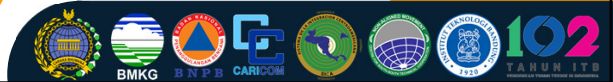


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# Basic Framework of the Disaster Risk Reduction (DRR)

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Surveying and Cadastre Research  
Division



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Dr. Irwan Meilano



## Education

- Geodetic Eng., ITB, 1997 (B.Sc)
- Earth and Environmental Science, Nagoya Univ., 2003 (M.Sc)
- Earth and Environmental Science, Nagoya Univ., 2006 (Dr.Sc)

## Speciality

- Earthquake Geodesy
- Seismic Hazard Analysis
- Disaster Risk Financing (DRF)

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## Earthquake Geodesist



2006– still counting .....

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## Outline

1. Key Terminology in Disaster Risk Reduction (DRR)
2. Global Targets of the Sendai Framework on DRR
3. DRR and SDGs
4. Disaster Risk Estimation (Earthquake and Tsunami)

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# Disaster Impact

### 2014

## Chinese earthquake death toll rises to 589

By Euan McKirdy, CNN  
August 6, 2014 -- Updated 0955 GMT (1755 HKT)



**88-year-old earthquake victim rescued**

**STORY HIGHLIGHTS**

- Death toll from Sunday's earthquake rises to 589, with 2,401 people reported injured

(CNN) -- The death toll from a 6.1-magnitude earthquake that struck China's southwestern Yunnan province on Sunday has risen to 589, with nine people still missing, China's state-run media said on Wednesday.

### 2015

Health & Science

## Experts had warned for decades that Nepal was vulnerable to a killer quake

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CHALLENGE EVERYTHING YOU EXPECT FROM A SAVINGS ACCOUNT.

A day after a massive Himalayan earthquake killed more than 2,500 people, rescue efforts



Nepal residents fear aftershocks of earthquake (1:24) postCtv

**Most Read National**

- Why David Letterman is among television history's biggest losers
- How the Bandidos became one of the world's most feared biker gangs
- Waco restaurant video shows bikers, others seeking cover

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# Disaster Impact

## MercoPress.

South Atlantic News Agency

### Haiti Earthquake 2010 and 2021

## Death toll from Haiti earthquake reaches 1,297 by Sunday evening



*Henry explained that due to the time at which the earthquake occurred, there were many people crowded in churches*

Authorities in charge of the relief efforts after Saturday's earthquake in Haiti Sunday announced the death toll had reached 1,297 and counting. After the 7.2 magnitude earthquake in the Richter scale that struck the southwest of the country, there were five aftershocks, including one of magnitude 5.2 17 kilometers from the town of Chantal, also with an epicenter 10 kilometers deep.

Various countries have expressed their solidarity with Haiti, where another earthquake left 300,000 deaths in 2010.

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## Disaster Impact



### BRITISH VIRGIN ISLANDS CLEANS UP AFTER FLASH FLOOD

AUGUST 10, 2017 332 1 MINUTE READ



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## Key Terminology in Disaster Risk Reduction (DRR)



The open-ended intergovernmental expert working (OIEWG) group on indicators and terminology relating to disaster risk reduction was established by the UN-General Assembly



UNDRR

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### Key Terminology in Disaster Risk Reduction (DRR)

#### Disaster

- A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

#### Risk

- The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.

#### Hazard

- A 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.

#### Mitigation

- The lessening or minimizing of the adverse impacts of a hazardous event.

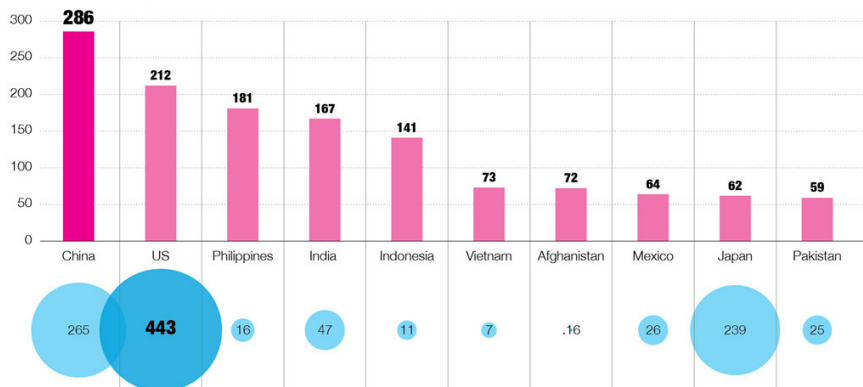
UNDRR

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### Disaster Impact (1)

Top 10 countries with most disasters, 2005-2014

Number of disasters Total damage (\$ billion)



China has the most disasters from 2005-2014 but the US has incurred the most damage, and while Japan is far behind in number of disasters, its economic loss is almost as big as that of China

UNISDR  
The United Nations Office for Disaster Risk Reduction

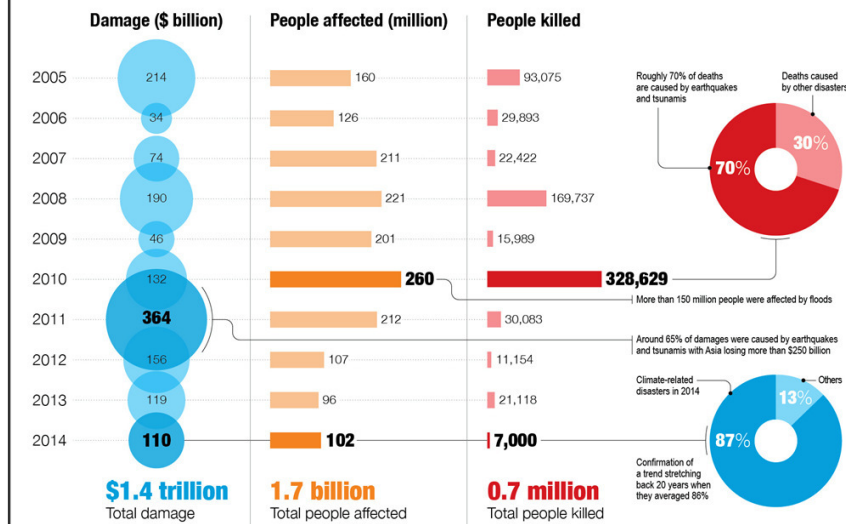
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## Disaster Impact (2)



### The Economic and Human Impact of Disasters in the last 10 years



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## Characteristics of disaster



- An extreme phenomenon (of different origins),
- Large intensity (e.g. a measurable quantity such as earthquake intensity, water depth)
- Limited duration (which can vary from seconds to months, but should be defined in time);
- Occurring at a certain location (this spatial component will be very important in this course);
- Involving a complex interplay between physical and human systems;
- Causing loss of lives and threats to public health, as well as physical damage
- Disruption of livelihood systems and society;
- Exceeding local capacities and resources
- Requiring outside assistance to cope with

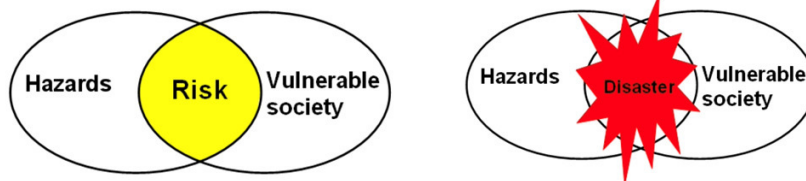
Westen et al., 2011

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## Disaster vs Risk

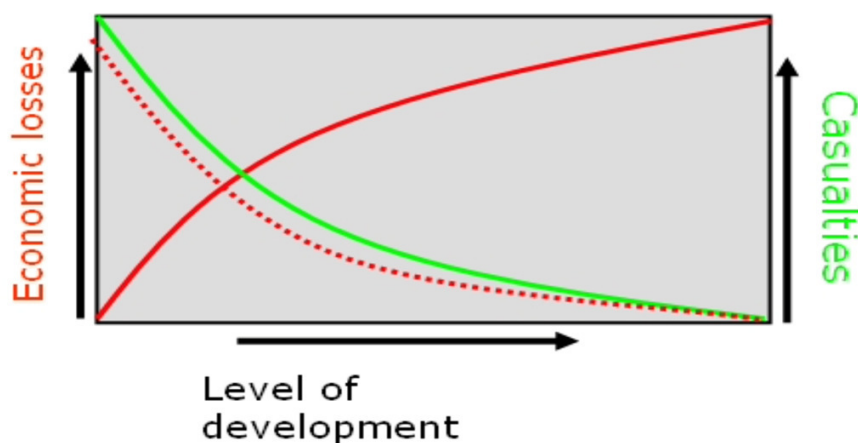
- A disaster is a function of the risk process.
- Risk results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk.
- Hazards can include latent conditions that may represent future threats. When the threat becomes a reality, the risk becomes a disaster.



Westen et al., 2011

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## Economic losses vs Level of development



Westen et al., 2011

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## Disaster Mitigation

- a simple answer to the hazard problem
- tend to be costly, disruptive, time consuming, and in some cases socially unpalatable
- competes with a number of other issues, many considered more pressing or immediate

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Westen et al., 2011

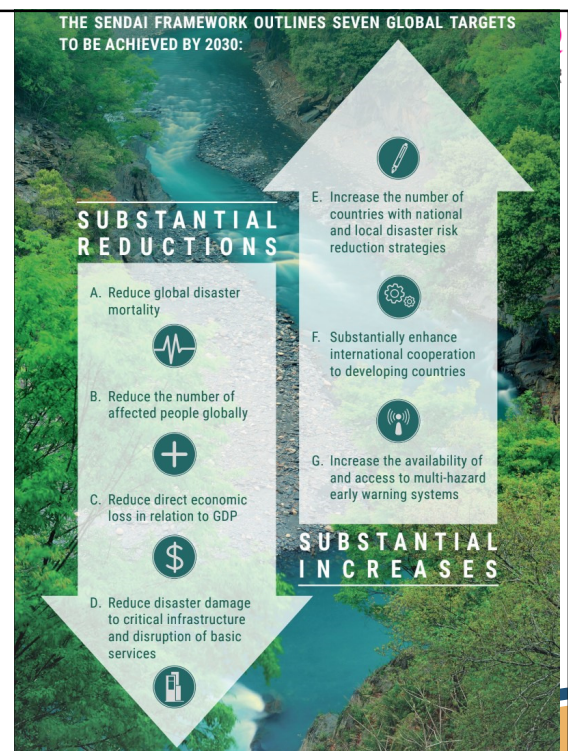


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## Sendai Framework for DRR

- The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster.
- The Sendai Framework works hand in hand with the other 2030 Agenda agreements, including The Paris Agreement on Climate Change, The Addis Ababa Action Agenda on Financing for Development, the New Urban Agenda, and ultimately the Sustainable Development Goals.

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## Sendai Framework for DRR: Targets



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## Sendai for DRR and SDGs

Sendai Framework  
for Disaster Risk Reduction  
2015-2030

SUSTAINABLE  
DEVELOPMENT GOALS



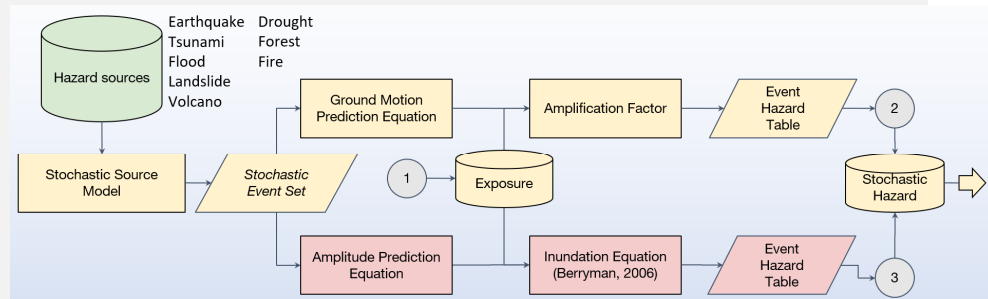
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## Disaster Risk Estimation (1)



### Stochastic Hazard

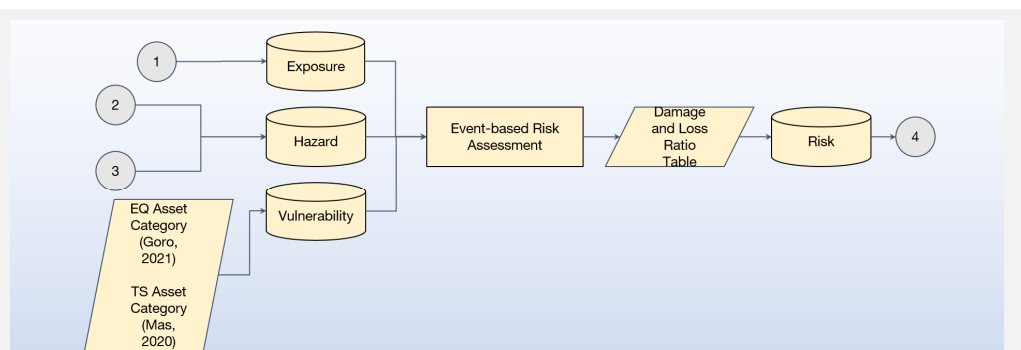


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## Disaster Risk Estimation (2)



### Loss and Damage (Risk)

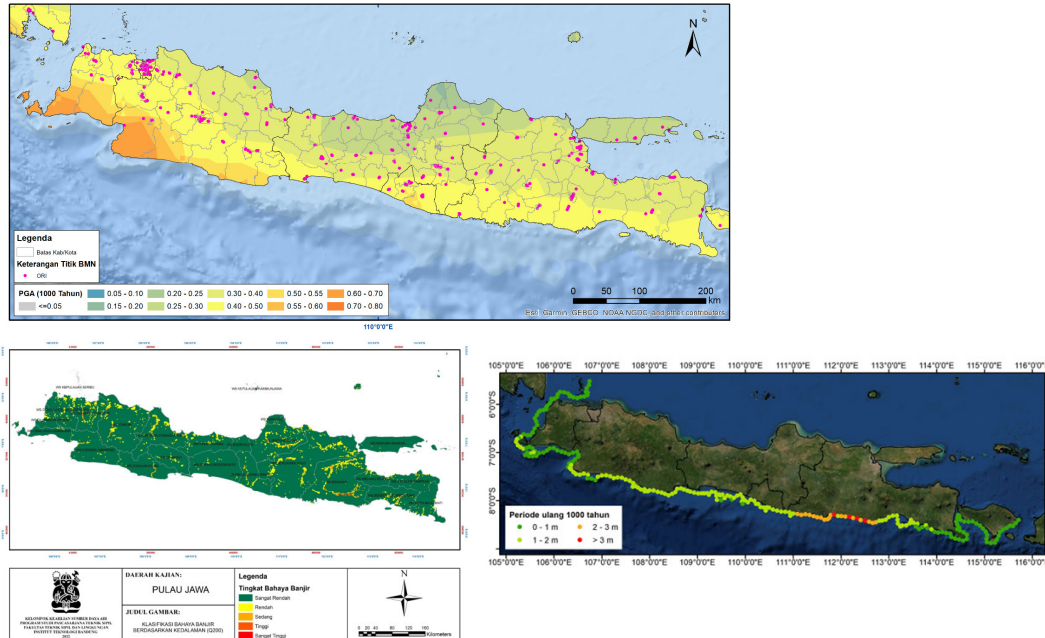


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## Disaster Risk Estimation : Hazard



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## Disaster Risk Estimation : Exposure

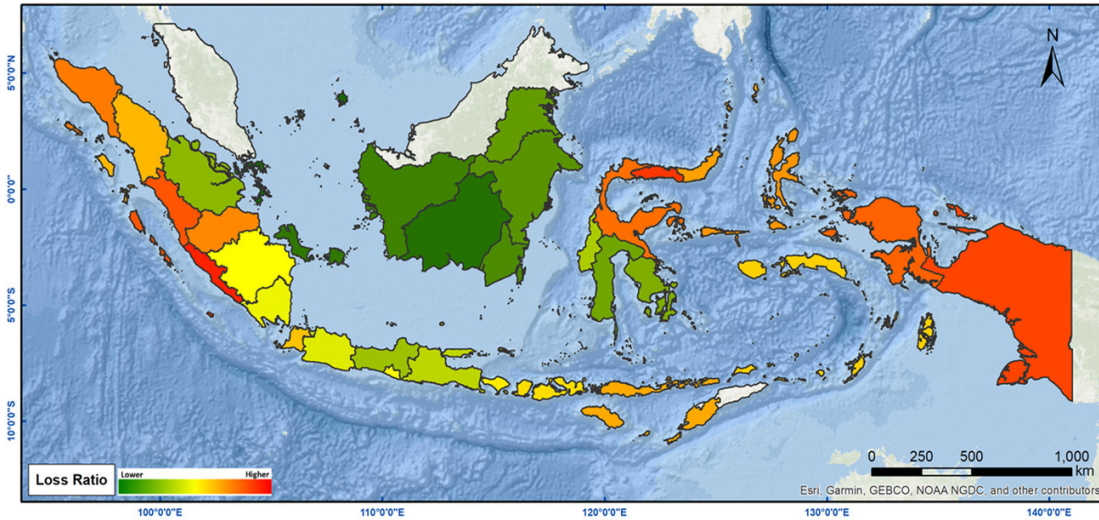


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## Disaster Risk Estimation

### Average Annual Loss Ratio per Province



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# Thank You



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