

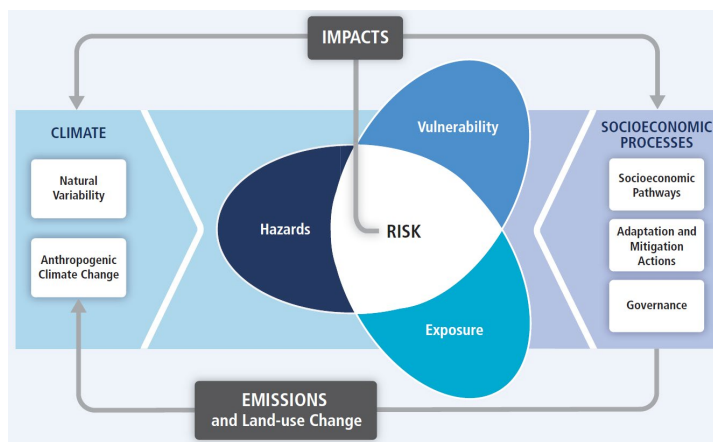
國立臺北大學自然資源與環境管理研究所

110 學年度第二學期『環境災害與風險管理』

課程講義 (02~03)：天然災害與巨災
Natural Hazards/Disasters and Catastrophes

● INTRODUCTION (CONTINUED)

- Smith (2013). *Environmental Hazards – Accessing Risk and Reducing Disaster*, 6th ed.
Part Two: The Experience and Reduction of Hazard
 6. Tectonic Hazards - Earthquakes and Tsunamis
 7. Tectonic Hazards - Volcanoes
 8. Landslide and Avalanche Hazards
 9. Severe Storm Hazards
 10. Weather Extremes, Disease Epidemics and Wildfires
 11. Hydrological Hazards - Floods
 12. Hydrological Hazards - Droughts
 13. Technological Hazards
 14. Environmental Hazards in a Changing World
- Disasters through History: All About History -- Book of Disasters (2016)
- Environmental Catastrophes and Human Tragedies: Encyclopedia of Disasters
- Hazard (cause)危害、Risk (likely consequence)危機/風險、Disaster (actual consequence)災害
 - ⇒ “Risk is opportunity” (Risk or Crisis) = (Danger + Opportunity)
 - ⇒ $RISK = Hazard \times Probability \times Elements \text{ at Risk} \times Vulnerability$ (S.p.71)
 - ⇒ Risk as a function of hazard, exposure and vulnerability. IPCC AR5
https://www.ipcc.ch/site/assets/uploads/2018/02/ar5_wgII_spm_en.pdf



- ⇒ The concept of risk in the IPCC Sixth Assessment Report
https://www.ipcc.ch/site/assets/uploads/2021/02/Risk-guidance-FINAL_15Feb2021.pdf

● CATEGORIES OF NATURAL DISASTERS

- Natural Disasters Discussed in Smith (2013)
- Natural Disasters Covered in *World Atlas of Natural Disaster Risk*
<http://www.springer.com/gp/book/9783662454299>; [World Atlas of Natural Disaster Risk \(researchgate\)](#)
 - ⇒ Earthquake, Volcano and Landslide Disasters
 - ⇒ Flood and Storm Surge Disasters
 - ⇒ Sand-dust Storm and Tropical Cyclone Disasters
 - ⇒ Heat Wave and Cold Wave Disasters
 - ⇒ Drought Disasters; Wildfire Disasters; Multi-natural Disasters

- Natural Disasters Assessed in *Natural Disaster Hotspots: A Global Risk Analysis*
[Natural Disaster Hotspots: A Global Risk Analysis \(worldbank.org\)](https://www.worldbank.org/en/programs/natural-disaster-hotspots)
 - ⇒ Geophysical hazards: earthquakes and volcanoes
 - ⇒ Hazards driven by hydro-meteorological processes: floods, cyclones, and landslides
 - ⇒ Drought

- SEISMIC (TECTONIC) HAZARDS (S. Chp.6&7)
 - Earthquake and Tsunami
 - ⇒ Ground shaking
 - ⇒ Soil liquefaction, Landslides, Tsunamis, etc.
 - Volcanoes
 - ⇒ Pyroclastic flows and Volcanic gases
 - ⇒ Ground deformation, Lahars, etc.
 - ⇒ Volcanic ashes

- OTHER NATURAL HAZARDS
 - Mass Movement Hazards (S. Chp.8)
 - ⇒ Rock Falls, Landslides and Debris Flows
 - ⇒ Snow Avalanches => c.f. Land Subsidence
 - Severe Storm Hazards / Atmospheric Hazards (S. Chp.9)
 - ⇒ Tropical Cyclones
 - ⇒ Severe Summer Storms
 - ⇒ Severe Winter Storms
 - Weather Extremes, Disease Epidemics and Wildfire (S. Chp.10)
 - ⇒ Extreme Temperature
 - ⇒ Disease Epidemics => Infectious Diseases and Climate
 - ⇒ Wildfire
 - Hydrologic Hazards (S. Chp.11&12)
 - ⇒ Floods: River floods vs. Coastal floods => c.f. Forecasting vs. Warning
 - ⇒ Droughts: Meteorological, Hydrological, Agricultural, and Famine droughts

- CATASTROPHE AND CATASTROPHE BOND
 - Definition of Catastrophe
 - ⇒ An unexpected or unanticipated natural or man-made event that has wide ranging negative socioeconomic impacts; also known as a disaster.
 - Stakeholders: Property owners, Insurers, Reinsurers, Capital markets, Societies, and Governments
 - Catastrophe Bond
 - ⇒ Catastrophe bonds (also known as cat bonds) are risk-linked securities that transfer a specified set of risks from a sponsor (insurer or reinsurer) to investors. They were created in the mid-1990s in the aftermath of Hurricane Andrew and the Northridge earthquake.
 - ⇒ [Formosa Re Cat Bond \(in 2003\): USD 100 Million, Mature period: 3 years.](#)
 - ⇒ [【疫情衝擊】陳冲提建言：政府可發行「巨災債券」 防疫投資又避險 \(蘋果日報\)](#)

- Homework Assignment #2 (No hand-in needed!)

請下載並閱讀 World Economic Forum 發行之 [The Global Risks Report 2021](#) and [The Global Risks Report 2022](#)，以利後續課程討論與期中考試作答。