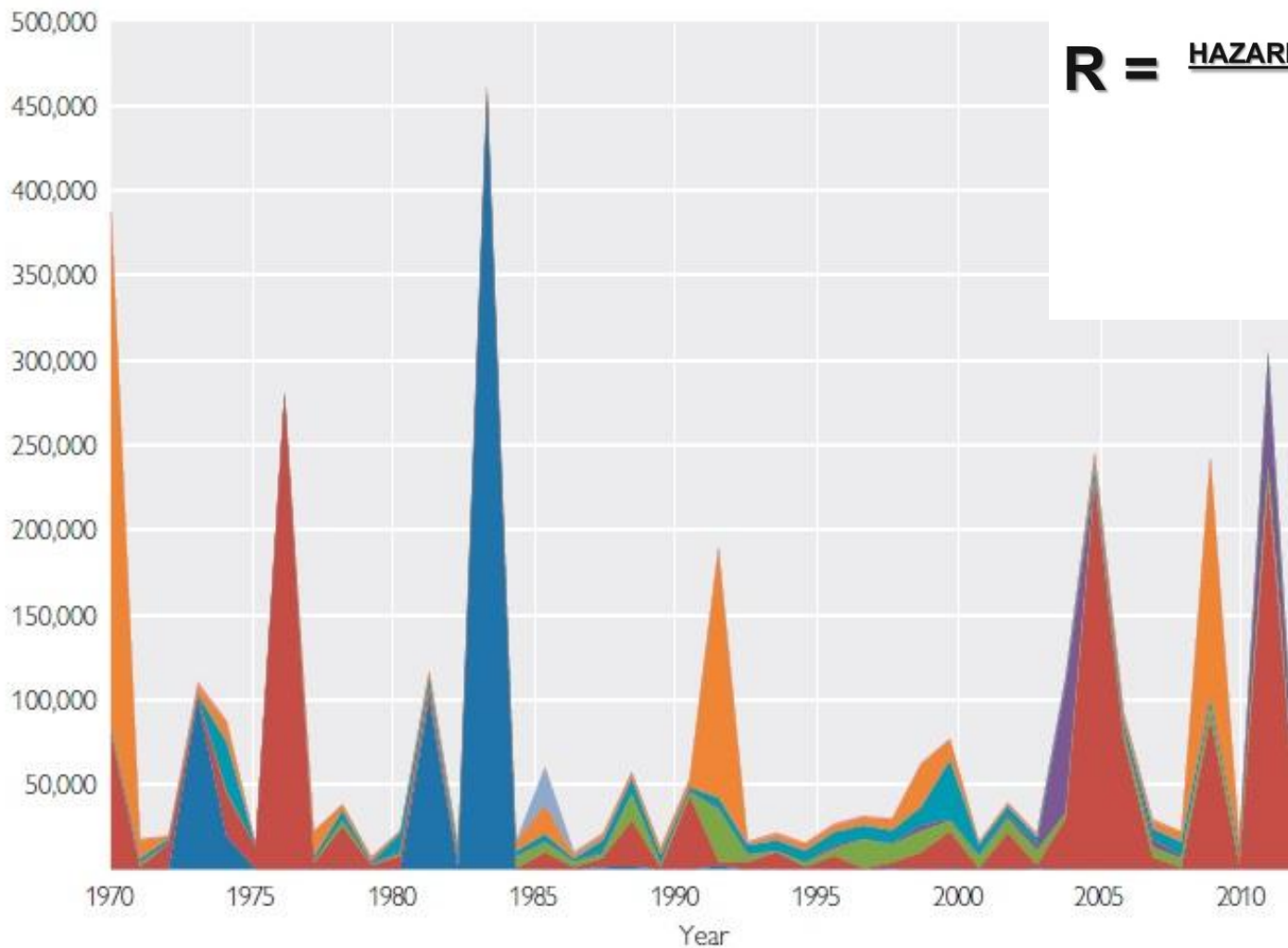
C = Coping capacity

Risk can be reduced by:

- Reducing the Hazard ?
- Reducing the Vulnerability of the Elements at Risk ?
- Reducing the Amount of the Elements at Risk ?
- **Increasing the coping capacity**



Number of deaths



Other
Volcano
Storm

Flood
Extreme temperature
Epidemic

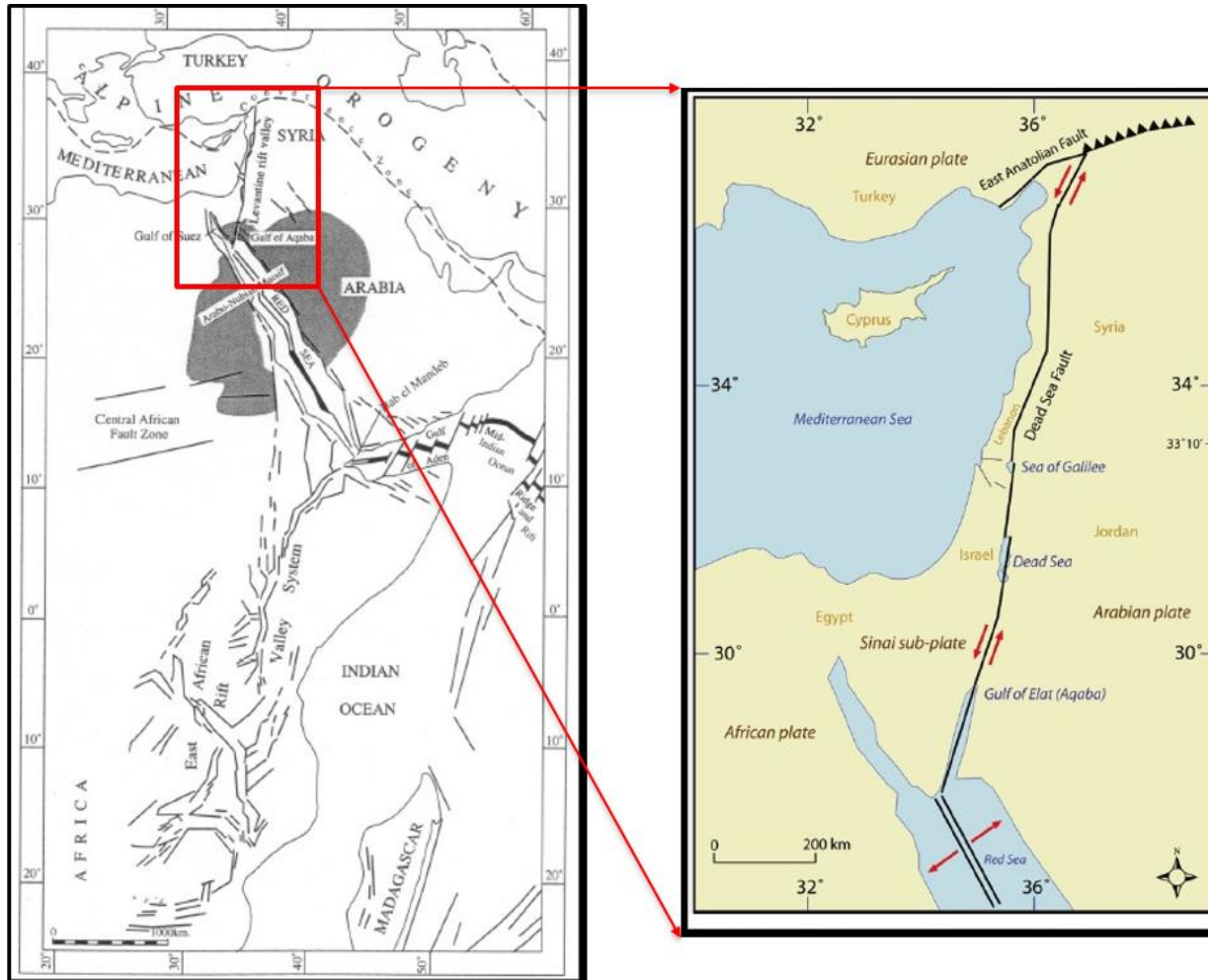
Earthquake
Drought

$$R = \frac{\text{HAZARD} \times \text{VULNERABILITY (exposure)}}{\text{CAPACITY}}$$



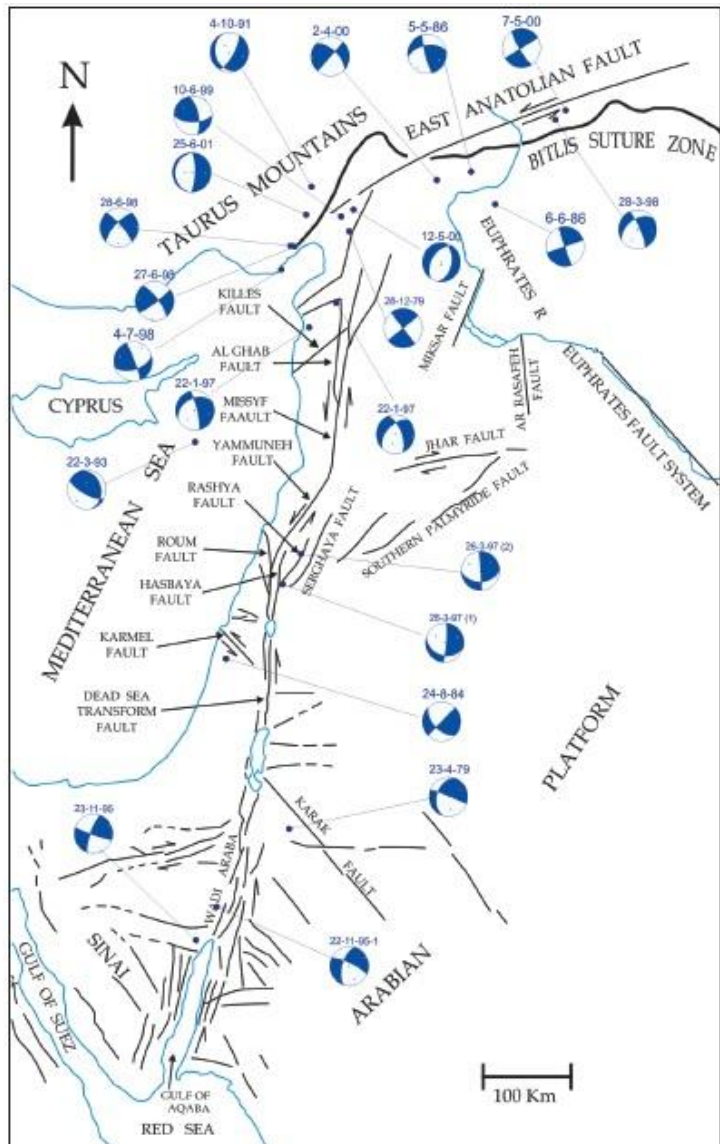
Source: Centre for Research on the Epidemiology of Disasters.

2. BACKGROUND AND PROBLEM STATEMENT



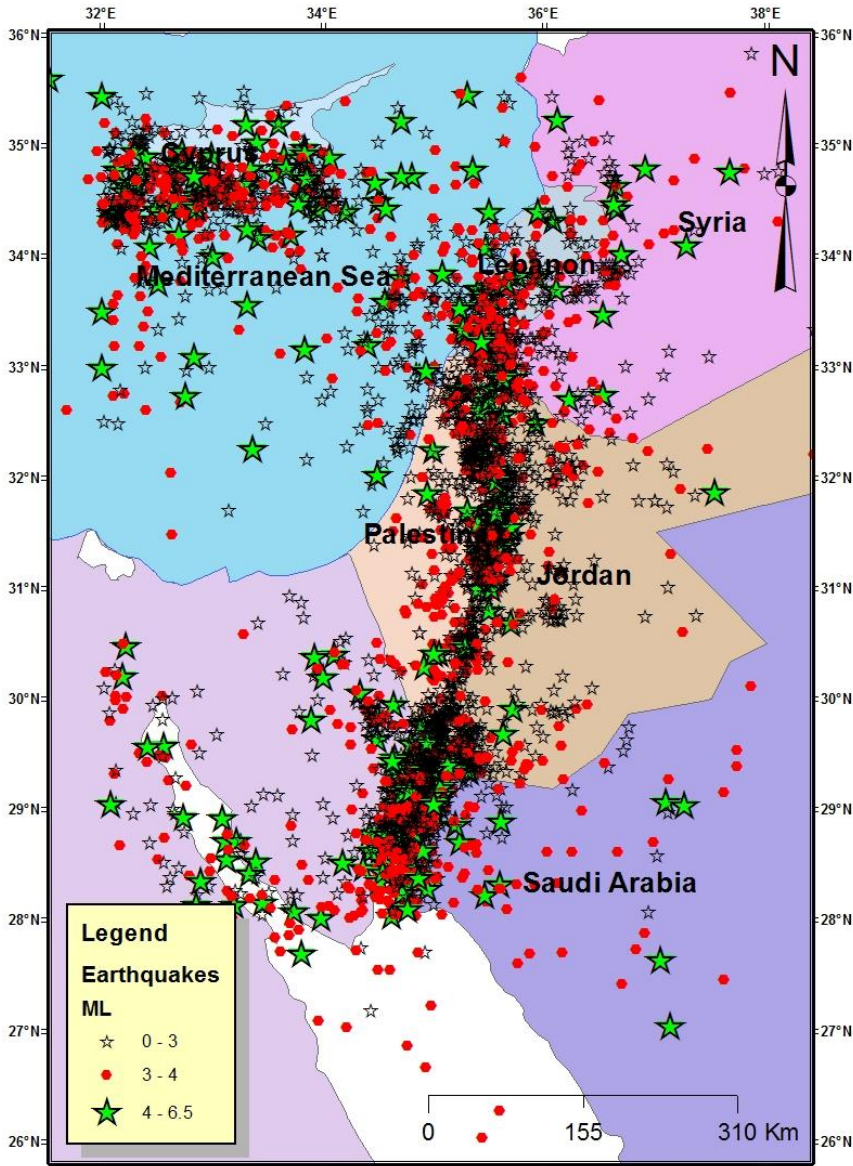
Location and **Tectonic Setting** of the Dead Sea transform fault (Horowitz et al., 2001 and Hötzl et al., 2009)

2. BACKGROUND AND PROBLEM STATEMENT



Summary of Major Fault
zones of the northern
Arabian plate (redrawn
from Garfunkel et al.,
1981; Barazangi et al.,
1993).

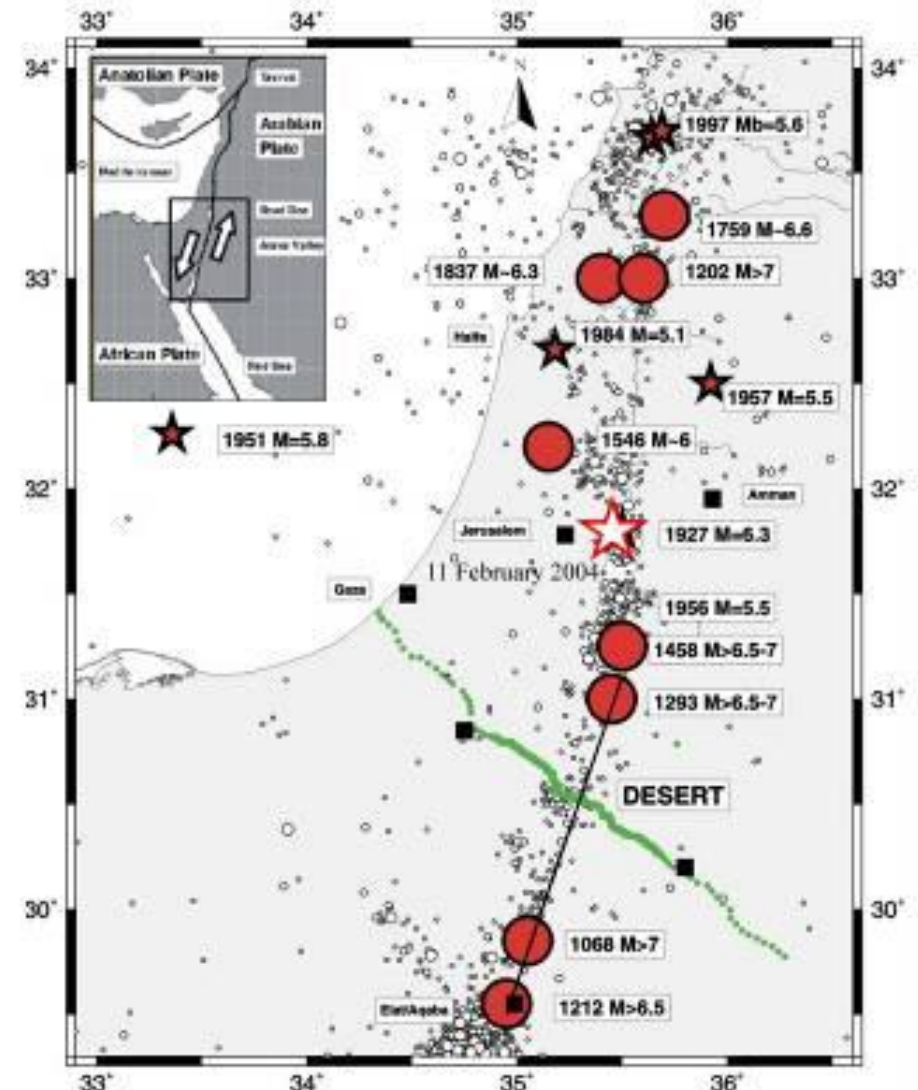
2. BACKGROUND AND PROBLEM STATEMENT



Seismicity Map of the Dead Sea transform region for the period 1900-2009. Data from JSO (1984-2009) and Al-Tarazi, 1992 and AL-Qaryouti, 2002.

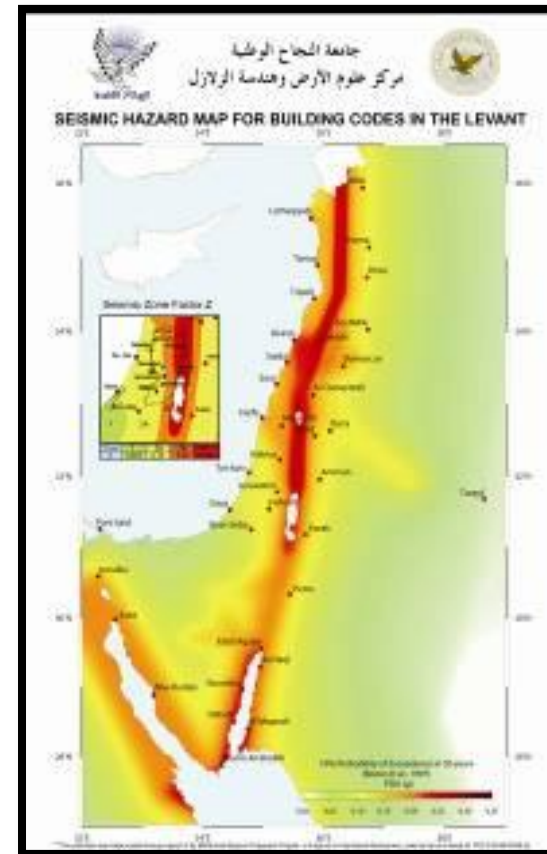
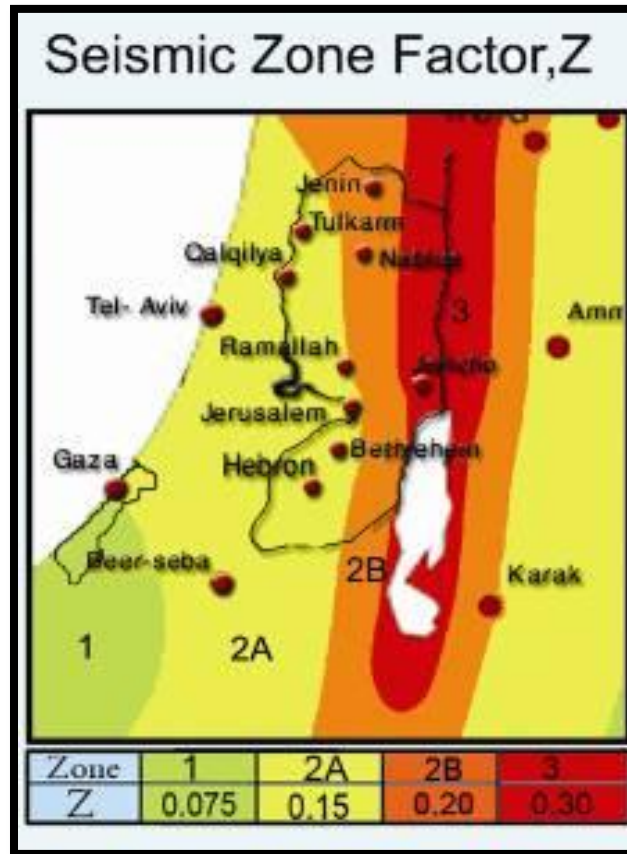
2. BACKGROUND AND PROBLEM STATEMENT

The Jordan-Dead Sea Rift is considered the major fault system in the region as a result of motion between the Arabian and African plates-Historical Events.



Recent Studies

Recent studies conducted by the Urban Planning and Disaster Risk Reduction Center (UPDRRC) at An- Najah National University estimated that a total damage of around 5% to 15% and partial damage of 25% or more are expected in some areas (Jalal Al Dabbeek 2007, 2008 and 2010).



Seismic Hazard Map and Seismic Zone Factor (Source ESSEU, Earth Sciences and Seismic Engineering Unit at NNU)

The Problems relating to earthquakes in Palestine can be summarized, but not limited, to the following:

- ☐ High vulnerability to earthquake damages and losses, as a direct result of Very high percentages of weak buildings that do not comply with seismic resistance requirements.
- ☐ Lack of adequate national programs and public policies on preparedness, mitigation, and emergency response.
- ☐ Weak institutional capacity in disaster management and rescue operations.

The Problems relating to earthquakes in Palestine can be summarized, but not limited, to the following:

- ❑ Weak of awareness by citizens, and weak capacity of professionals, engineers, and decision makers.
- ❑ Weak of comprehensive, reliable, and easily accessible resources about seismic vulnerability of buildings which should be available for relevant Public/Governmental institutions to support decisions and long term

3. Academic Hubs: Using Science and Technology to build resilience

The main requirements and strategies needed to make scientific institutions to work as academic hubs in DRR are:

- ☐ Embedding DRR culturally;
- ☐ Building civil societies capacity to respond to disaster in a targeted and DRR manner;
- ☐ Becoming information-hub locally, nationally and regionally,

Achieving

3. Academic Hubs: Using Science and Technology to build resilience

Adopting:

- ☐ Holistic-approach concepts and methodologies..
- ☐ Local, national and international stakeholders' integrations and networking concepts;
- ☐ Web-based platforms: Target groups individual citizens, professionals and decision-makers
- ☐ Giving priority to the **applied research** and to the **community service** programs;

Academic Hubs: Using S and T to Build Resilience (Case Study)

An-Najah University's Urban Planning and Disaster Risk Reduction Center (UPDRRC) brought players, using scientific knowledge and strategies and community services to draw together all the target groups.

As an Academic Hub, the UPDRRC and other units at NNU has an important role in enhancing the resilience of Palestinian communities to disasters, through:

- Adopting a holistic approach to DRR activities.
- Adopting scientific strategies to draw together decision-makers, practitioners and the public to drive towards sustainable RR, exceeding parameters of an traditional academic centre.

As a Result, this Approach had a Wide Remit and Objectives Including :

- ☐ Assisting Government, practitioners with infrastructure vulnerability and local site effect conditions assessments and creating solutions;
- ☐ Drafting new Seismic Building Code regulations.
- ☐ Developing several courses and programs on DRR, including master program on DRM.
- ☐ Conducting several capacity building programs on DRR. (Tenth of TR).
- ☐ **Modeling and mapping:** Hazards, seismic vulnerability and RA.
- ☐ Developing and conducting post disaster damages assessment.
- ☐ Introducing DRR requirements on physical planning guidelines.

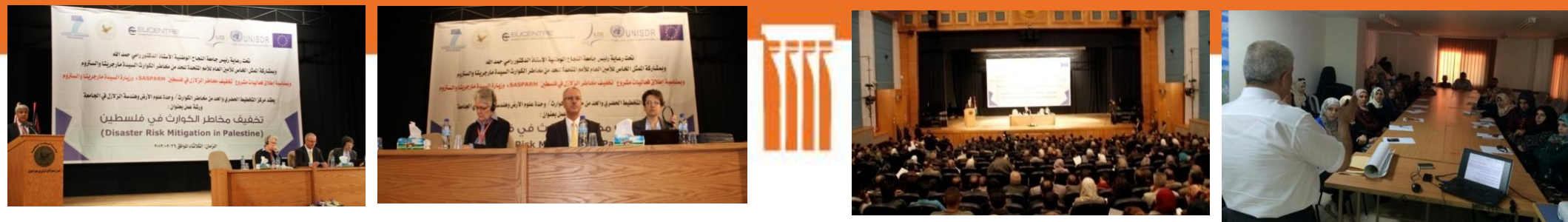
Building capacity within civil society and general public to cope with natural disasters

- ❑ Developing engineering courses for non engineers and urban planning courses for not planners.
- ❑ Community service programs: **5000 students** each year: Blood donation, short courses on DRM, 50 working hours with emergency response org., working for/with vulnerable citizens (with children's, mothers, handicapped or disabled persons, etc)... meetings and workshops.



Building capacity within civil society and general public to cope with natural disasters

- ☐ Training courses on DRR for **Journalists** to create common language..
- ☐ Hundreds of Meetings, Public Lectures, Workshops, Training Courses, etc.
- ☐ Dissemination activities by using the available media: TVs, Radios, ..etc.
- ☐ Public seismic Poll: to measure the seismic awareness levels of individual citizen.

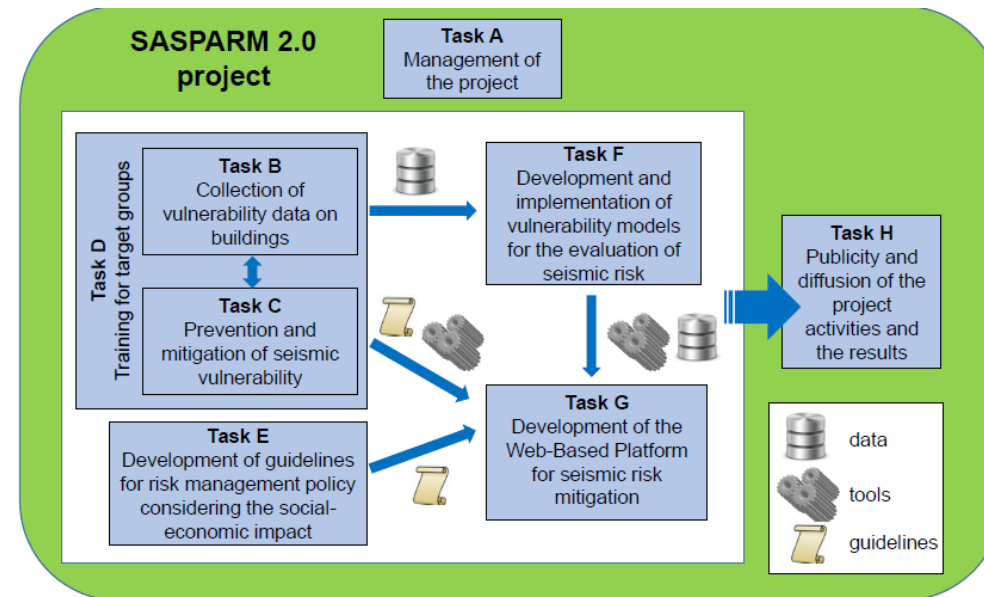


Hundreds of Meetings, Public Lectures, Workshops, Training Courses, etc



4. Support Action for Strengthening Palestine capabilities for seismic Risk Mitigation (SASPARM 2 - Project).

Ex: example for regional and inter. networking and integration:
Partnership with NRA, RSS, GFZ, EUCENTRE, IUSS, USGS, etc.



A Web platform will be realized:

Web GIS platform

- Collection of structural data
- Vulnerability and the seismic risk assessment.

Ex. of ongoing project: SASAPARM 1 and SASPARM 2 (EU fund): www.sasparm.ps



Data Collection

SASPARM 2.0



SASPARM2 Project-Selected Case Study

Development of urban resilience strategies by working with Citizen and stakeholders .

❑ Building data collection by using special forms: citizens and practitioners forms.

| | |
|-----------------------------|--|
| Name of the compiler: _____ | |
| Education Level: _____ | |

| 1) Identification of the Building | |
|--|--|
| Municipality: _____ | Address: _____ |
| Street Number: _____ | District/Municipality: _____ Zip Code: _____ |
| Name of the building: _____ | |
| Geographical Coordinates (WGS 84 System) | |
| Lat.: _____ | Long.: _____ |
| Position of Building: | |
| <input type="radio"/> 1 Isolated Building <input type="radio"/> 2 Internal Building <input type="radio"/> 3 End Building <input type="radio"/> 4 Corner Building | |
| | |

| 2) Description of the Building | |
|---|-----|
| Metrics | Age |
| N° Total floors with basement <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12 <input type="radio"/> 13 <input type="radio"/> 14 <input type="radio"/> 15 <input type="radio"/> 16 <input type="radio"/> 17 <input type="radio"/> 18 <input type="radio"/> 19 <input type="radio"/> 20 <input type="radio"/> 21 <input type="radio"/> 22 <input type="radio"/> 23 <input type="radio"/> 24 <input type="radio"/> 25 <input type="radio"/> 26 <input type="radio"/> 27 <input type="radio"/> 28 <input type="radio"/> 29 <input type="radio"/> 30 <input type="radio"/> 31 <input type="radio"/> 32 <input type="radio"/> 33 <input type="radio"/> 34 <input type="radio"/> 35 <input type="radio"/> 36 <input type="radio"/> 37 <input type="radio"/> 38 <input type="radio"/> 39 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| | | Vertical Structure of the Building | | | |
|---------|---------------------|---|--|--|--|
| Masonry | Reinforced Concrete | If the building is in reinforced concrete: | | | |
| | | B.1 <input checked="" type="checkbox"/> The building has no walls at floors: <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 | | B.2 <input type="checkbox"/> The building has partially walls at floors: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 | |
| A | B | <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> ≥12 B.3 <input type="checkbox"/> The building is composed totally by walls | | <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> ≥12 B.4 <input type="checkbox"/> The building has RC shear walls | |

Training and Workshops:

- Training for university students
- Training for practitioner eng.
- Training for citizens
- Workshops and lectures for stakeholders and policy makers
- ❑ Identify the vulnerability class of the buildings according to their structural data.
- ❑ Appropriate retrofit measures for the mitigation of seismic risk will be suggested to the end users of the platform.



SASPARM 2.0



Expected Results

The main outcomes of the project will be:

- ✓ An increased awareness of seismic risk by the stakeholders involved in the project: students, citizens, practitioners, GOs and NGOs stakeholders;
- ✓ A shared DB, including a large number of vulnerability data;
- ✓ A WEB that integrates the data above through vulnerability models developed for the Palestinian building typologies, to evaluate seismic risk;
- ✓ Guidelines on the implementation of measures to reduce vulnerability hence mitigate seismic risk;
- ✓ Guidelines for risk management policy towards mitigating the impact of socio-economic losses.



Projects Follow up

- ✓ Extend the case study of Nablus municipality not only to all the other Palestinian municipalities but also to other Developing Countries and European Countries;
- ✓ Engage policy makers and government to foster long-term actions. Moreover, promote Palestinian stakeholders' activities in a risk mitigation perspective with the foundation of a Palestinian Civil Protection Mechanism;
- ✓ Establish the concepts of risk governance to account for the possibility of earthquake insurance coverage (considering that the related cost would be reduced if private initiative in retrofitting world is taken).

Projects Follow up

- ✓ Ensure the maintenance of the Web-Based Platform to collect larger amounts of data, first on seismic vulnerability of citizens' properties, and second on public buildings in order to keep the process of increasing awareness going on after the project lifetime.
- ✓ Promote new undergraduate and graduate courses on seismic risk mitigation since the training on this topic will play a fundamental role for the continuation of the project goals even after its lifetime.

Eventually





Special Thanks for the:

*Higher Council for Innovation and Excellence
(HCIE) - Palestine*



*For nominating me to contribute in this
workshop.*

THANKS



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