International semester ‚crisis & disaster management‘

Welcome to our Disaster Risk Management Training

Volker Stillig

11 February 2025

CONRIS

INNOVATION PARTNERSHIP KNOWLEDGE

HTTP://DRMKC.JRC.EC.EUROPA.EU

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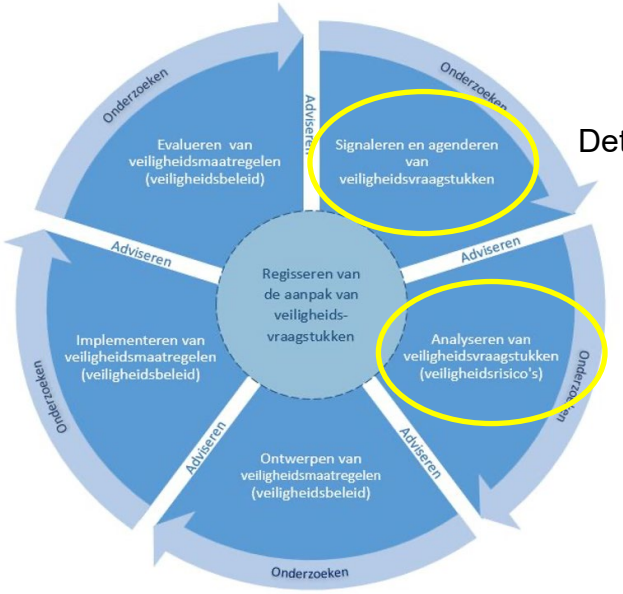
This week

With the DRM training we would like to provide (future) disaster risk management professionals with international, state of the art, evidence-based knowledge about disaster risk management which should contribute to the quality of disaster risk management practices.

Main objective of the course is that students understand the main concepts of disaster risk management, from understanding the risk to communication and management; also take into account possible future challenges.



Detecting and putting safety issues on the agenda

Analysing safety issues

	Tue 11 February	Wednesday 12 February	Thursday 13 February	Friday 14 February
Morning session	08.45 AM Check-in 09.00 AM Opening address disaster risk management *Christina Corbane, Disaster Risk Management Knowledge Centre, Joint Research Centre EU* 09.15 AM Organizational details Introduction disaster risk reduction *Volker Stillig, Saxion UAS* 10.15 AM Break 10.45 AM Public perception of disaster risks *Yung-Fang Chen, Coventry University* 11.45 AM Introduction assignment 'understanding your crisis type' Start with group assignment #1 *Volker Stillig, Loes van Rijswijk, Saxion UAS*	08.45 AM Check-in 09.00 AM Welcome, organizational aspects *Volker Stillig, Loes van Rijswijk, Saxion UAS* 09.10 PM Societal Transformation: From Risk Management to Collapse of Societies *Juergen Weichselgartner, Berlin School of Economics and Law* 11.00 AM Break 11.30 AM Risk drivers that foster hazards, their likelihood, exposure and/or vulnerability in the future *Prof. Dr. Clemens Gause, Hamburg Northern Business School*	08.45 AM Check-in 09.00 AM Time to work on your group assignment *Volker Stillig, Loes van Rijswijk, Saxion UAS* *Project rooms* 10.20 AM Welcome, organizational aspects *Volker Stillig, Loes van Rijswijk, Saxion UAS* 10.30 AM Disaster governance and societal resilience *Kees Boersma, Vrije Universiteit Amsterdam*	Online 08.30 AM – 16.00 AM Final poster presentation (online) *All (in groups)* *Frits Jellema, Volker Stillig*
	Lunch break	Lunch break	Lunch break	
Afternoon session	01.30 PM Hazards and their impact *James Douris, World Meteorological Organization* 02.30 PM Start with group assignment #2 *Volker Stillig, Loes van Rijswijk, Saxion UAS*	02.00 PM Group assignment #3 *Volker Stillig, Loes van Rijswijk, Saxion UAS*	01.00 PM Group assignment #4 and preparation poster presentation *Volker Stillig, Loes van Rijswijk, Saxion UAS*	08.30 AM – 16.00 AM Final poster presentation (online) *All (in groups)* *Frits Jellema, Volker Stillig* Submit final product and poster in Brightspace

Disaster Risk Management Training = assignment #1

CONRIS Network

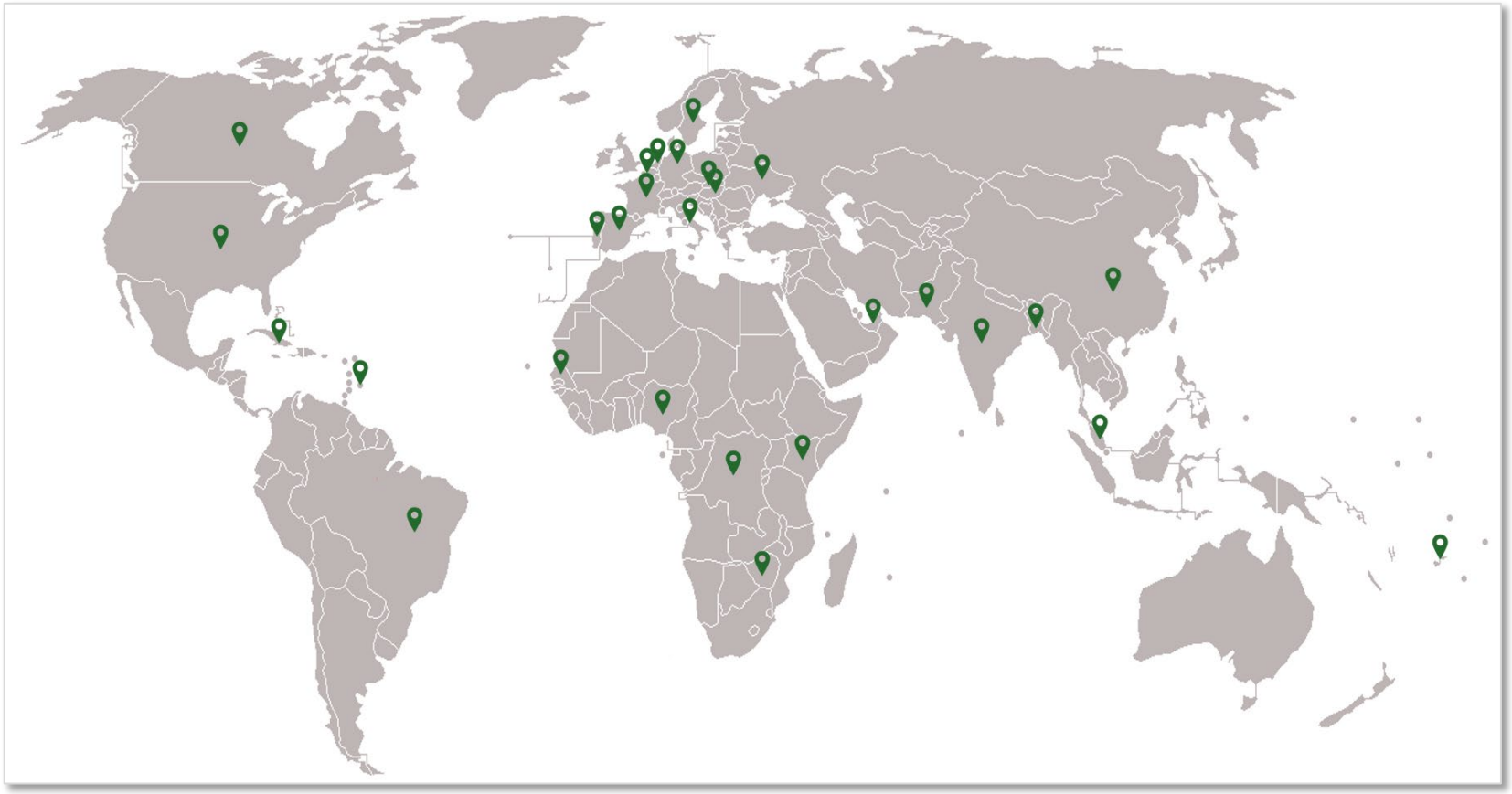
Cooperation Network for Risk, Safety & Security Studies

CONRIS is a network of universities with accredited degree programs in risk, safety & security management. CONRIS aims at increasing safety and security in Europe through collaboration in education and research.

Play Introduction

> 70 external participants

- Online participation in the lectures
- Hybrid lectures
- Participants from > 22 countries



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Guest lectures will help to understand disaster risk management.

You have to transfer and apply this knowledge to your specific crisis type (heat wave, flooding, terrorist attack, power blackout).

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Group work and assignment ‘understanding your crisis type’

During the DRM training you will zoom in on your specific crisis type (heat wave, power blackout, flooding, terrorist attack). You will deliver several products at the end of the disaster risk management training:

1. Portfolio: Summary of different tasks during this week
2. Handout of your poster presentation

We really need to understand disaster risk

- Public perception
- Risk drivers
- Exposure / likelihood / impact
- Coping capacities of authorities and citizens
- Vulnerable groups
- Poster presentation and reflection

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Introduction disaster risk reduction

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Where was this photo taken?

Picture: Tim Ireland / Xinhua / IMAGO

A woman walks through Greenwich Park in London in July 2022

- The summer of 2022 was the hottest in Europe for at least 500 years.
- Excess mortality in the months of June, July and August amounted to **107,000 people**.

- “Summer of the century" in 2003 claimed around 70,000 lives. Refrigerated tents had to be set up on the outskirts of Paris because the city's morgues were completely overcrowded.

- The record summer of 2003 has already been beaten four times since then. The hottest summers to date are now, in ascending order, 2010, 2018, 2021 and 2022.

Picture: Tim Ireland / Xinhua / IMAGO

Top 10 disasters in Europe ranked according to reported deaths and economic losses

(1970–2019)

Table 7. Top 10 disasters in Europe ranked according to reported (a) deaths and (b) economic losses (1970–2019)

(a)	Disaster type	Year	Country	Deaths
1	Extreme temperature	2010	Russian Federation	55 736
2	Extreme temperature	2003	Italy	20 089
3	Extreme temperature	2003	France	19 490
4	Extreme temperature	2003	Spain	15 090
5	Extreme temperature	2003	Germany	9 355
6	Extreme temperature	2015	France	3 275
7	Extreme temperature	2003	Portugal	2 696
8	Extreme temperature	2006	France	1 388
9	Extreme temperature	2003	Belgium	1 175
10	Extreme temperature	2003	Switzerland	1 039

(b)	Disaster type	Year	Country	Economic losses (in US$ billion)	
1	Flood	2002	Germany	16.48	21 victims
2	Flood	1994	Italy	16.03	
3	Flood	2013	Germany	13.86	8 victims
4	Storm	1999	France	12.27	
5	Flood	2000	Italy	11.87	
6	Flood	1983	Spain	10.0	
7	Drought	1990	Spain	8.81	
8	Flood	2000	United Kingdom	8.75	
9	Storm	2007	Germany	6.78	
10	Storm	1990	United Kingdom	6.65	

Source: World Meteorological Organization – Atlas of mortality and economic losses from weather, climate and water extremes (1970–2019), p. 55

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Source: Government of the Netherlands - Security Strategy for the Kingdom of the Netherlands; https://www.government.nl/documents/reports/2022/09/26/national-risk-assessment-of-the-kingdom-of-the-netherlands-2022

Figuur 11 Totale risicodiagram

Impact	Zeer onwaarschijnlijk	Onwaarschijnlijk	Enigszins waarschijnlijk	Waarschijnlijk	Zeer waarschijnlijk
Catastrofaal		• Overstroming zee	• Pandemie door een mens overdraagbaar virus		
Zeer ernstig	• IS grijpt de macht in Marokko • Inzet van kernwapens Saoedi-Arabië – Iran • Geïnduceerde aardbeving	★ Keteneffecten elektriciteitsuitval • Chinese hereniging Taiwan • Tijdelijke bezetting van een EU-lidstaat	★ Overstroming rivier • Griep pandemie • Instorten van de Venezolaanse staat • Uiteenvallen van de NAVO • Systeempartij in de fin. sector in zwaar weer	• Orkaan ★ Hitte/droogte • Import van fossiele energie • Aanval Cloud Service Provider	
Emstig	• Kerncentrale Borssele • Treinramp met gaswolkbrand • Ransomware telecom	• Handelsoorlog waar Europa bij betrokken is ★ Meervoudige terroristische aanslag • Verstoring van het betalingsverkeer • Statelijke verwerving van een belang in grote telecom-aanbieder • Infiltratie openbaar bestuur	• Sneeuwstorm • Crisis in de Zuid-Chinese Zee • Tweespalt in de EU • Crimineel geweld richting media en overheid • Ongewenste buitenlandse inmenging in diasporagemeenschappen • Bestorming en gijzeling Tweede Kamer	★ Landelijke black-out • (Heimelijke) beïnvloeding door China • Polarisatie rond complottheorieën • Desintegratie van Bosnië-Herzegovina	• Hybride operaties – aangrijpen op maatschappelijk debat • Griep epidemie • Verstoring van handel door productieproblemen buitenland • Natuurbranden
Aanzienlijk	• Stralingsongeval in Europa • Falen opslagtank ammoniak	• Europese schuldencrisis • Cyberaanval ICS - Chemische sector • Ransomware zorgsector • Terroristische aanslag met een bio-wapen	• Uiteenspatten van de OVSE • Aanval op pride evenement • Natuurlijke aardbeving • Geweldsescalatie rechtsextremisten • Anarcho-extremisme • Buitenlandse regulering techbedrijven • Ondermijnende enclaves	• Cyberspionage overheid • Georganiseerde criminaliteit door heel Nederland • Uitbraak MKZ onder koeien • Klassieke statelijke spionage • Innovatie nucleaire overbrengingsmiddelen • Correctie op waardering financiële activa • Misconfiguratie Internetdienstverlener • Criminele inmenging bedrijfsleven • Anti-overheidsextremisme	• Collateral damage
Beperkt			• Uitbraak zoönotische variant vogelgriep	• Tekorten essentiële grondstoffen • Overname van bedrijf dat o.a. dual-use goederen produceert	• Alleenhandelende dader • Buitenlandse durfkapitaalinvesteringen in startups

Likelihood

Source: National Risk Profile 2016, p. 182

A brief history

Sendai framework for disaster risk reduction 2015-2030

Image by Angelo Giordano from Pixabay

How did the concept of disaster risk reduction develop?

1970s

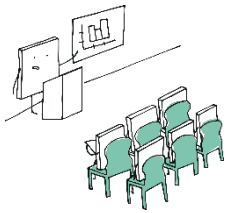
- Actual and potential consequences of natural hazards were becoming so severe, and were of such a scale, that much greater emphasis on pre-disaster planning and prevention was necessary
- Development of a methodology for risk and vulnerability analysis

1980s / 1990s

- Technocratic paradigm: disaster as a geophysical phenomenon. The physical hazard as the main trigger in the explanations of disasters.
- Causes of the disaster were somehow *external* to the organization of society.
- 1990s: International Decade for Natural Disaster Reduction: Focus on raising public (governmental) awareness – to move away from fatalism and to actively reduce disaster losses and impacts.

1994 / 2000s

- "Disasters are socio-ecological processes par excellence". This means that they are the result of social, environmental, cultural, political, economic, physical, and technological processes, as well as individual choices, which, in their interaction with a hazard, produce damage.



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Source: https://www.preventionweb.net/walk-though-history-disaster-risk-reduction

Sendai Framework 2015-2030

…in 2015 adopted by UN Member States at the 3rd UN World Conference on Disaster Risk Reduction in Sendai City, Japan.

The Framework aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over the next 15 years.

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Sendai framework - priorities for action

There is a need for focused action within and across sectors by States at local, regional, national and global levels.

Priority 1: Understanding disaster risk
Disaster risk management needs to be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.

Priority 2: Strengthening disaster risk governance to manage disaster risk
Disaster risk governance at the national, regional and global levels is vital to the management of disaster risk reduction in all sectors and ensuring the coherence of national and local frameworks of laws, regulations and public policies.

Priority 3: Investing in disaster risk prevention and reduction
Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.

Priority 4: Enhancing disaster preparedness for effective response
Disaster preparedness needs to be strengthened for more effective response and ensure capacities are in place for effective recovery.

Understanding disaster risk

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Source: Understanding disaster risk; Disaster Risk | Understanding Disaster Risk

Source: European Commission / I. Clark (personal communication, February 2022)

Hazard

Image by Mario Alberton from Pixabay

Hazard vs. disaster / crisis

Hazard: process, phenomenon or human activity that **may** cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. It describes the probability of experiencing a certain intensity of hazard at a specific location.

Source: UNDRR open-ended intergovernmental expert working group on indicators and terminology, https://www.undrr.org/terminology

Hazard vs. disaster/crisis

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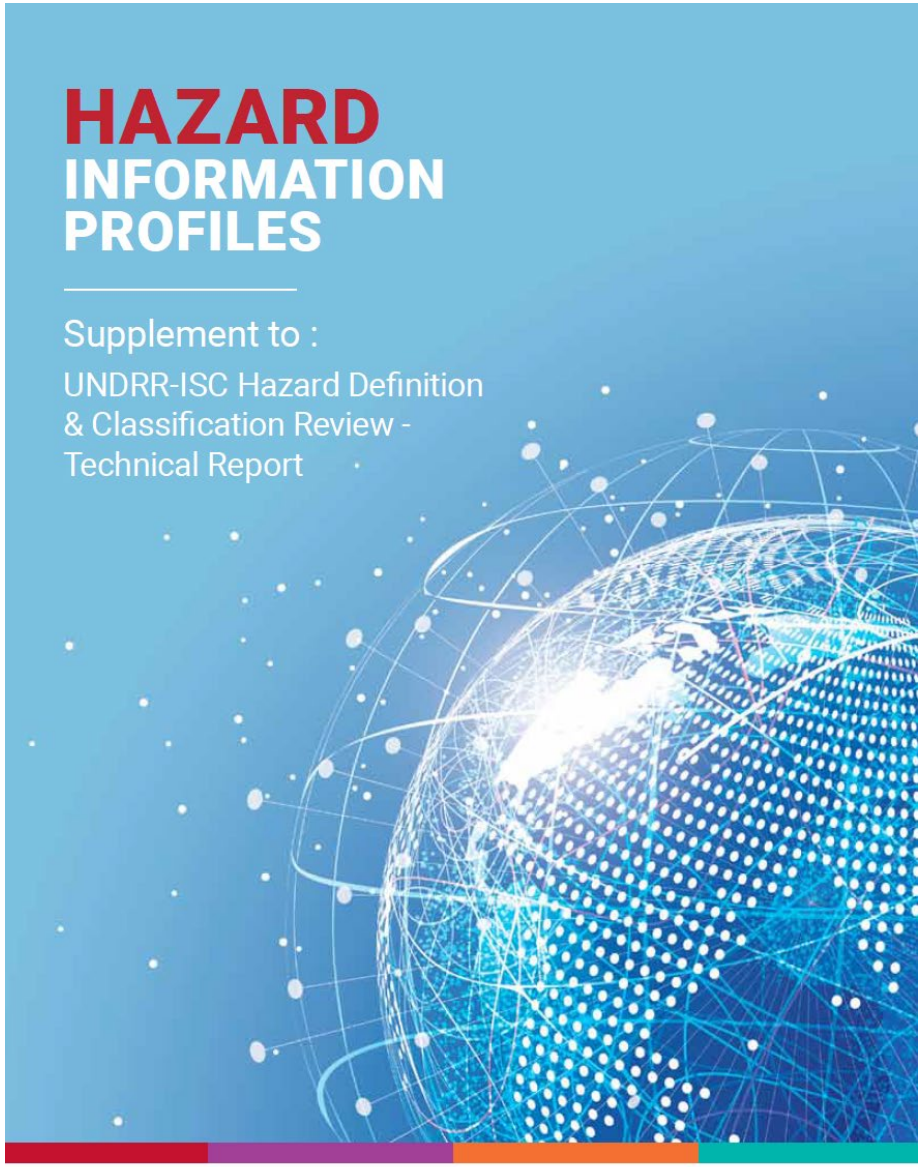
Interesting!

The Hazards Information Profiles and the Technical report provide an important resource to support the implementation of disaster risk reduction and risk-informed investment, aligned with the Sendai Framework for Disaster Risk Reduction 2015–2030.

Overview of more than 300 hazard information profiles



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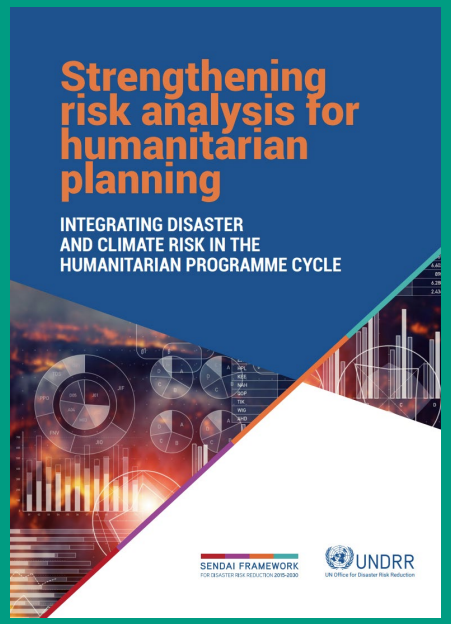
How do we measure hazards?



Download: https://www.undrr.org/media/83715/download?startDownload=true

Example of likelihood assessment

Hazard/shock type	Hazard/ shock identified	What makes it likely?	What makes it less likely?	Likelihood assessment
Meteorological / wind-related	Hurricane	• Six hurricanes of category 3 over the past five years. • 14 hurricanes category 1 or 2 in the past 10 years. • No hurricane last year.		Very likely - 5
Geo-hazard/ seismogenic	Earthquake		Not an area deemed at risk. Absence of tectonic movement for the last 10,000 years.	Very unlikely -1
Meteorological / precipitation-related	Drought	• Two major drought periods over the past 10 years. • Rise in temperatures recorded.	• Reforestation efforts.	Moderately likely - 3
Hydrological / flood	Floods	• 10 major floods over the past two years.	• Upgrade of the drainage infrastructure.	Likely -4

The images below show the paths of the two typhoons. Haiyan resulted in a disaster because it hit populated areas at its highest strength. This demonstrates that disasters are not natural, but rather a combination of different natural and non-natural factors.

Exposure

The situation of people, infrastructure, housing, production capacities, stock of property and infrastructure and other tangible human assets located in hazard-prone areas.

UNDRR Terminology, 2017

Typhoon Lekima and Typhoon Haiyan (Yolanda) comparison Source: UNITAR (2014)

Exposure

The situation of people, infrastructure, housing, production capacities, stock of property and infrastructure and other tangible human assets located in hazard-prone areas.

UNDRR Terminology, 2017

Source: World Risk Report 2023

Vulnerability

The characteristics determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

UNDRR Terminology, 2017

https://www.preventionweb.net/understanding-disaster-risk/component-risk/vulnerability

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Vulnerability relates to a number of factors

Physical factors

e.g. poor design and construction of buildings, unregulated land use planning, etc.
(> housing standards in earthquake areas)

Social factors

e.g. poverty and inequality, social exclusion and discrimination by gender, social status, disability and age (amongst other factors), lack of medical services, etc.
(> Elderly and poor/houseless individuals particularly susceptible to the effects of extreme temperatures)

Economic factors

e.g. the uninsured informal sector, unemployment, vulnerable rural livelihoods, dependence on single industries, globalisation of business and supply chains, etc.
(> Recover less quickly due to bad personal economic circumstances)

Environmental factors

e.g. poor environmental management, overconsumption of natural resources, decline of risk regulating ecosystem services, climate change, etc.
(> Air pollution pose significant health risks)

Source: Vulnerability | Understanding Disaster Risk (preventionweb.net)

Not everyone who is exposed is vulnerable…

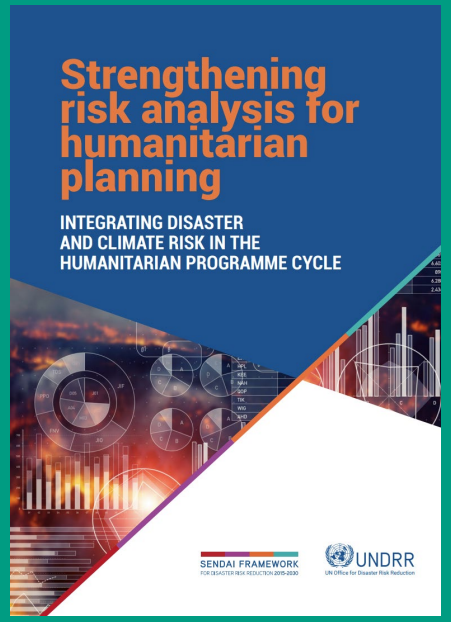
- Disaster risk not only depends on the severity of **hazard** or the number of people or assets **exposed**, but that it is also a reflection of the **susceptibility** of people and economic assets to suffer loss and damage.
- Vulnerable groups find it hardest to reconstruct their livelihoods following a disaster, and this in turn makes them more vulnerable to the effects of subsequent hazard events.
- At the same time, it is possible to be exposed but not be or less susceptible to natural hazards.

Example

- Hurricanes commonly batter the coastlines of Caribbean islands – where many wealthy populations establish their second and third homes.
- Wealthy populations, like others who live near the coast, clearly have a degree of exposure. But, as they have enough resources, they may build houses that are more resilient to storms and thus be less vulnerable.
- Also, they can recover more quickly or afford to leave the island before the storm hits.
- They and their housing would be considered highly exposed – but due to their resources, they would not be considered particularly vulnerable.

Source: Vulnerability | Understanding Disaster Risk (preventionweb.net)

Measuring the impact



Download: https://www.undrr.org/media/83715/download?startDownload=true

Figure 17. Example of impact assessment

Shocks/hazard	Impact	Vulnerability	Capacity	Impact assessment
Hurricane	Past category 3 hurricanes destroyed at least 60 per cent of the town, leading to a high number of casualties and more than 970,000 people affected. High disruptions of water, electricity and telecommunication systems. High population density in coastal areas.	Reconstructions from last hurricane still underway. High levels of people with disability and chronic illnesses in the coastal areas. Higher levels of dengue and malaria cases than usual already recorded.	Low investment in preparedness measures. Recent flooding in the area already left households' coping capacities depleted.	Critical - 5
Earthquake	Not in an area deemed at risk.			Negligible - 1 No impact foreseen.
Drought	The worst drought led to a 40 per cent decline in agricultural production.	More pronounced in the south-west part of the country where 100,000 people mostly rely on farming and agriculture-	No functioning social safety-net system.	Severe - 4

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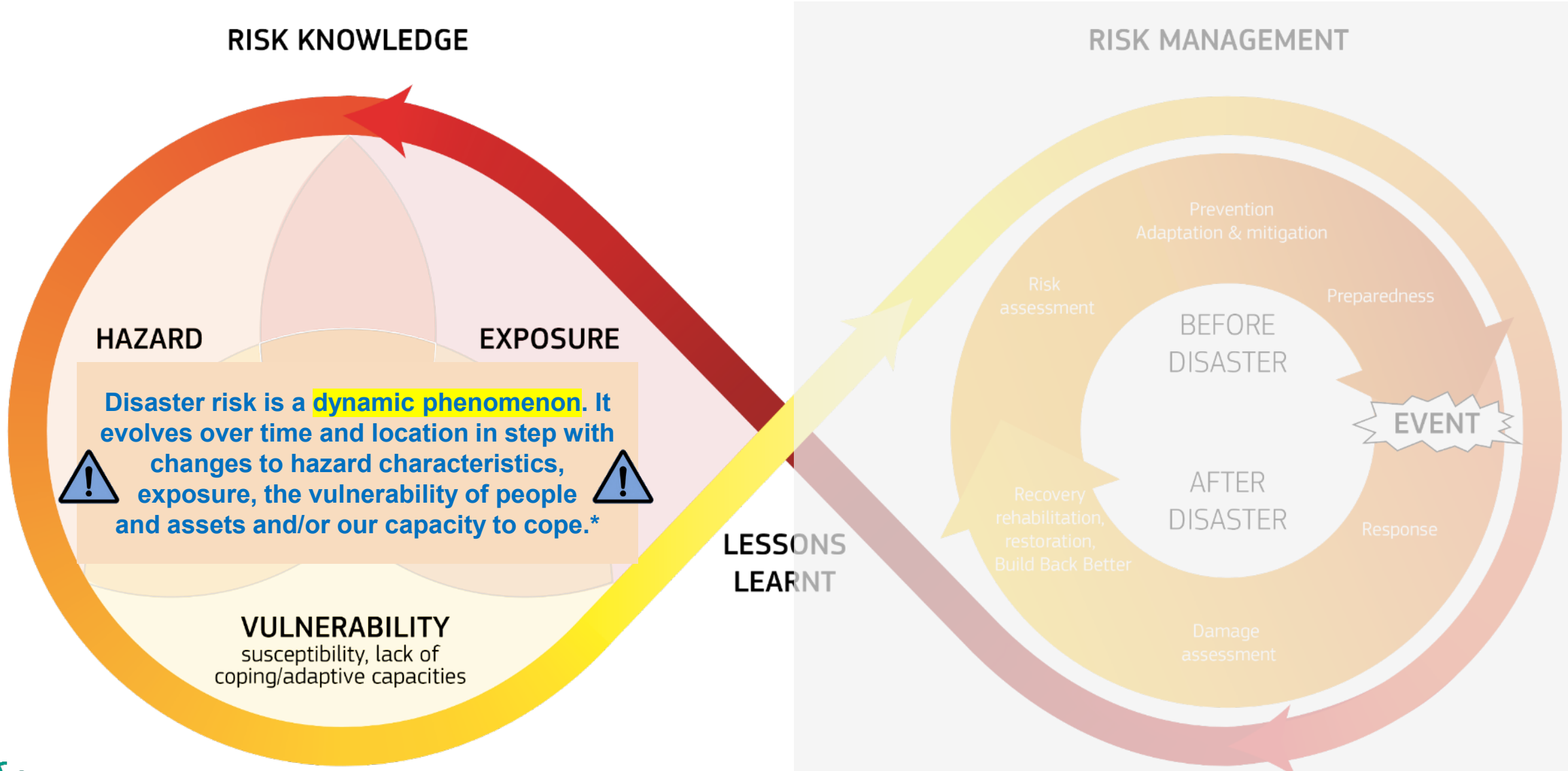
Understanding disaster risk



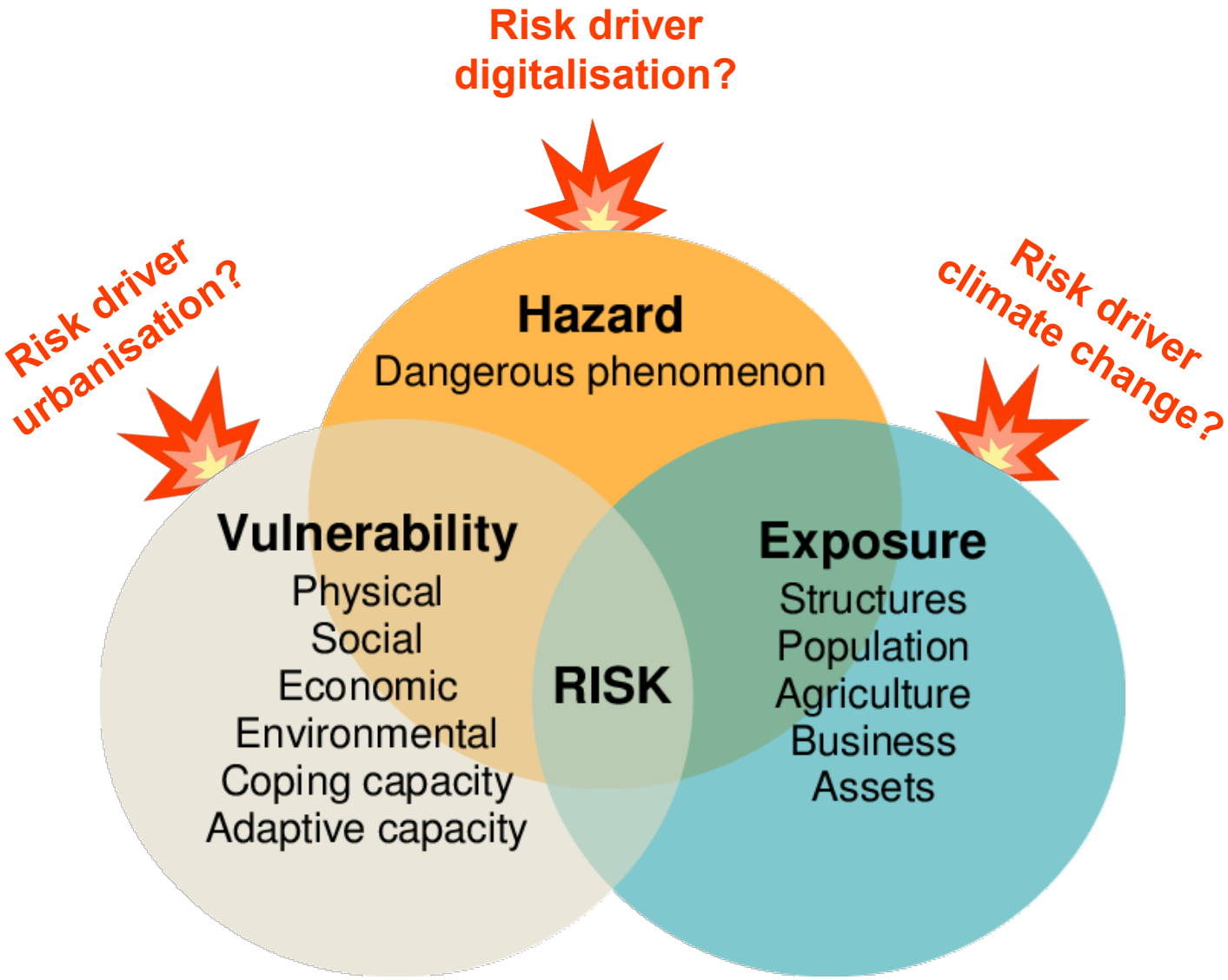
*) Source: Overview of natural and man-made disaster risks the European Union may face 2020

Source: European Commission / I. Clark (personal communication, February 2022)

Disaster risk is a dynamic phenomenon

Processes or conditions […] that influence the level of disaster risk by increasing levels of exposure and vulnerability or reducing capacity.

Source: UNDRR open-ended intergovernmental expert working group on indicators and terminology, https://www.undrr.org/terminology



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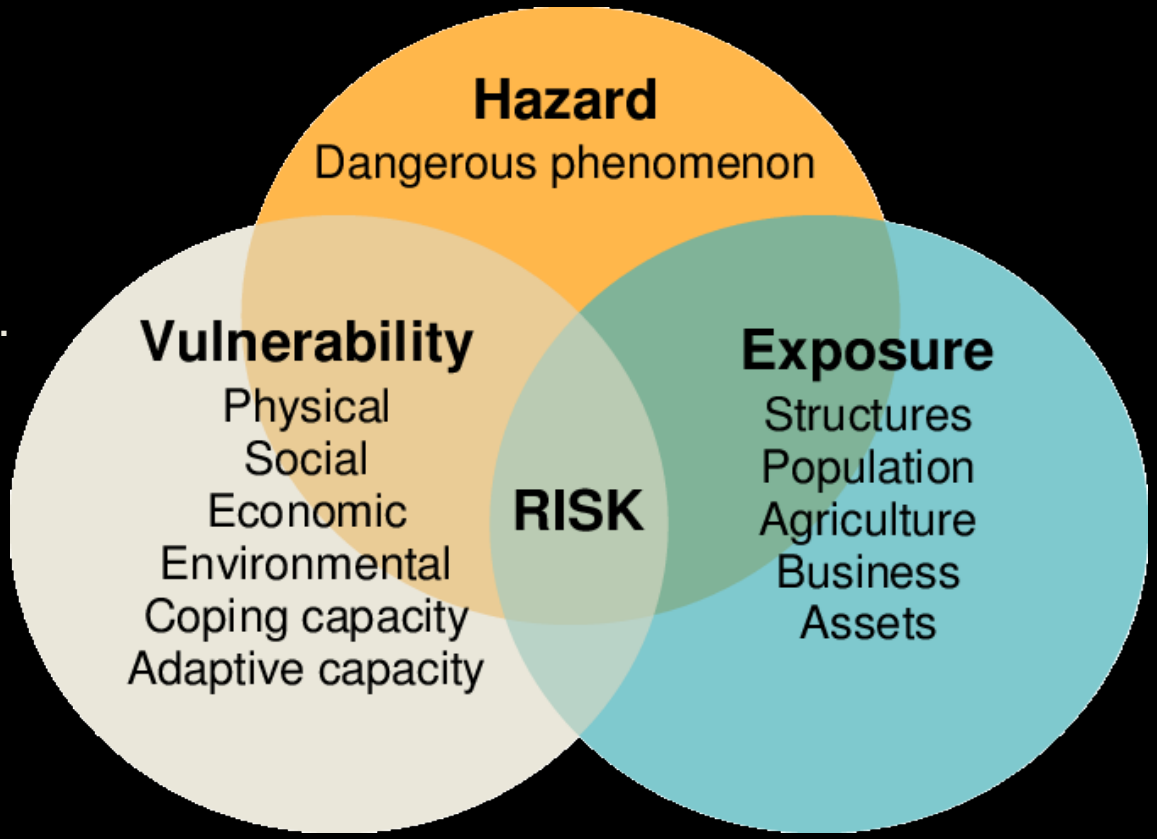
Risk driver ‘urbanisation’

Triggering new hazards: As the built environment expands in a sprawling manner, it fragments landscapes, leading to the deterioration of biodiversity and ecosystem services. This aggravates the likelihood and impacts of floods, droughts and heatwaves.



Urban areas are centers of economic activity and growth. In 2014, metropolitan areas generated 47% of the EU’s Gross domestic product (GDP).

→ High concentration of population, infrastructure, business

‘Urban heat island’ effect – a microclimatic phenomenon whereby urban settings experience higher temperatures than their rural surroundings

Geographical expansion has brought people and assets closer to hazards. Urbanisation along the European coast has exposed more people and assets to coastal flooding.

Urban areas are home to ¾ of Europeans.

Increasing risk of wildfires with human casualties and damage to properties resulting from an urban sprawl into forested areas.

Thanks for your attention!

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