UNIVERSITÉ DE GENÈVE

MOVE
Methods for the Improvement of Vulnerability Assessment in Europe

SELÇUK ÜNİVERSİTESİ 1975

MOVE Outreach Workshop

Experiences Exchange

DISASTER RISK REDUCTION MANAGEMENT:

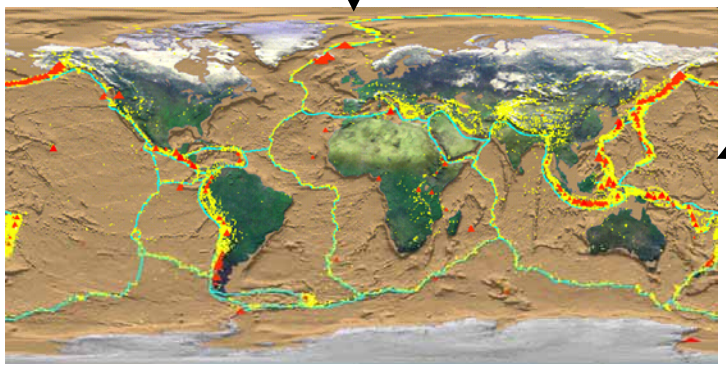
A KEY ROLE FOR THE VULNERABITY EVALUATION

Prof. H. Jean-Jacques Wagner

Stryszawa (Poland), 22 September 2011

PLANET EARTH: A DYNAMICAL ENVIRONMENT

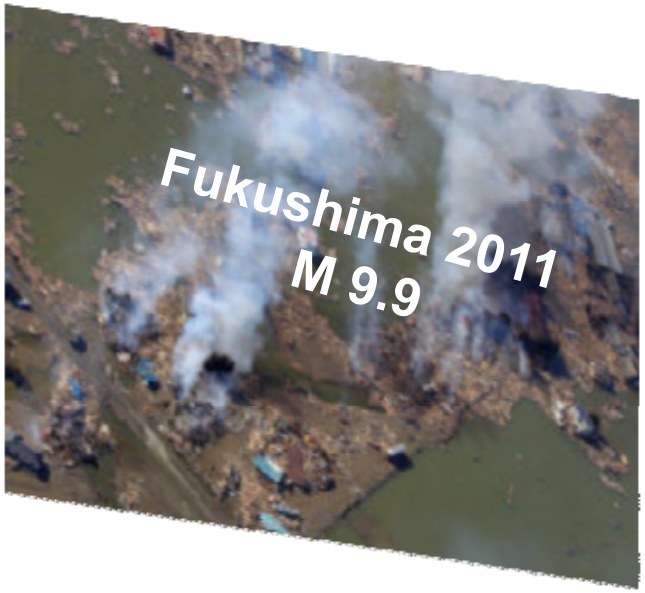
Atmosphere



Earth

People

EVERY YEAR HUMANKIND FACES MAJOR DISASTERS



A BASIC REMINDER

RISK : A DEFINITION (UNDRO, 1979)

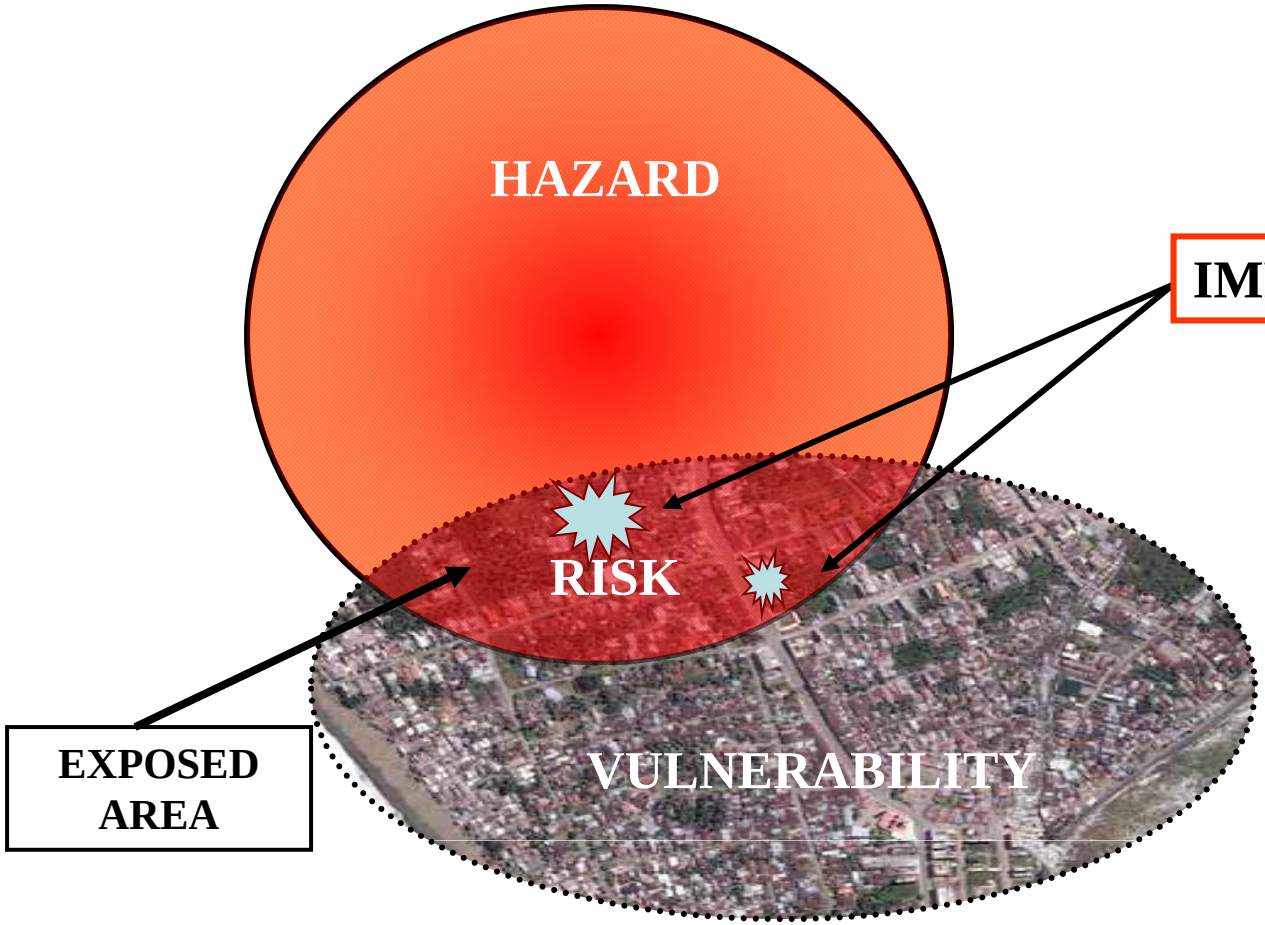
RISK = HAZARD *VULNERABILITY *VALUE

**THE POTENTIALITY OF LOSS OF LIFE
AND
DAMAGE TO PROPERTY AND CULTURAL HERITAGE
IN AN AREA EXPOSED
TO THREAT OF A NATURAL HAZARD**

RISK: A SYNTHETIC ILLUSTRATION

RISK CITY

RISK: AN ILLUSTRATION

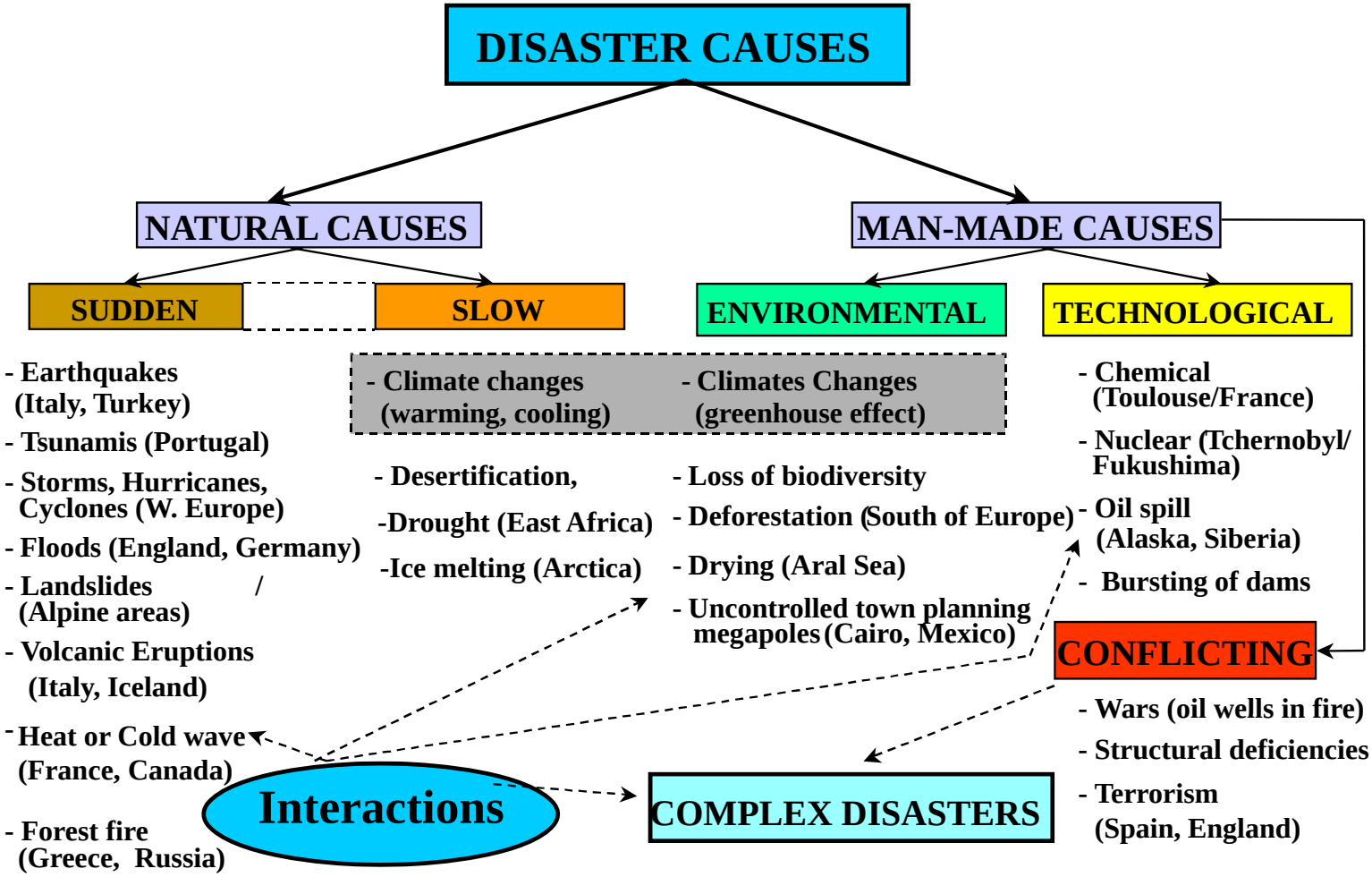


Important Notice:

Hazard and Vulnerability evolve with distinct time scales !

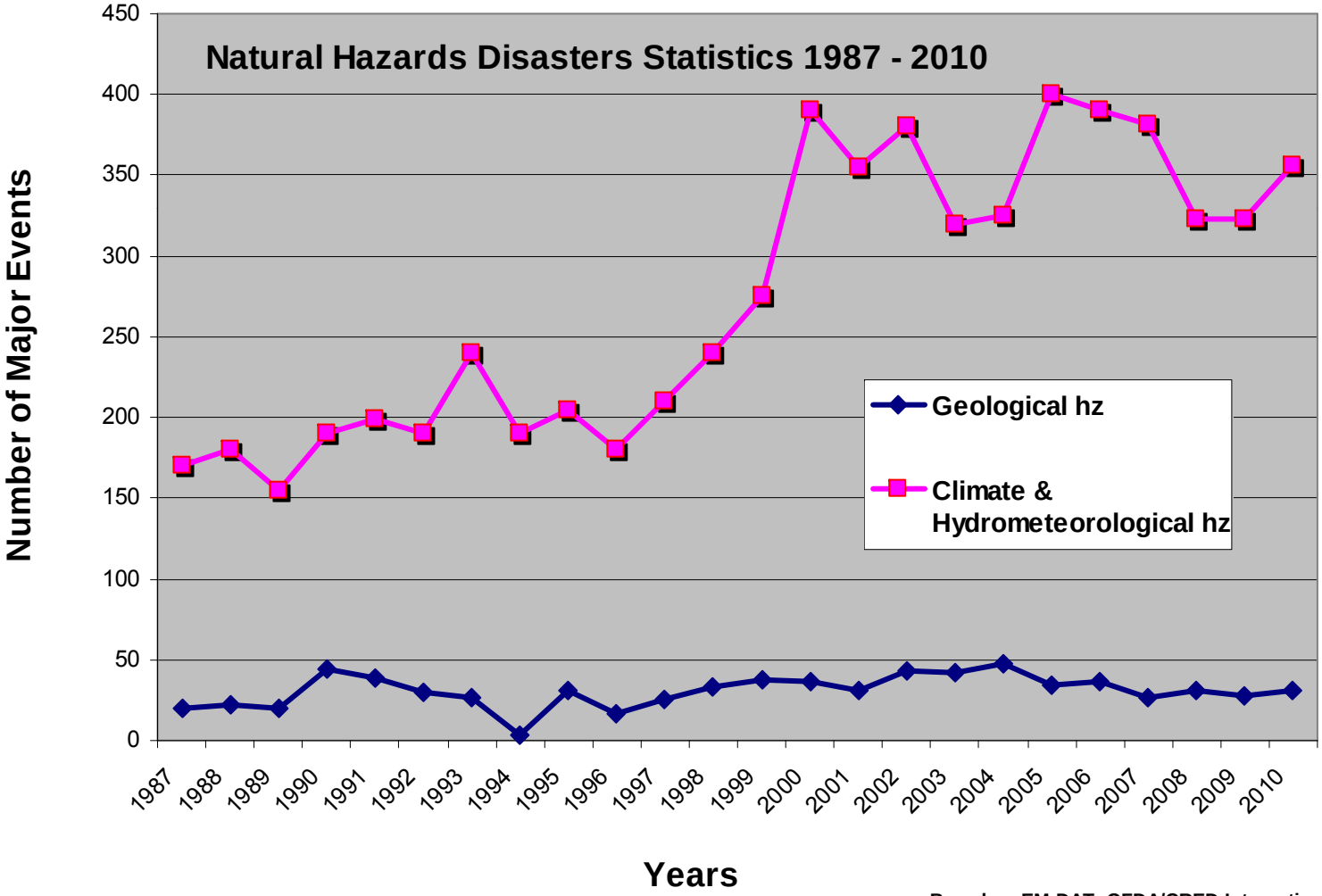
J.-J.Wagner modified from Th. E. Downing, ECI, Oxford

OUR FIELD OF REFERENCE



DOES CLIMATE CHANGES PLAY A ROLE IN NH DISASTERS ?

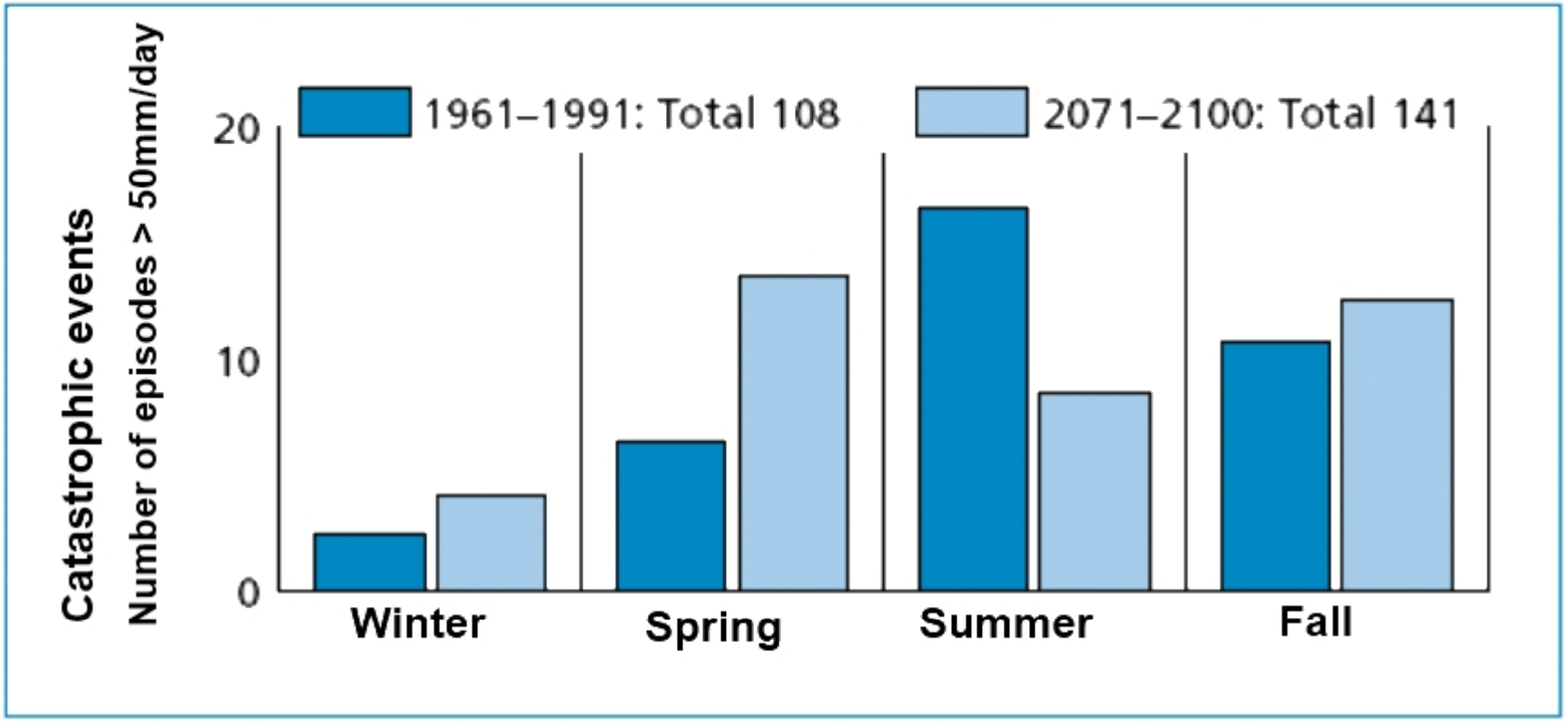
Frequency comparison between disasters related to Geological hazards and Hydrometeorological hazards



Based on EM-DAT: OFDA/CRED International Disaster Database

IMPORTANCE OF THE CLIMATE COMPONENT!

Historical and potential intense precipitations (catastrophic?) per season



In Protection de la population OFPP, 11.2008 M. Beniston, UNIGE

VULNERABILITIES

Pedro Rafael González Chavajay, 1989 - Tragedia

THE MAJOR VULNERABILITIES !

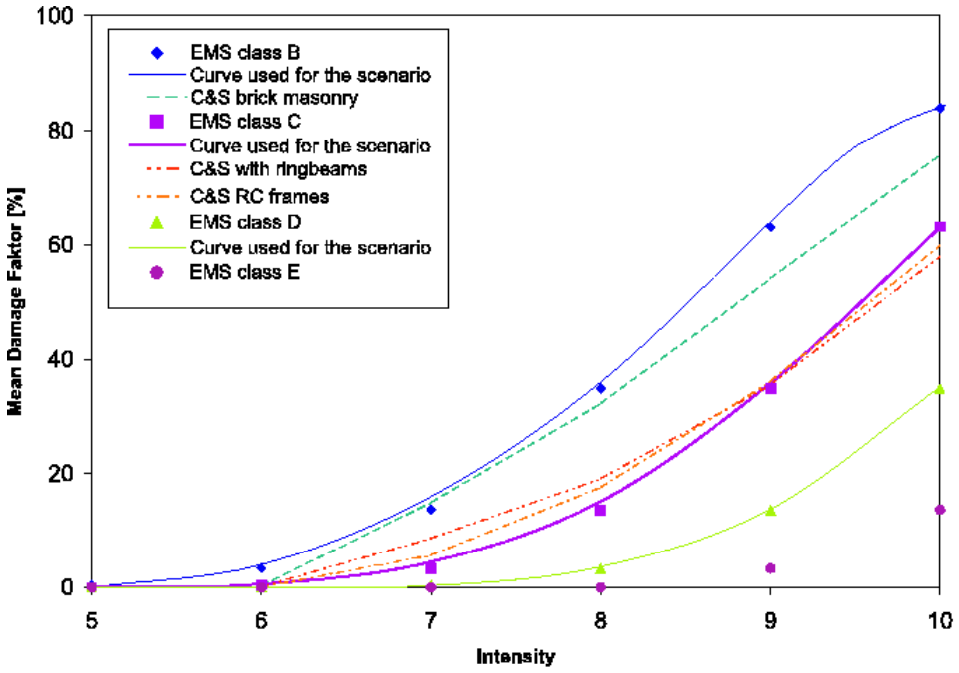
VULNERABILITIES				
Physical	Social		Economic	Environmental
Buildings	Vulnerable groups	Vulnerability factors	Unemployement	Climate change
Infrastructures:	Children	Poverty	Losses of vital services	Ecological changes
Services (Water, electricity etc..)	Women ?	Densely populated areas	Losses of production	Pollution potentialities
Transport systems	Elderly	Etc…	Etc…	Etc…
Telecommunications	Disabled			

ARE QUANTITATIVE METHODS OF SOCIAL, ECONOMICAL, ENVIRONMENTAL VULNERABILITIES ASSESSMENTS APPROPRIATE TO INTEGRATE THE RISK «FORMULA» ?

EXAMPLE OF PHYSICAL VULNERABILITY ASSESSMENT

BUILDING VULNERABILITY FUNCTIONS FOR EARTHQUAKES

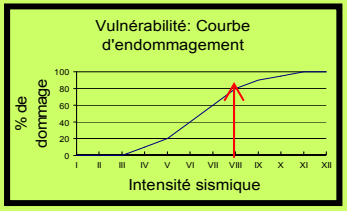
Based on the **E**uropean **M**acroseismic **S**cale



Type of Structure		Vulnerability Class A B C D E F
MASONRY	rubble stone, fieldstone	
	adobe (earth brick)	
	simple stone	
	massive stone	
	unreinforced, with manufactured stone units	
	unreinforced, with RC floors	
	reinforced or confined	
REINFORCED CONCRETE (RC)	frame without earthquake-resistant design (ERD)	
	frame with moderate level of ERD	
	frame with high level of ERD	
	walls without ERD	
	walls with moderate level of ERD	
	walls with high level of ERD	
STEEL	steel structures	
WOOD	timber structures	

O most likely vulnerability class; — probable range;
----- range of less probable, exceptional cases

Principle of quantitative risk evaluation for an earthquake intensity I≥VIII

RISK =	HAZARD *	ELEMENT AT RISK *	VALUE *	VULNERABILITY
	$P_y(I \geq VIII) = 0.01$	 * 250	300k€ 	
	1% annual probability that an EQ I ≥VIII occurs	250 houses type N	300k€	For I=VIII, a house of type N will have damages which amount 80% of its value
R≥600K€	**0.01 ***	**250 ***	**300 ***	**0.8**

FROM SCIENCE TO POLICY !

For an appropriate management of the natural hazard risk; fundamental questions

- What is the objective: Save lives ? Protect goods ? Both ?
- What is the level in the political priorities ?
- What is the part of the national resources which can be invested?
- What is the price that society is ready to pay today to protect future generations?

Adapted from Gabor Czitrom, Cahier technique AFPS, sept. 1999

THE OPINION OF A REINSURER

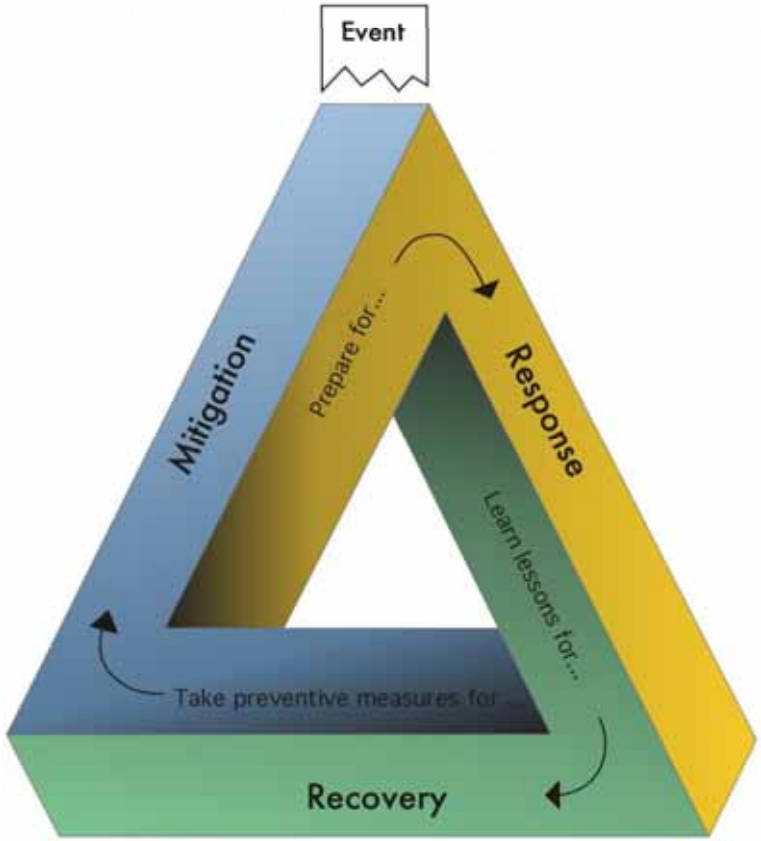
Risk management involves the capacity both to avoid *and* to deal with losses

SwissRe

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Risk management: mechanisms for an integrated approach

Reduce existing and prevent build-up of new risks with non-structural and structural measures

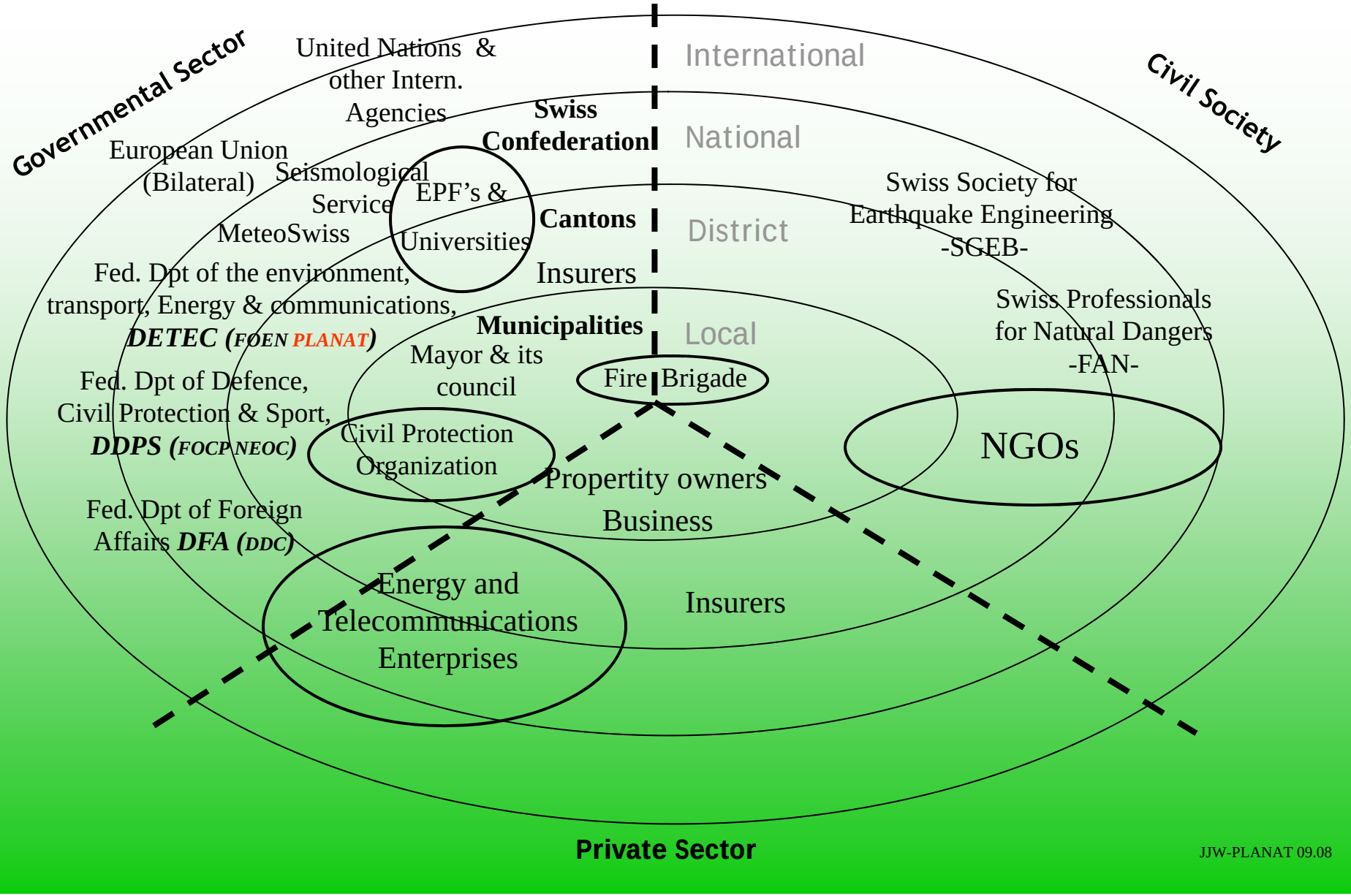


Reduce impact of disasters through rescue, relief and rehabilitation

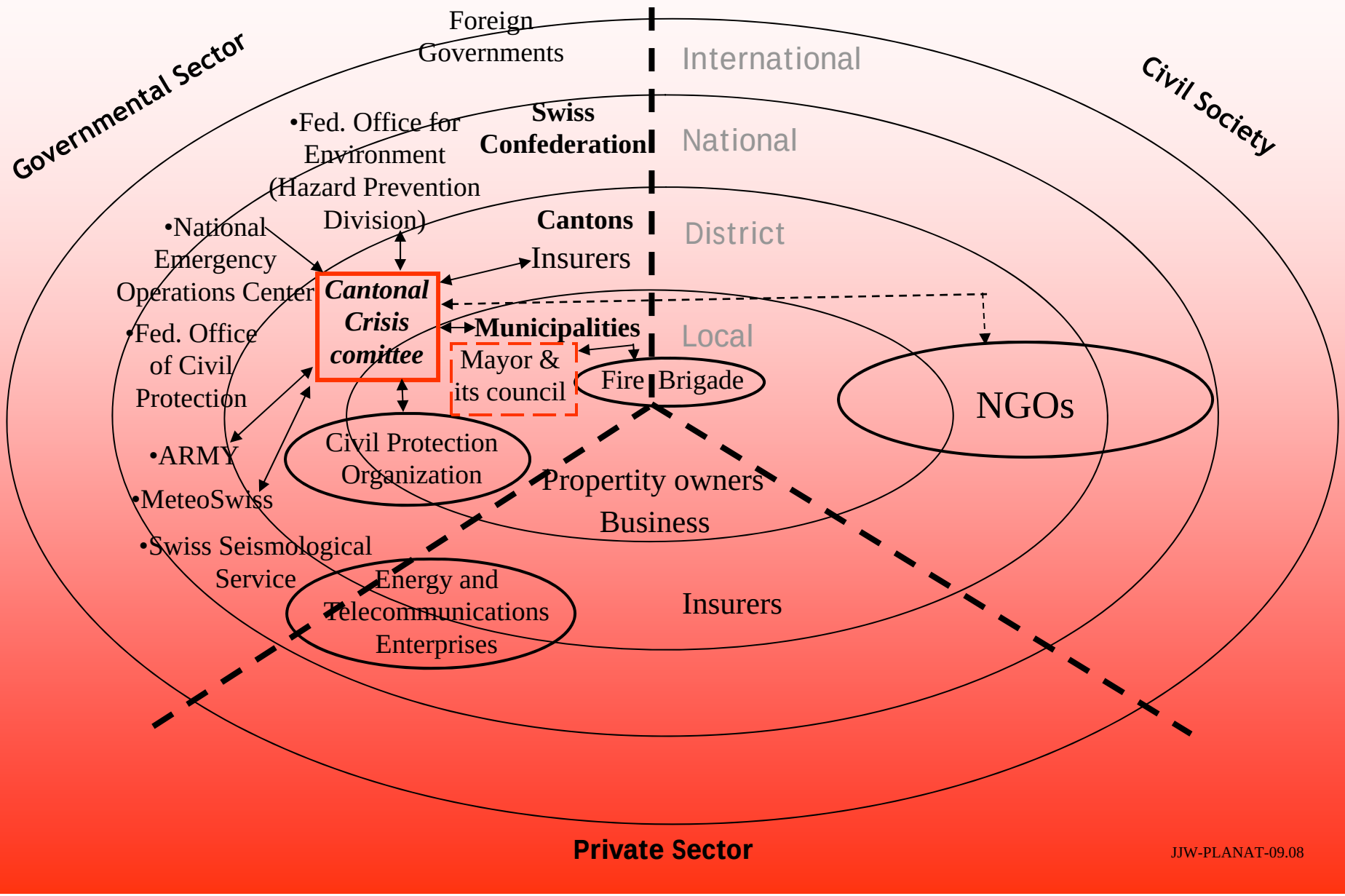
Reduce possible losses in future with adapted recovery

Source: DDC-CH

Institutional Actors and Stakeholders in Normal Times

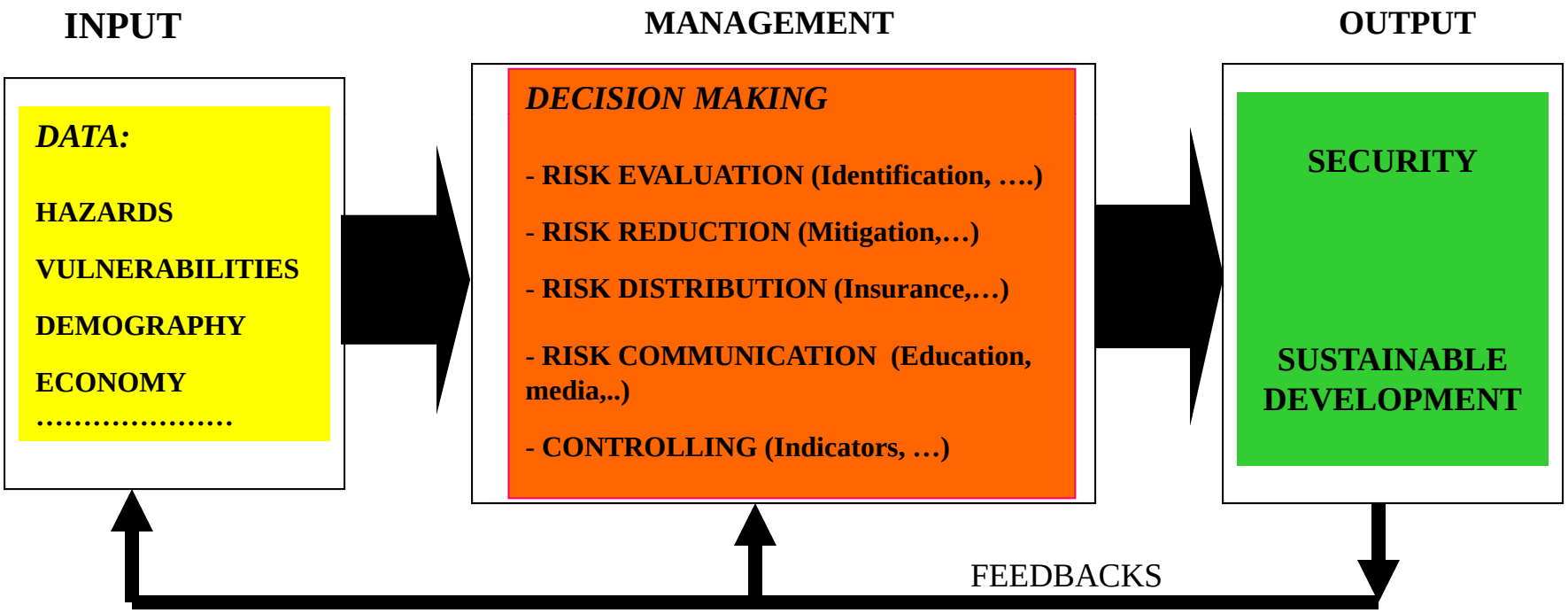


Institutional Actors and Stakeholders in Crisis Times

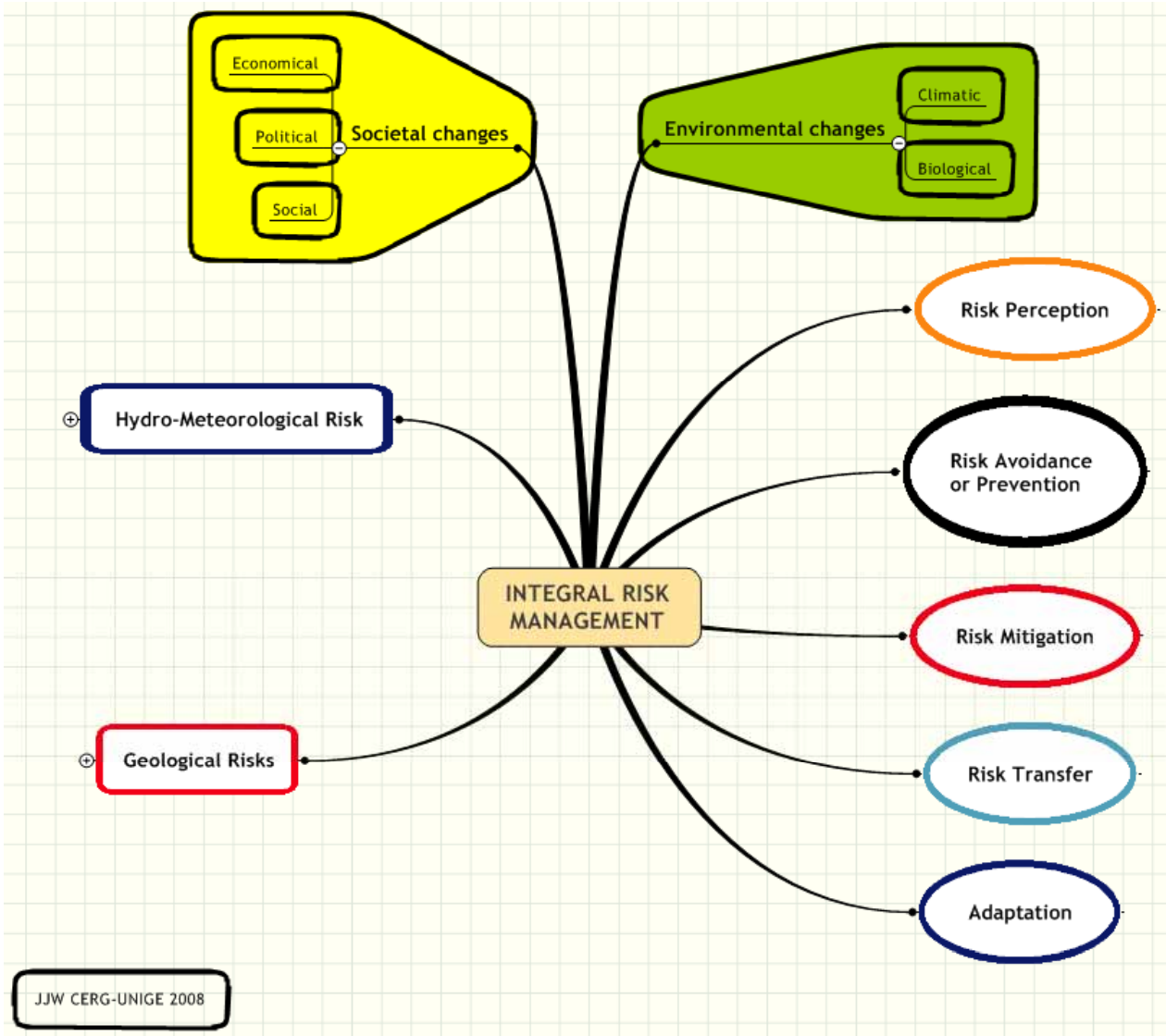


JJW-PLANAT-09.08

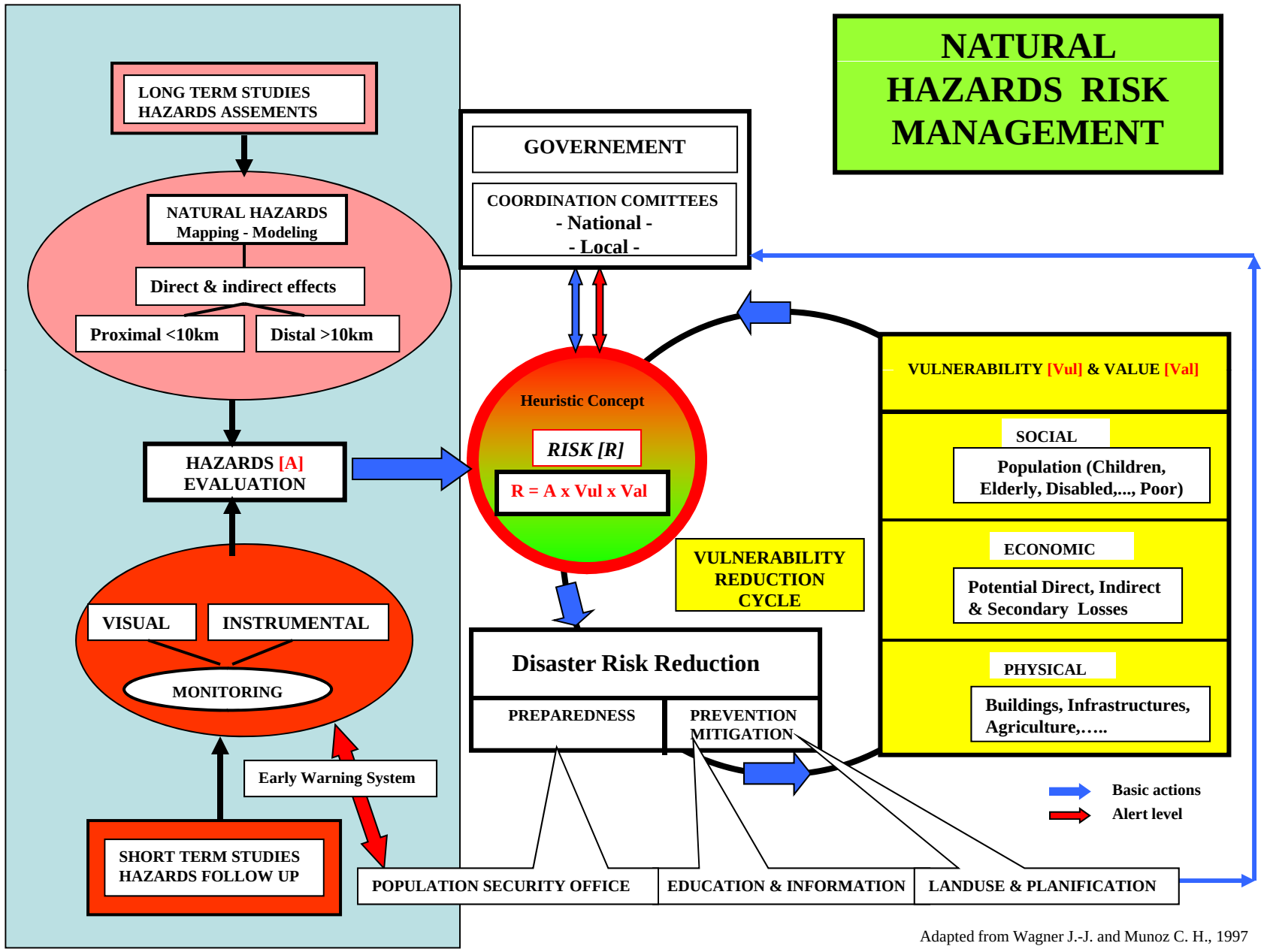
NATURAL HAZARDS RISK MANAGEMENT



ELEMENTS OF INTEGRAL RISK MANAGEMENT

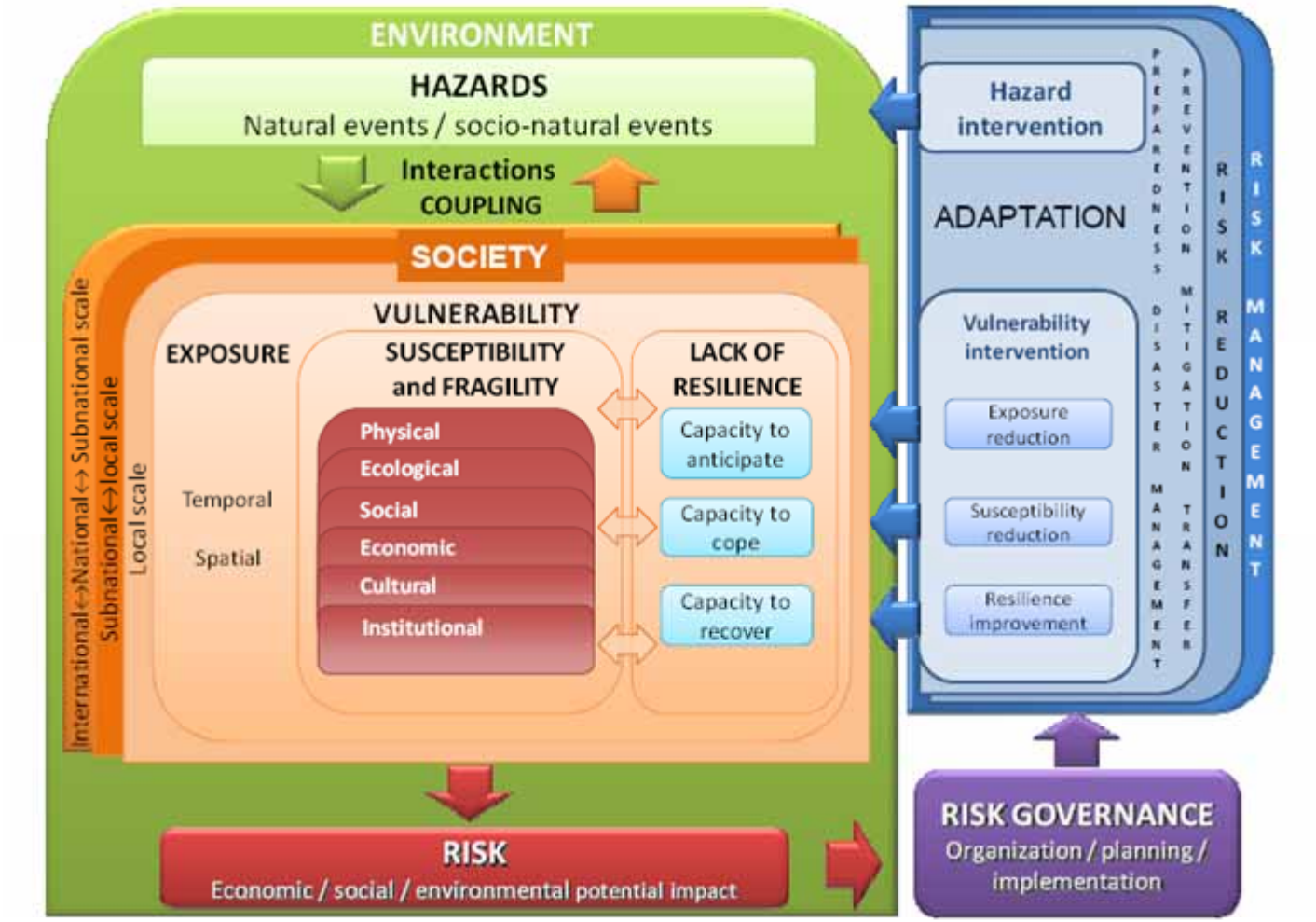


NATURAL HAZARDS RISK MANAGEMENT



Adapted from Wagner J.-J. and Munoz C. H., 1997

THEORETICAL FRAMEWORK FOR A HOLISTIC APPROACH TO DISASTER RISK ASSESSEMENT AND MANAGEMENT



MOVE GENERIC FRAMEWORK

ARE THESE VARIOUS CONCEPTS WELL UNDERSTOOD!

VULNERABILTY VERSUS **?**

Resiliance

Coping capacity

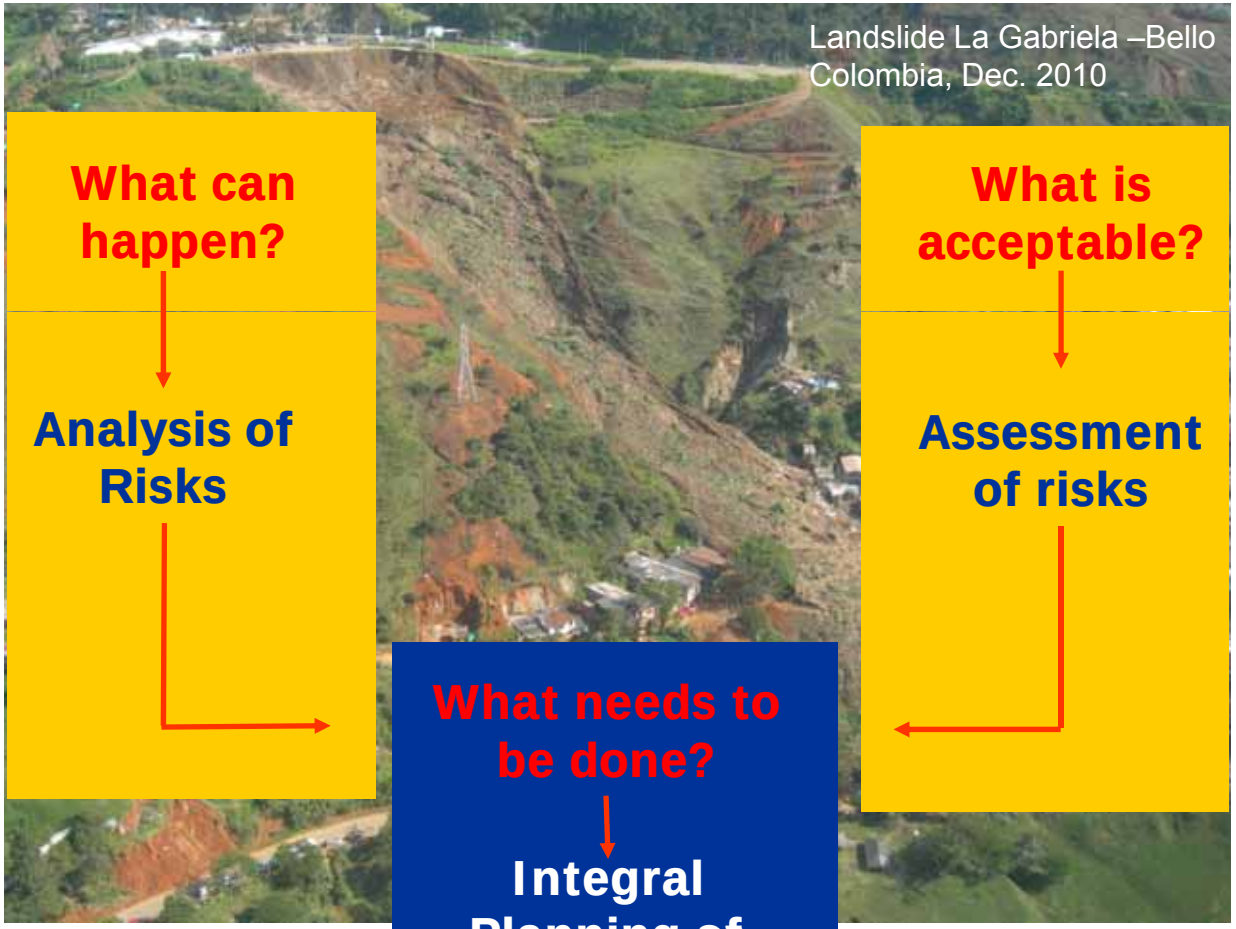
Adaptive capacity

Capability

Resistance

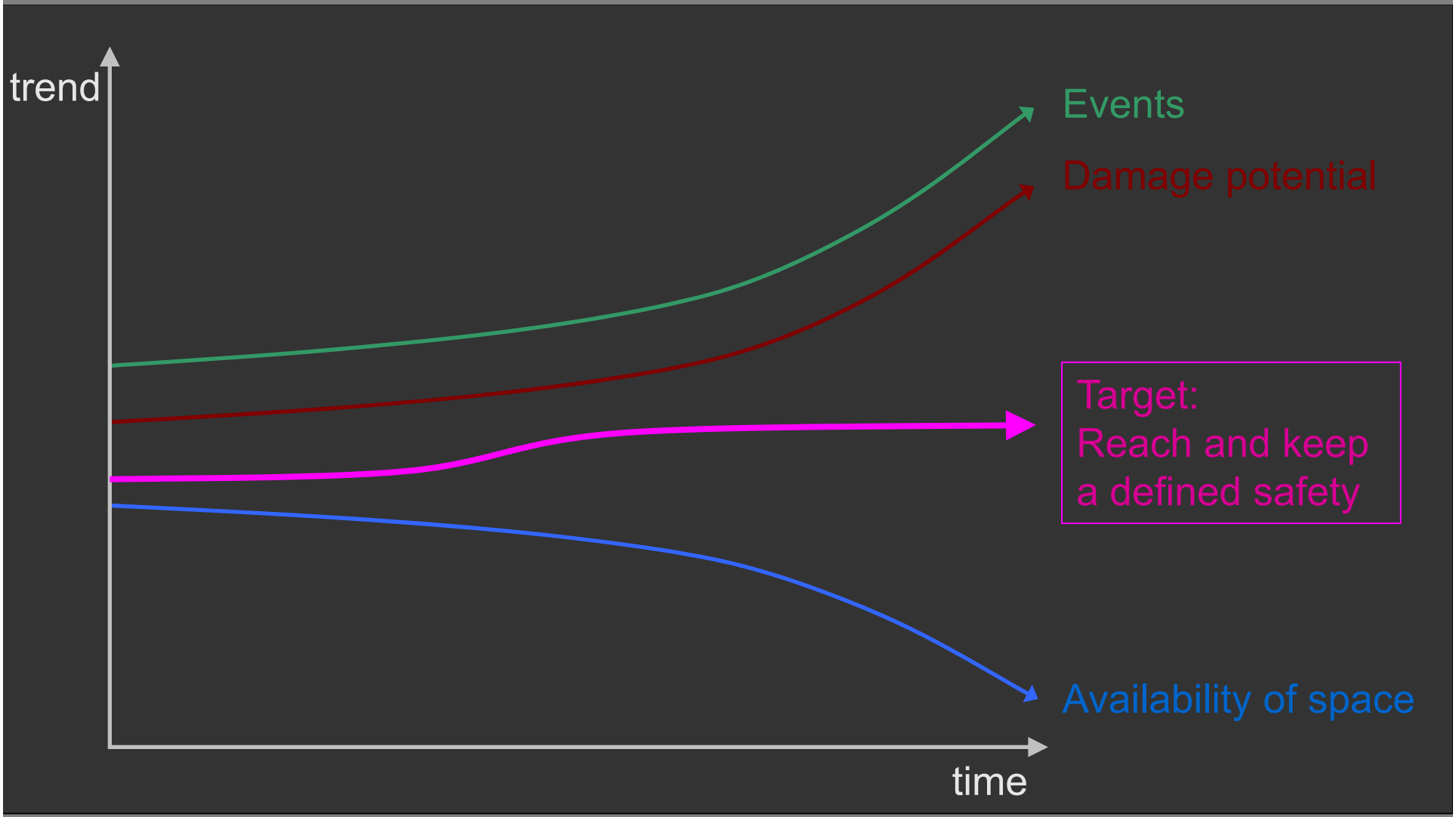
The Risk Concept serves as a conceptual frame to address natural hazards vulnerabilities and risks.

Basic questions have to be answered:

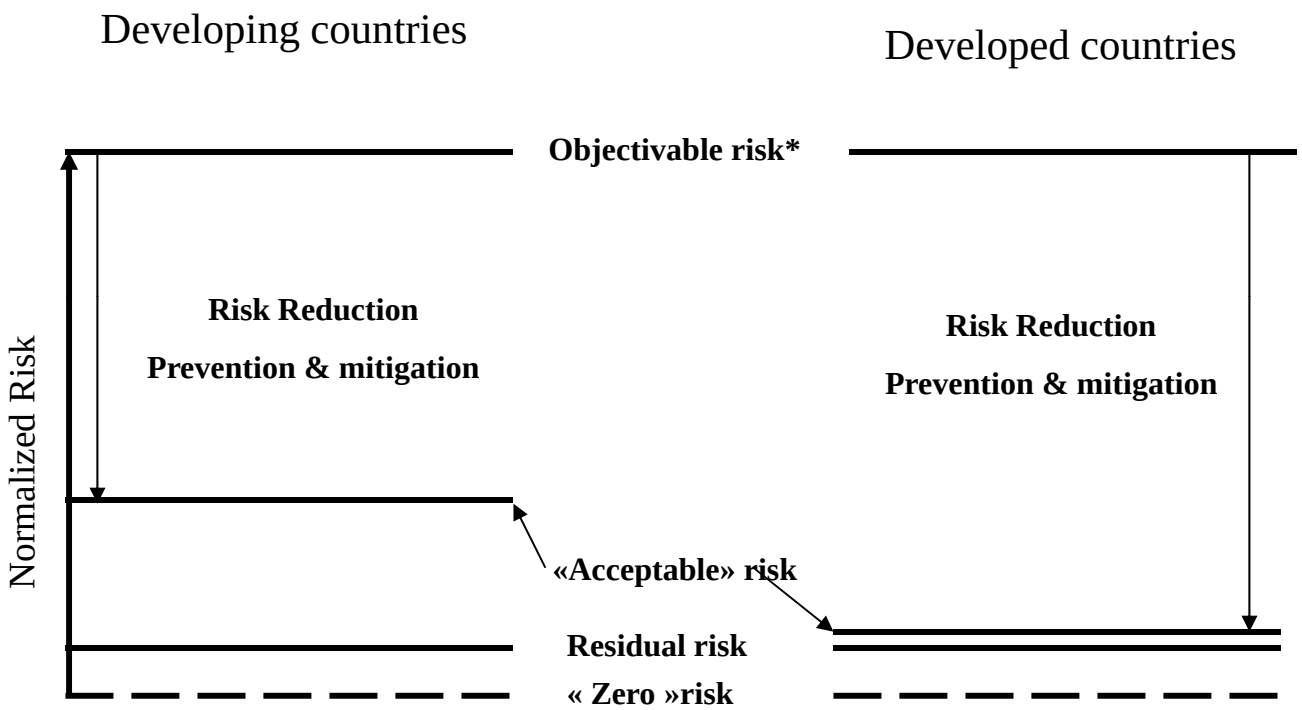


Modified from Planat, UN World conf. on disaster reduction, Kobe 2005

Dealing with natural hazards



Risk Management Levels



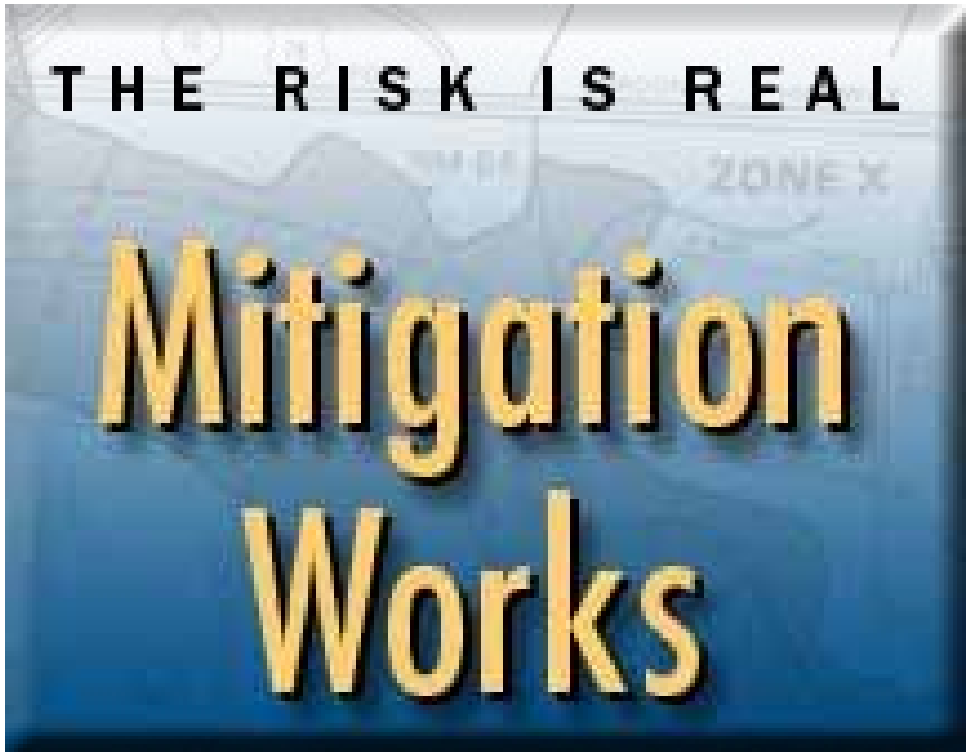
*Based on the most likely event !

HOW TO FIND THE BEST SOLUTION ?

FORTUNATLY BASIC INFORMATION EXISTS

A FEW OF EXAMPLES OF MANY EXISTING DOCUMENTS!

UNFORTUNATELY DISASTERS STILL HAPPENED…….



Author unknown

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Nationale Plattform Naturgefahren PLANAT
Plate-forme nationale «Dangers naturels»
Piattaforma nazionale «Pericoli naturali»
National Platform for Natural Hazards

The future: Permanent Education and Training

Volcanito in Guatemala

THANK YOU

Dziękuję

Sakurajima volcano in Japan

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