

„Risk drivers that foster hazards, their likelihood, exposure and/or vulnerability in the future“

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Literature (26th February 2024)

- UN The 2023 Interconnected Disaster Risks report analyses six interconnected risk tipping points, representing immediate and increasing risks
- [Downloads - Interconnected Disaster Risks \(interconnectedrisks.org\)](https://www.interconnectedrisks.org/)
- <https://www.pik-potsdam.de/en>
- The Logic Of Failure: Recognizing And Avoiding Error In Complex Situations Taschenbuch – Illustriert, 4. August 1997
- On War: Carl von Clausewitz, Everyman's Library CLASSICS, 1993
- Cebrowski, Network Centric Warfare, An Emerging Military Response to the Information Age; in: Military Technology, 27/2003, S. 12-23.
- Dekameron, Boccaccio

"I know of nothing better on Sundays and public holidays,

Than a talk of war and war cries,

When at the back, far away, in Turkey

the nations clash.

You stand at the window, finish your glass

And watch the colorful ships glide down the river;

Then you return home happy in the evening

and bless peace and times of peace".

A third citizen:

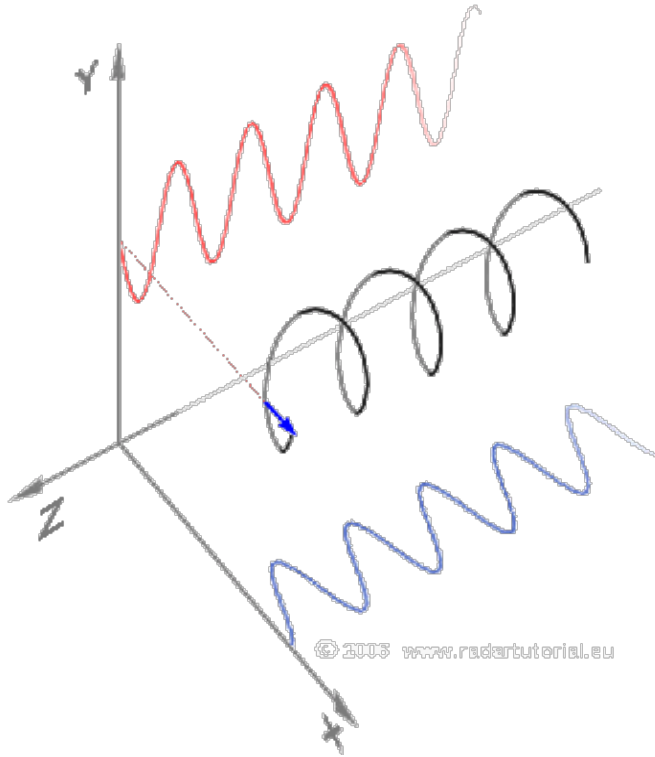
"Mr. Neighbor, yes! I'll let it happen that way,

They may split their heads,

May everything get in struggle; But only at home stay the same"

1. turning point in the security situation
2. insecurity among the population
3. “renaissance” of security (civil protection and civil defense)

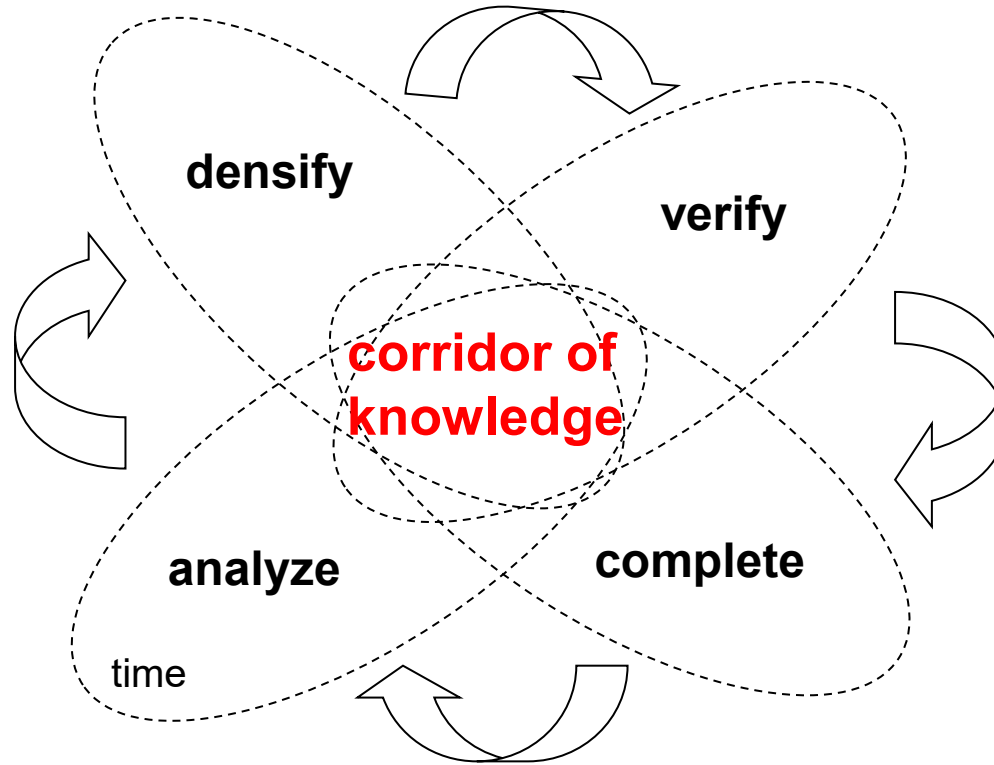
perception

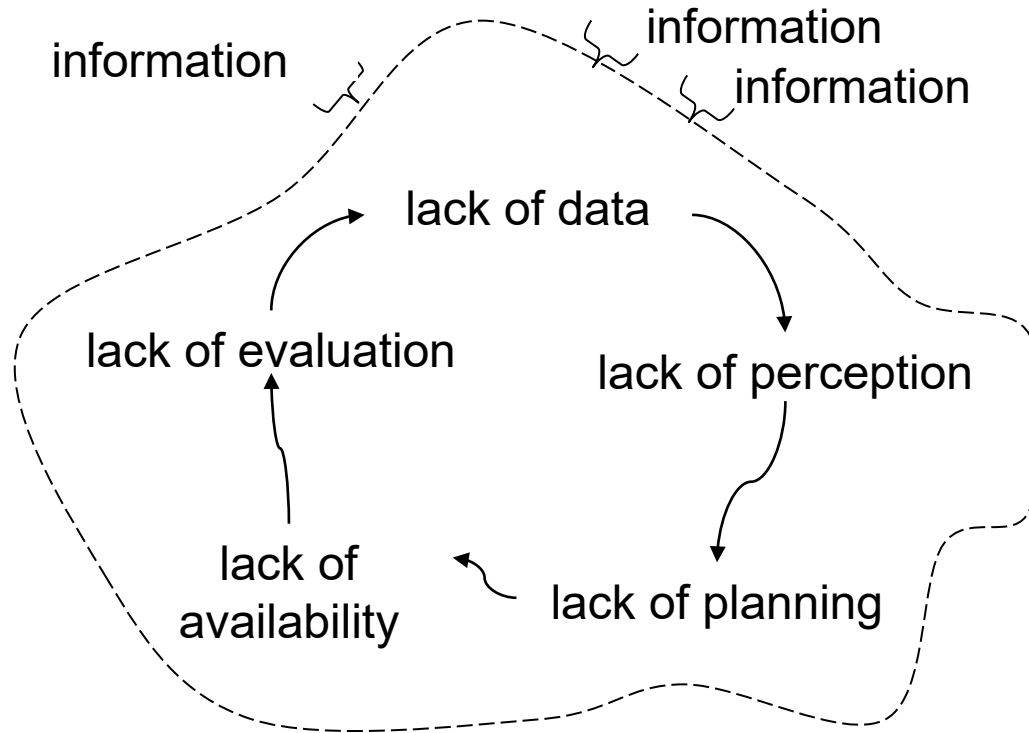


1. **Climate change**
 1. **Weather**
 2. **Water**
2. **Shortage of energy and raw materials**
3. **Globalization**
 1. **Global value and commodity chains**
 2. **Diseases**
 3. **Inequalities, decoupling, standard of living**
4. **Digitalization**
5. **War (in Europe)**

"... in the broad sense of the word, to the art, that is, to the skill of picking out the most important and decisive ones from an immense number of objects and relationships through the tact of judgment."

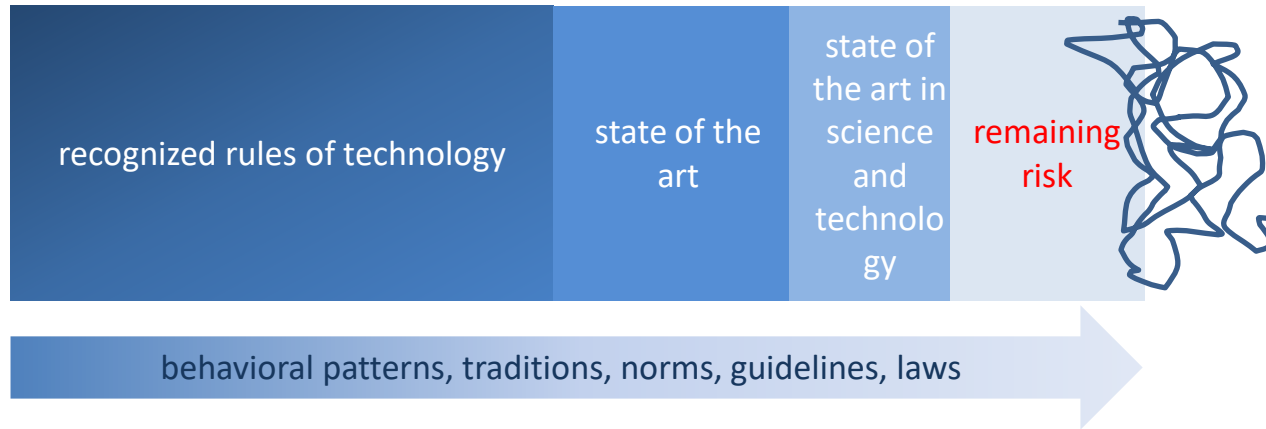
Carl von Clausewitz





risk

Federal Constitutional Court: Risk is "inescapable and in this respect must be borne by all citizens as a socially adequate burden"



negative drivers

problems/“drivers“(real world)

1. climate change
2. energy and raw materials
3. demography
4. supply chains
5. war in Europe
6. prices
7. political and media cycle

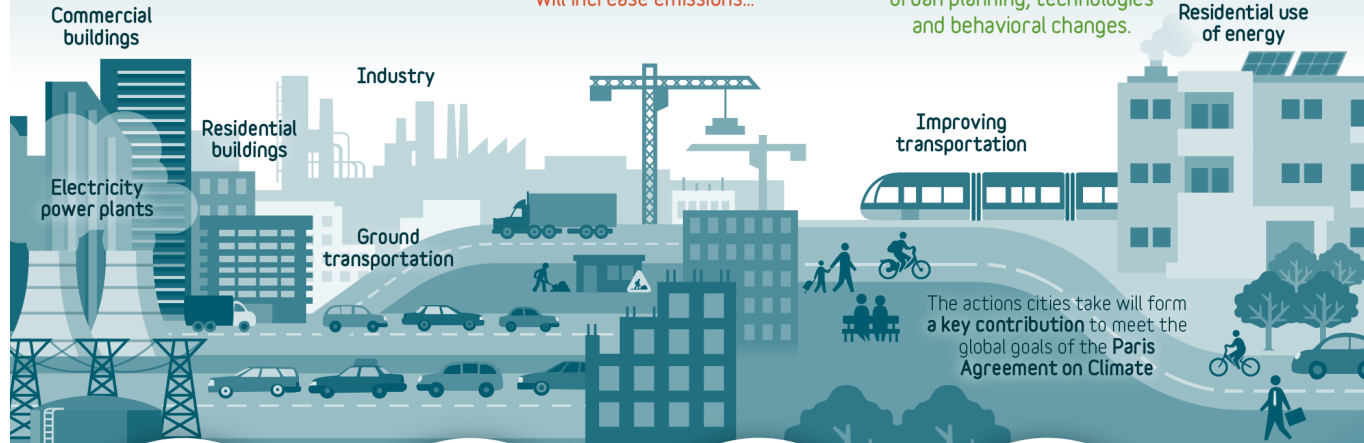
drivers

1. Deforestation
2. Pollution
3. Urbanization
4. Atmospheric / ocean warming
5. Changing freshwater systems
6. Vulnerable infrastructure
7. Drought
8. Insufficient early warning system
9. Lack of regulation/enforcement
10. Organized crime
11. Insufficient future planning
12. Risk-intensifying land use
13. Lack of information
14. Living and working in at-risk areas

High energy use and dense populations – the city is a CO₂ hotspot

1

The main contributing sectors are:



2

Urbanization will continue in the future, and this process will increase emissions...

3

...unless cities take actions to reduce emissions through urban planning, technologies and behavioral changes.

The actions cities take will form a key contribution to meet the global goals of the Paris Agreement on Climate

Altogether, cities account for **more than 70%** of man made fossil fuel CO₂ emissions.

Cities **emissions vary** depending on land use, energy consumption and a variety of socioeconomic and geographical factors.

The Global Carbon Project compiled a unique dataset of CO₂ emissions and socioeconomic variables from **343 global cities.**

This data will help scientists and policy-makers **explain the role of socioeconomic drivers** in cities' emissions.

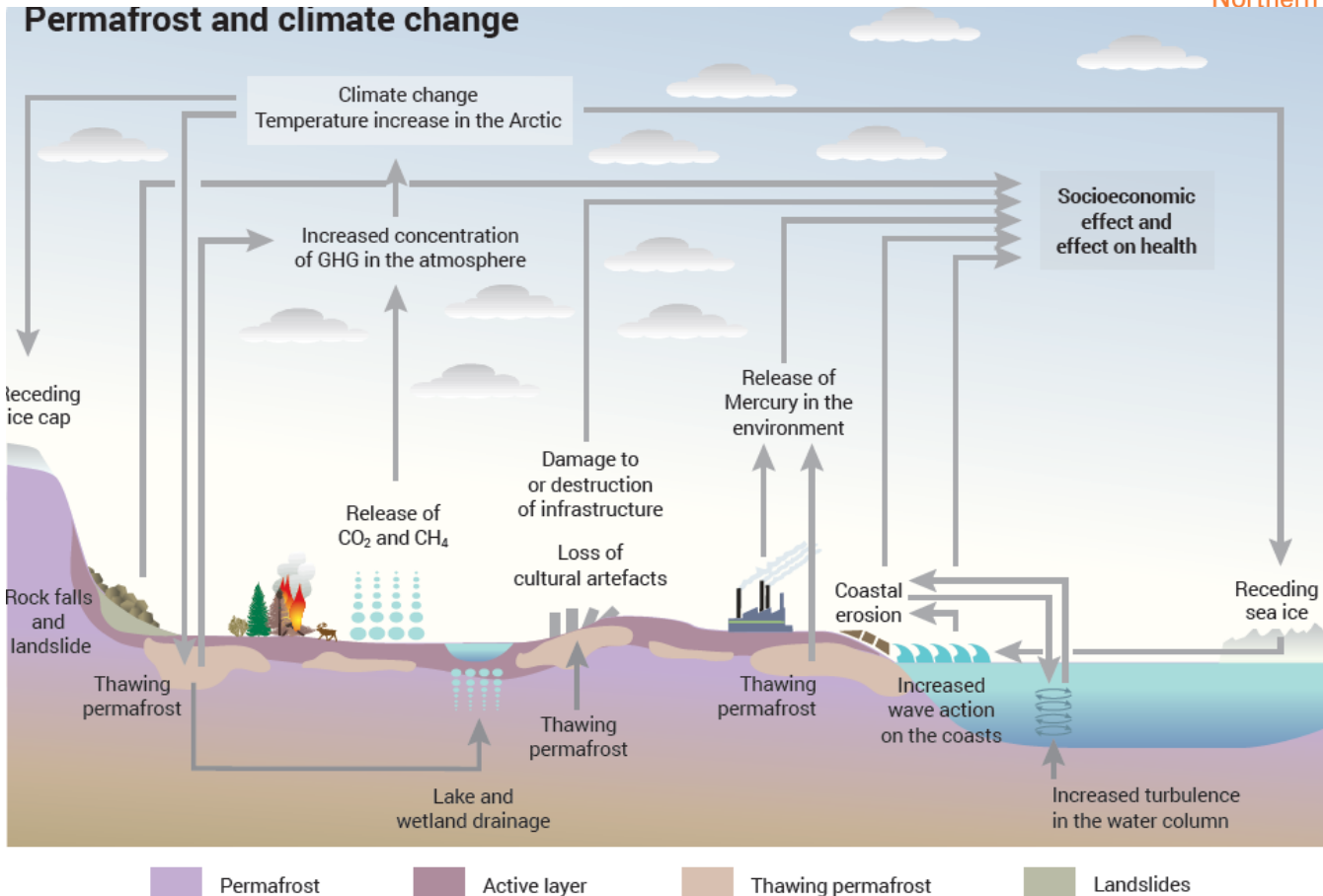
Tipping points

CLIMATE CHANGE AND NATURE LOSS COULD SOON CAUSE 'TIPPING POINTS' IN THE NATURAL WORLD

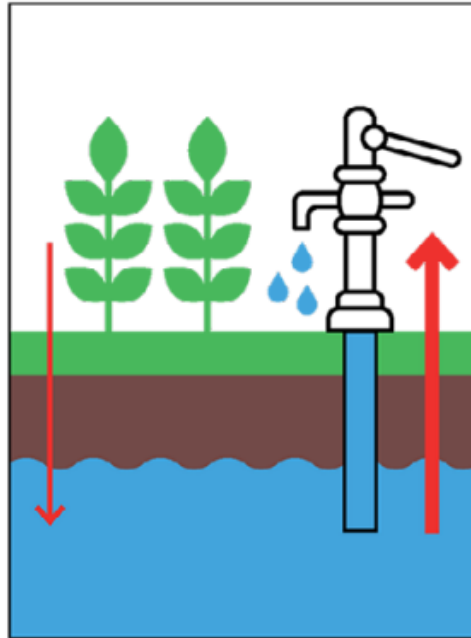
Environmental stresses could become so severe that large parts of the natural world are unable to maintain their current state, leading to abrupt and/or irreversible changes. These moments are called Earth system 'tipping points'. Five major tipping systems are already at risk of crossing tipping points at the present level of global warming:

Tipping points

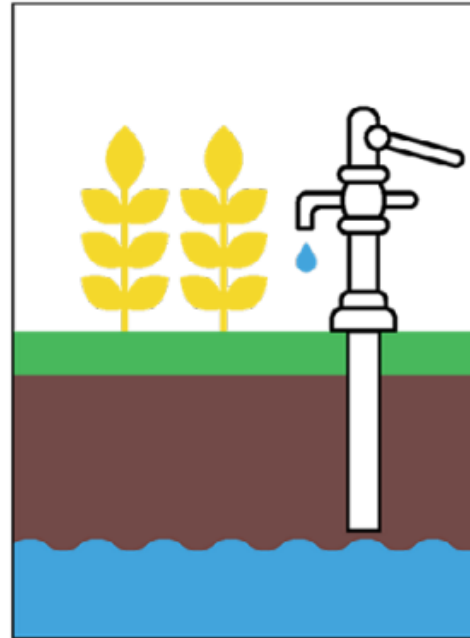
1. the Greenland and
2. West Antarctic ice sheets,
3. warm-water coral reefs,
4. North Atlantic Subpolar Gyre circulation,
5. and permafrost regions.



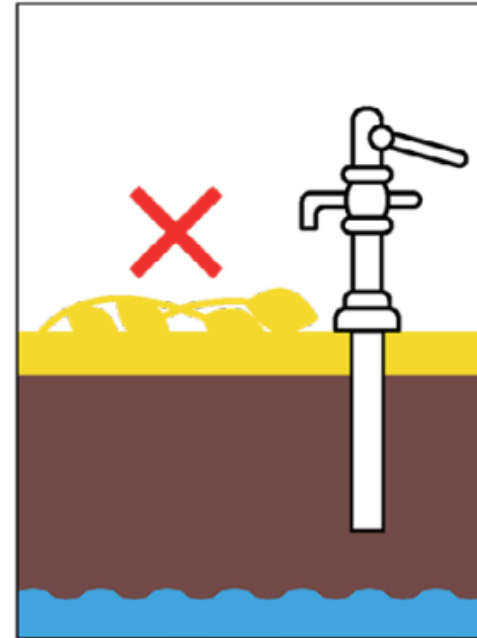
Tipping points „small example“



1. Increasing risk = More groundwater is extracted than is able to be recharged



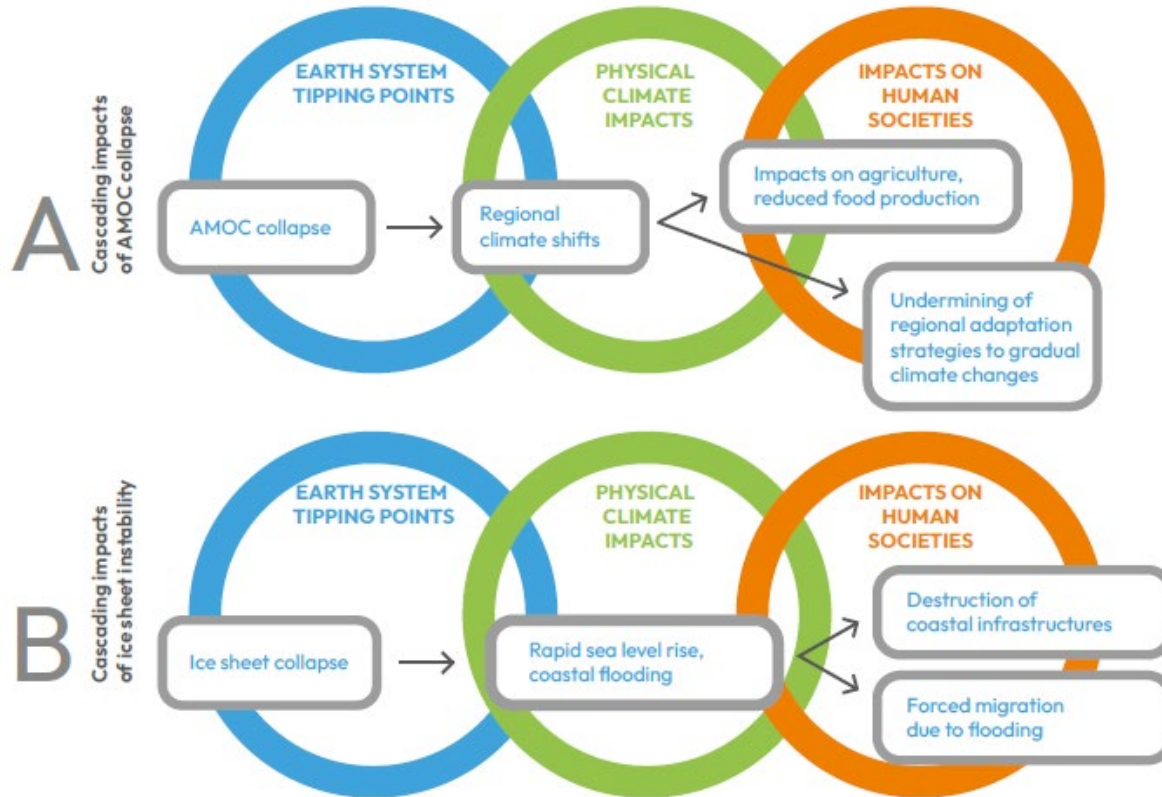
2. Tipping point = Water table drops consistently below well depth



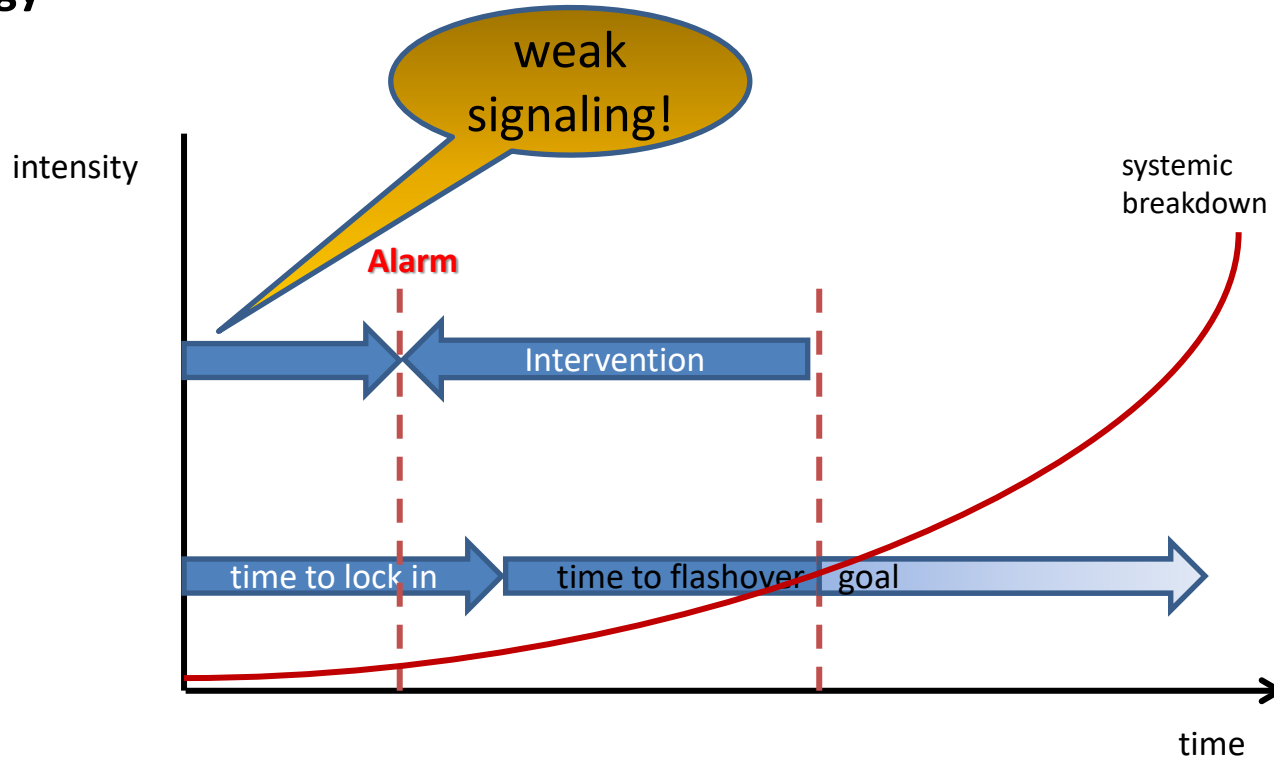
3. Tipped = Access to groundwater is unavailable, increasing the risk of crop failure

Tipping points

“These threats could materialise in the coming decades, and at lower levels of global warming than previously thought. They could be catastrophic, including global-scale loss of capacity to grow major staple crops. Triggering one Earth system tipping point could trigger another, causing a domino effect of accelerating and unmanageable damage. Tipping points show that the overall threat posed by the climate and ecological crisis is far more severe than is commonly understood.”

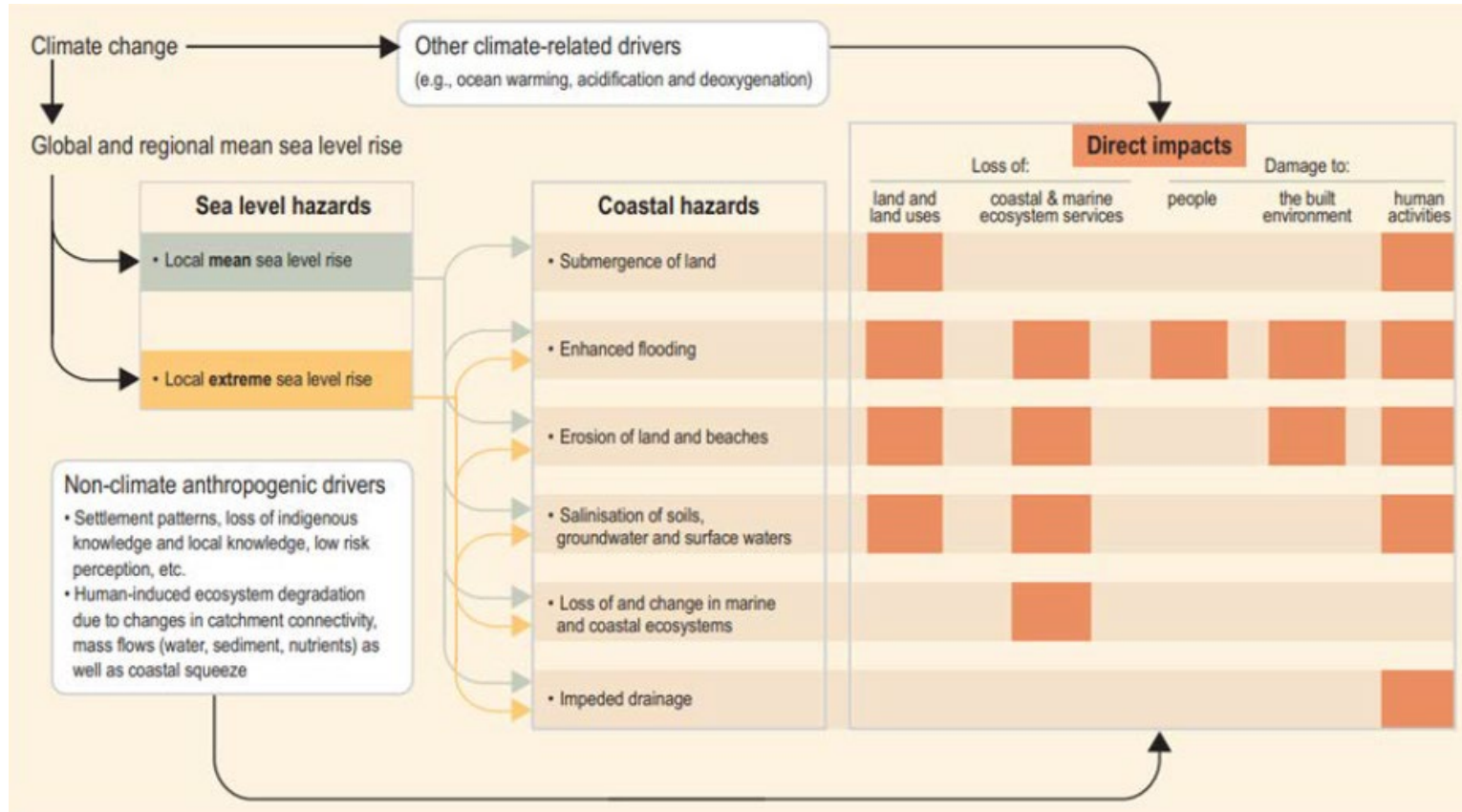


risk analysis strategy



Tipping points

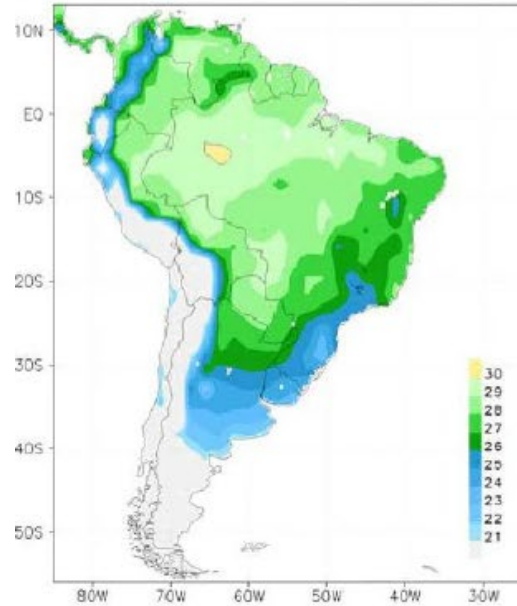
“This will multiply crises in the same way that the COVID-19 pandemic caused cascading stress to societies and economic systems globally, with unequal and unjust consequences. These impacts could escalate to threaten the breakdown of economic, social and political systems, triggering destructive tipping points in societies experiencing stresses beyond their ability to cope.”



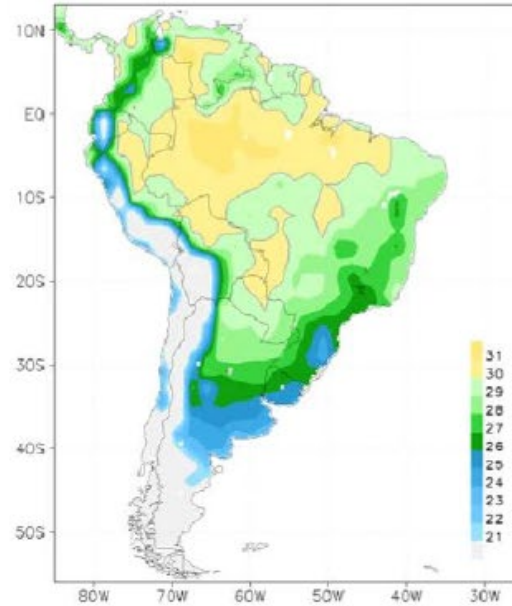
RISK OF BIOME SHIFTS IN THE AMAZON



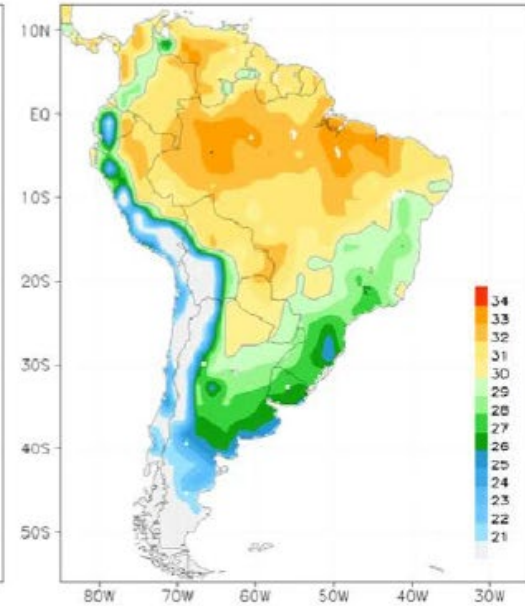
HF – Forested in historical

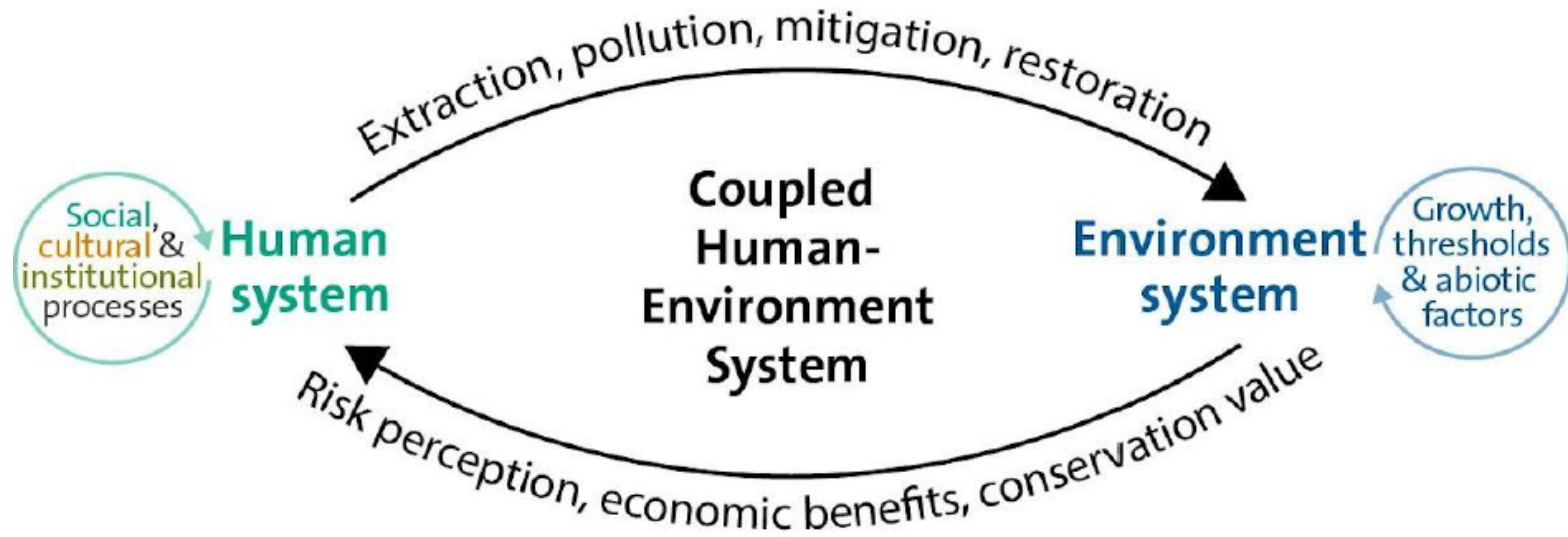


45F – Forested in RCP4.5



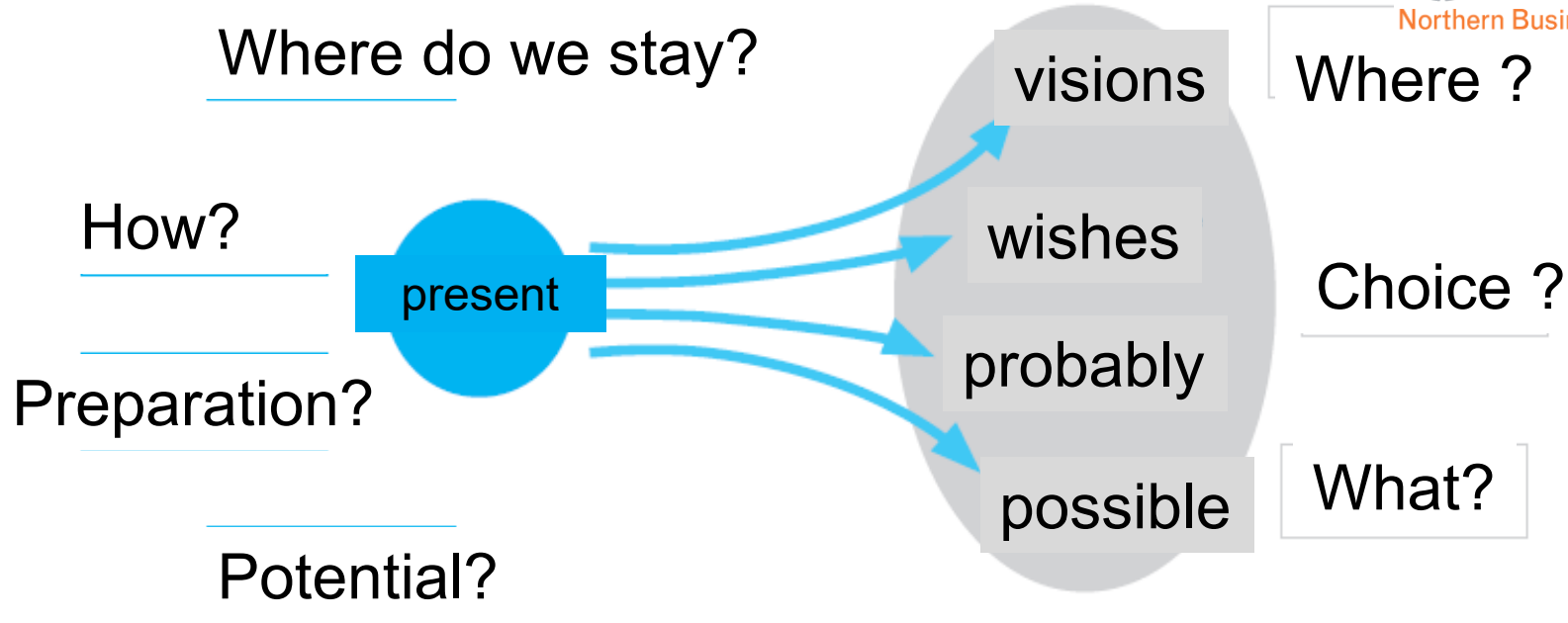
85F – Forested in RCP8.5



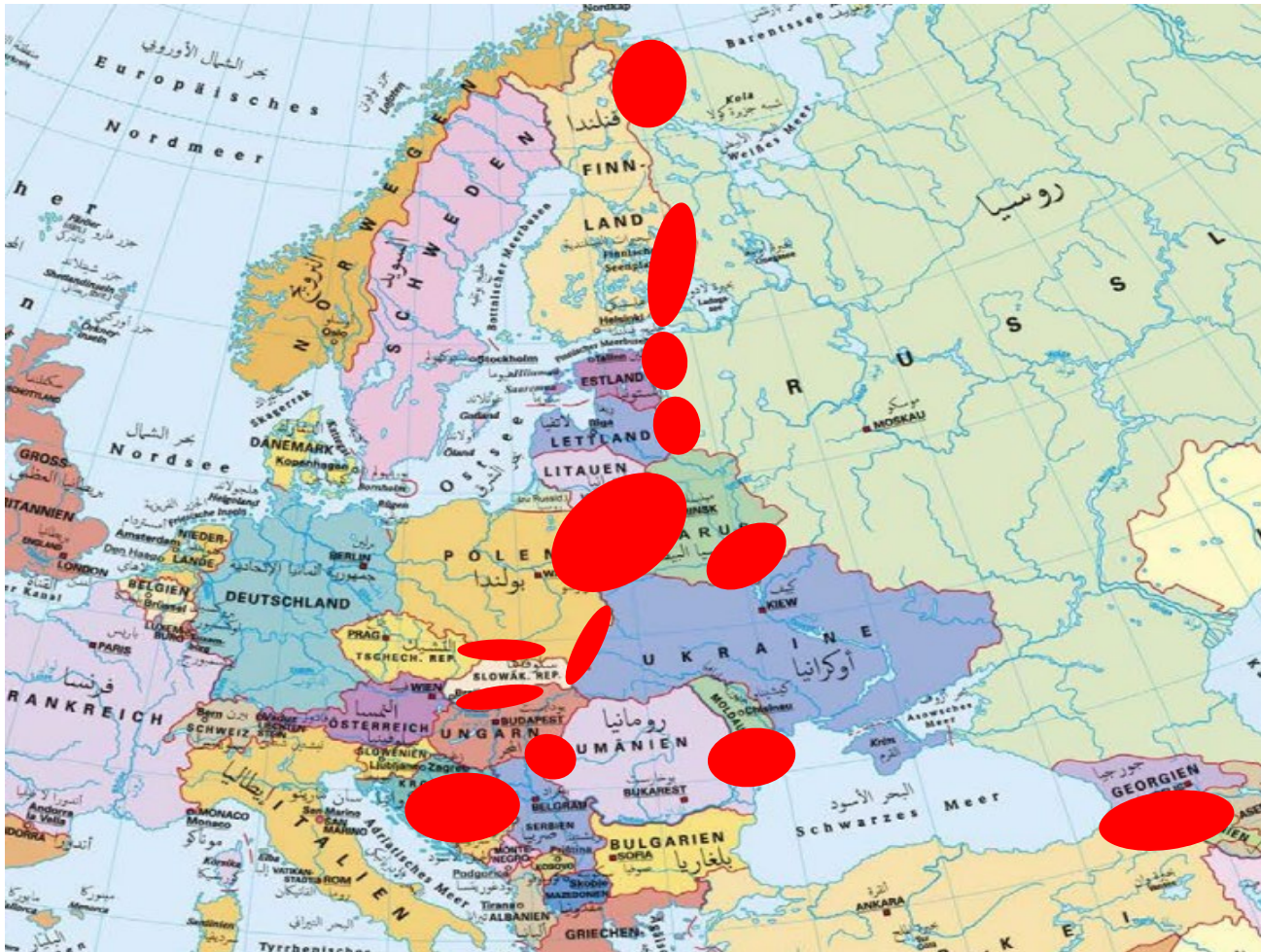


definitions

- technology assessment: Understanding the risks of new technologies and incorporating them into an assessment of social values and norms
- future research: Development of alternative future (normative, explorative) developments, taking into account technical, social, political, economic and ecological paths.

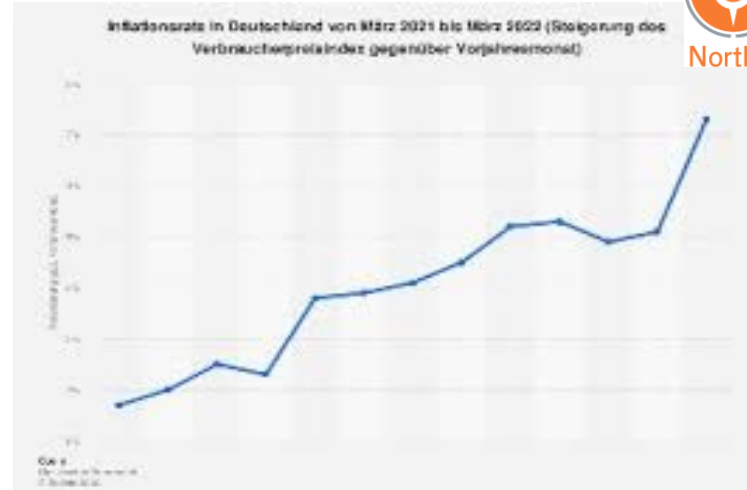
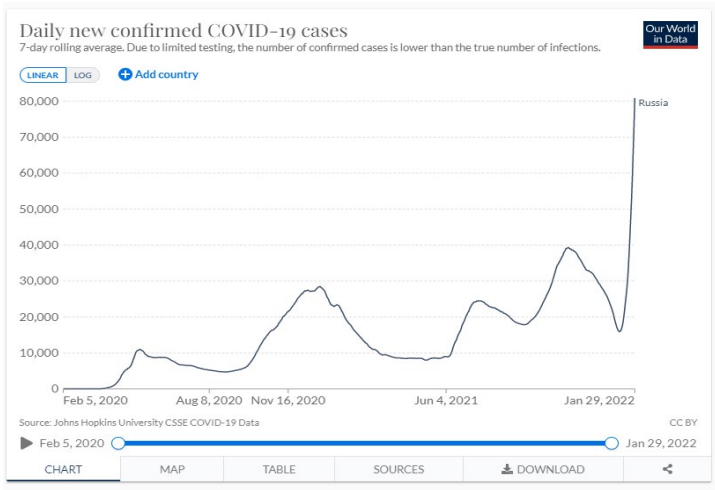


Futurology is the scientific study of possible, desirable and probable future developments and options as well as their preconditions in the past and present. (Kreibich 2008, Gerhold 2024)



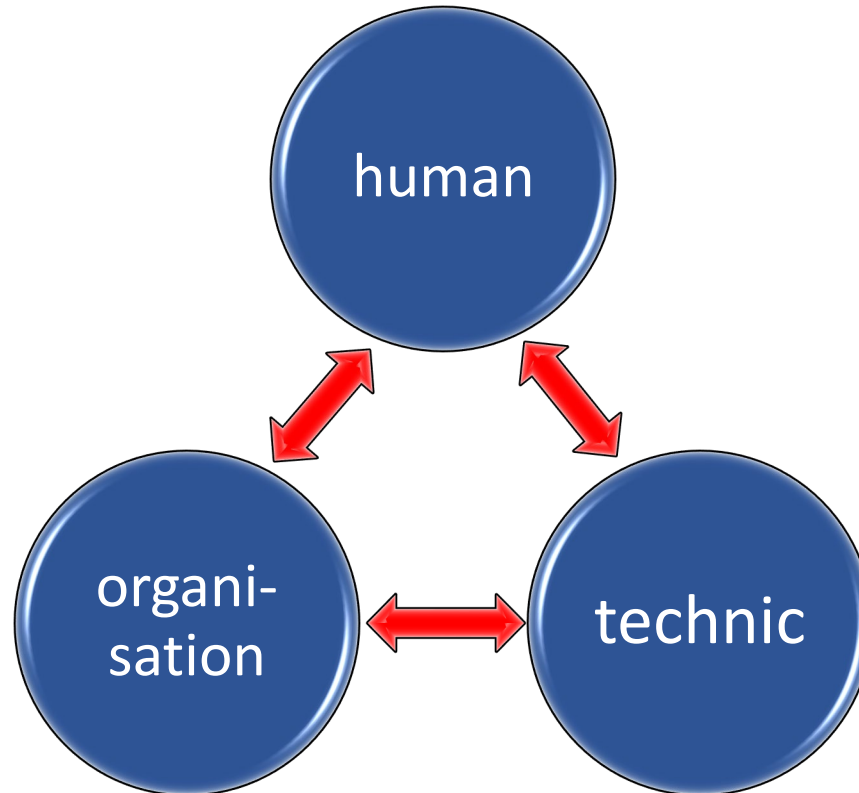
Cleavages

- old and new
- wet dreams?



positive drivers

system hardening



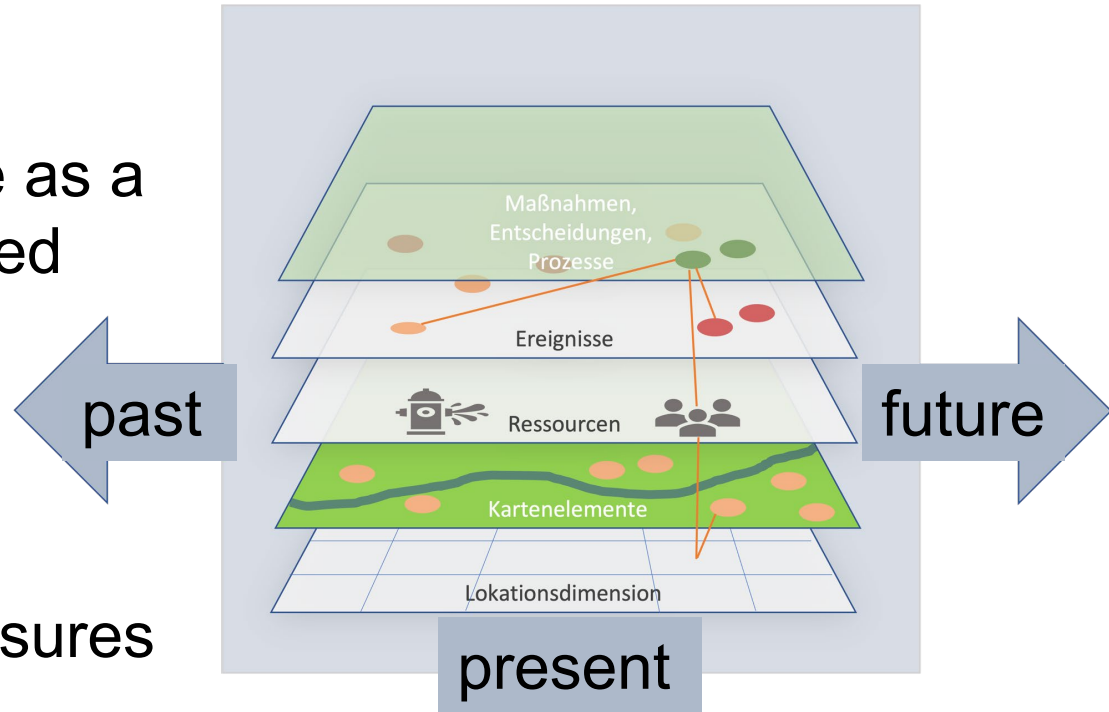


SPELL

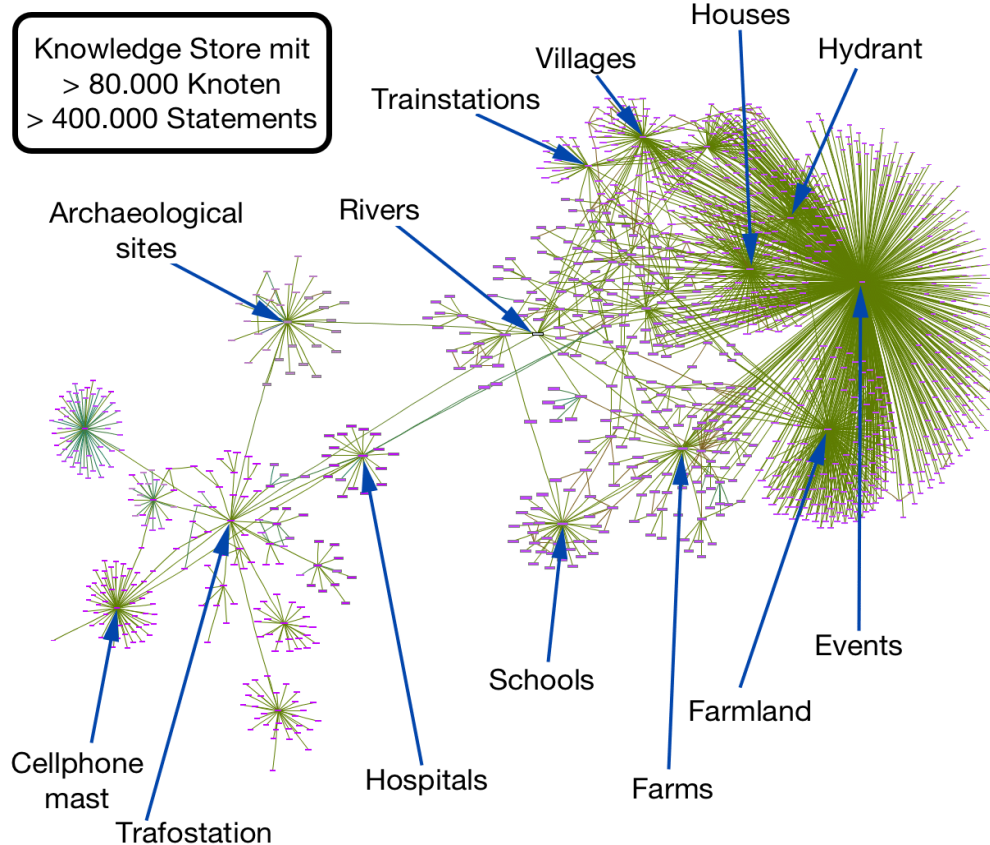
layer model

central knowledge base as a starting point for AI-based value-added services.

mapping in a layered model with map data, resources, events, measures and processes.



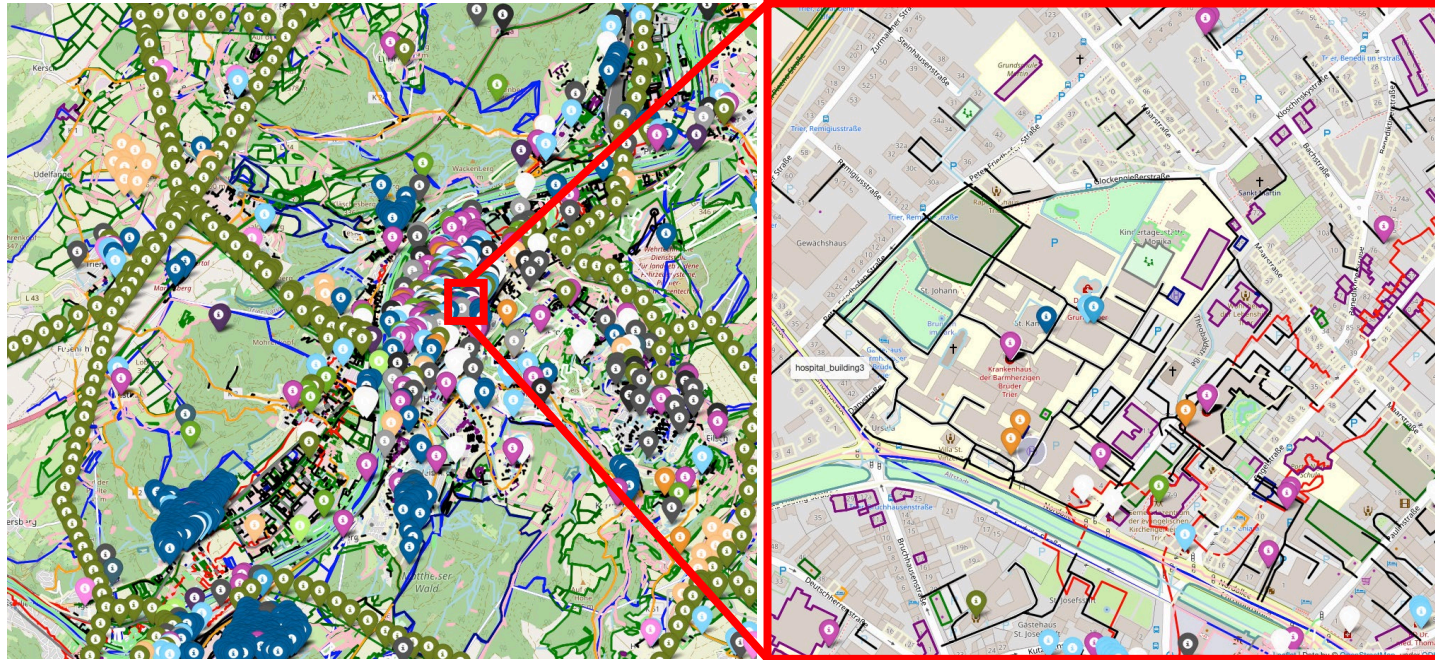
Example



SPELL –
knowledge
base
City of Trier

Example

SPELL – city map (Trier)



example

SPELL – simulation flood (Trier)

By adjusting a single variable (water level), a flood can be simulated in the model region.

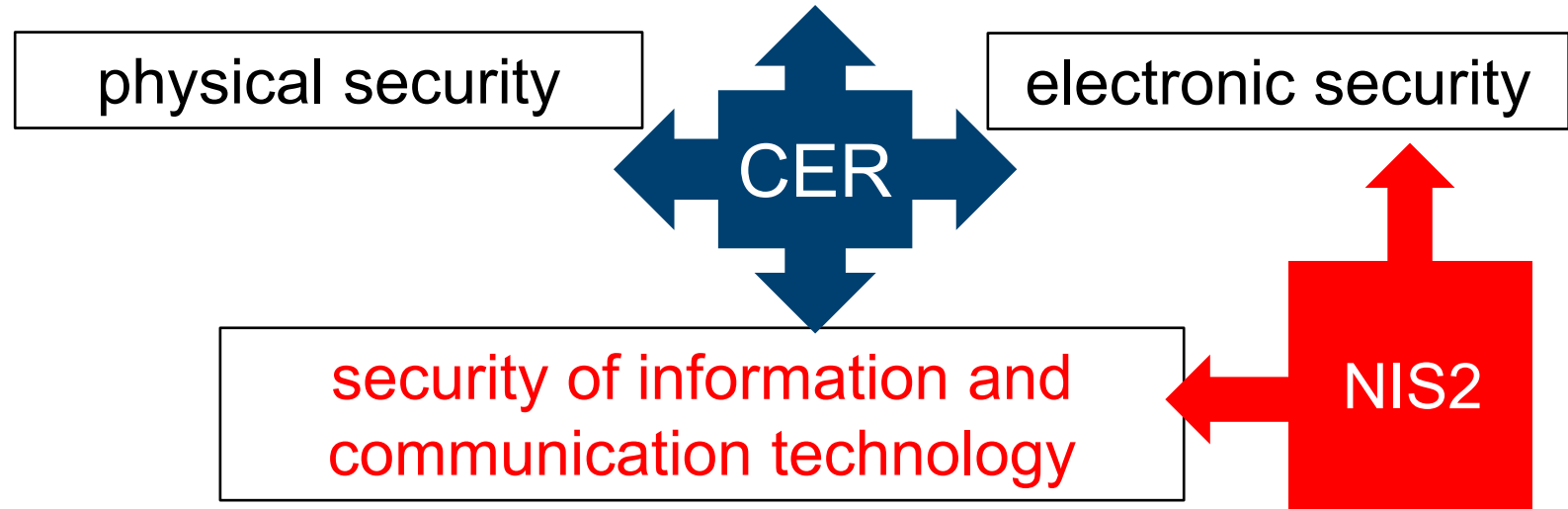
This allows various questions to be addressed.

1. How can people at risk in an affected region be identified and informed about hazards?
2. How can volunteers in crisis areas be quickly integrated into the work by providing the necessary data and information?
3. How can decision-makers, emergency services, politicians, etc. use a semantic dashboard to keep track of the increasing amount of information?



Example: law

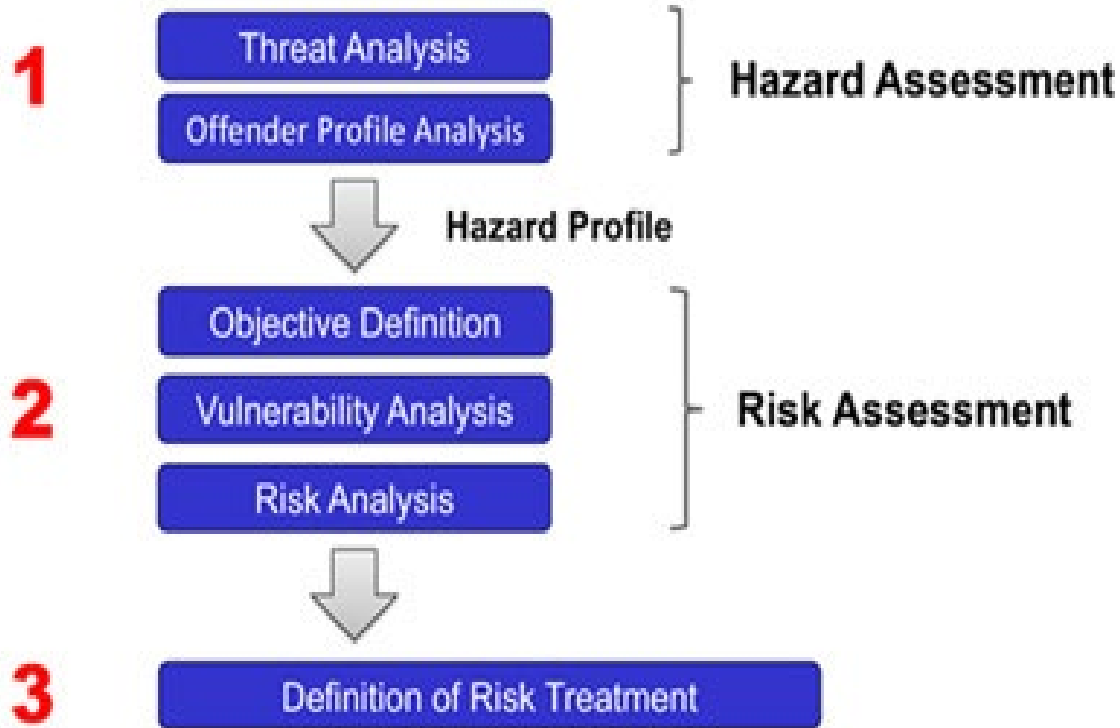
security and information management



Example CER

- definition and demarcation of critical areas and institutionalized cooperation are important aspects
- creation of cross-sector regulations to minimize obstacles to cooperation and exchange
- possibility for associations to draw up minimum standards for operators
- mandatory risk analyses and assessments both by the state and by operators (first after 9 months, then every 4 years)
- resilience plans based on risk analyses and assessments (to be submitted every two years)
- establish central incident monitoring and appoint a contact point
- reporting via BBK and BSI





National resilience strategy and Europe

- a national strategy to improve resilience by January 17, 2026
- special requirements for plants and installations of particular importance for Europe (> 6 member states)
- national and EU-wide warning system for other operators/states
- reliability and accountability

conclusion

- laws
- step in the right direction
- new jobs and businesses
- resillience
 - catastrophe dementia
 - diffusion of responsibility
 - concerted unfairness
- evaluation and development
- system thinking

Thank you very much for your attention!

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