

GLCb2020

Environmental

threats and security

Catastrophic future?

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Agenda

- Disasters: definitions, types, solutions
- Nuclear energy

The worst “natural” disasters in history

	Location	Date	Type	Fatalities
1.	Northern China	1876-8	Drought	12 million
2.	Bengal	1770	Drought	10 million
3.	Central India	1876-8	Drought	6 million
4.	Huang Ho river, China	1931	Flood	3.7 million
5.	China	1928	Drought	3 million
6.	China	1959	Flood	2 million
7.	Bangladesh	1943	Drought	1.9 million
8.	Bihar, India	1965-7	Drought	1.5 million
8.	Rajputana, India	1869	Drought	1.5 million
8.	India	1900	Drought	1.5 million

Disaster: definition

- Disaster events caused by a combination of *hazards* and *vulnerability*
- Hazards can be natural (e.g., earthquake) or human made (e.g., industrial processes)
- **Vulnerability**: risk, sensitivity, resilience, fragility

Risk

- Probability X impact

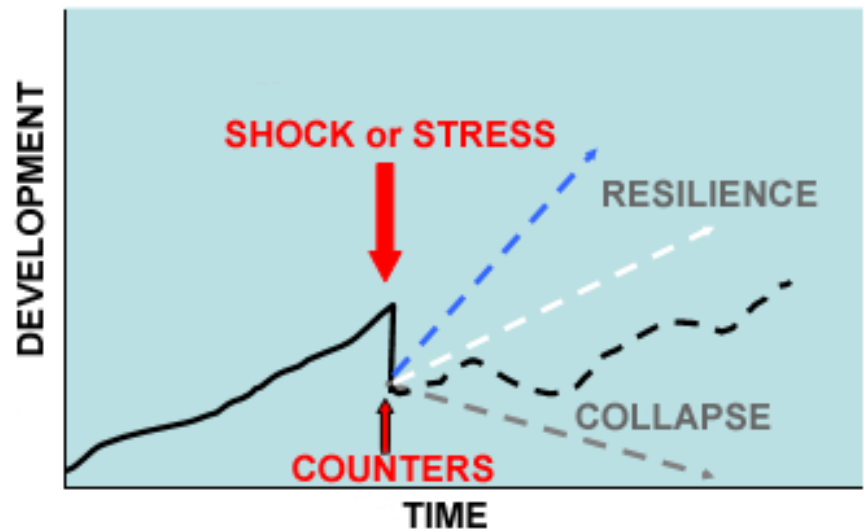
Sensitivity

- Degree to which a given community is negatively affected by external stimuli
- Higher sensitivity due to poor quality living conditions increases vulnerability

Resilience

- Ability to “bounce back”
- Depends on:
 - Social support/ networks
 - Available resources
 - Equal access to resources

Figure 1 - Concept of resilience



Graphic: UK DFID

Fragility

- Ability of a system to withstand stress
- Destroyed society can never be able to rebuild
 - Third Punic War 149-146 BC
 - Genocide in Bosnia and Darfur

Types of disasters

- **Geological:** earthquake, avalanche, landslide, volcanic eruption
- **Meteorological:** storm, tornado, extreme temperatures, fire, drought, hydrological disasters (flood, tsunami)

What increases vulnerability?

- Poverty
- Population growth
- Urbanization
- Soil degradation
- Refugees
- Climate change
- Lack of democracy

Disasters and energy

- **Oil:**

- Deepwater Horizon oil spill (2010): killed 11 people and spilled 5 million barrels of oil
- Arctic drilling in pristine areas
- Tar sands in northern Canada

- **Natural gas:**

- Burning of natural gas releases CO₂
- Chemical pollution of ground water from fracking in USA and Canada
- Increased number and severity of earthquakes (Oklahoma surpassed California in seismic activity)

What to do about disasters?

- Vertical approach
 - Send soldiers for emergency operations, application of science (e.g., better technologies, forecast)
- Horizontal approach
 - Solve societal factors as elements of vulnerability

Does the world need nuclear energy?

https://www.ted.com/talks/stewart_brand_mark_z_jacobson_debate_does_the_world_need_nuclear_energy

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