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# National critical infrastructures: The need for addressing cascading effects and cross-sector governance

JONAS JOHANSSON | LUND UNIVERSITY | SWEDEN | 20240730  
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# Jonas Johansson

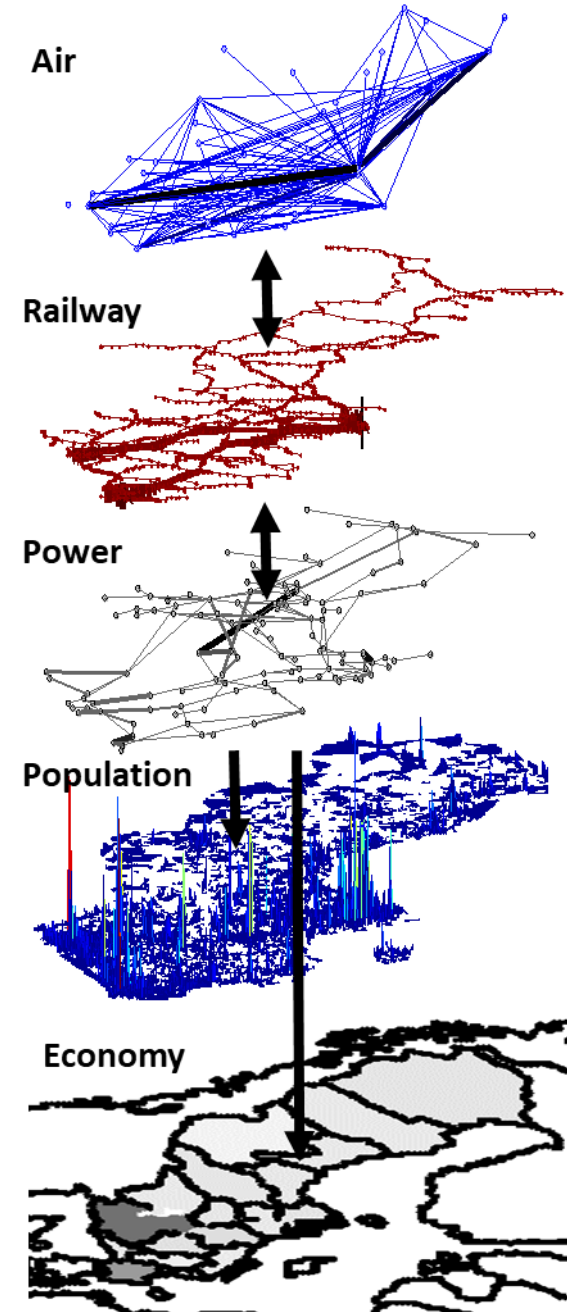
Associate Prof., Div. Risk Management and Societal Safety, Lund University  
Director Centre for Critical Infrastructure Protection Research (CenCIP)

- Critical Infrastructures

- +20 years of Critical Infrastructure research
- 7 years as senior infrastructure risk management advisor
- Focus sectors: Energy, Transport, Telecom, Water, etc.
- Director of **CenCIP** at Lund University
  - Centre-of-Excellence for the Swedish Civil Contingency Agency (MSB)

- Critical Infrastructure ↔ Crisis Management

- **Interdependencies** of critical infrastructures
- **Societal consequences** arising at local, regional, national and international levels in **crises and disasters** related to critical infrastructures
- **Governance** and **management** of critical infrastructures
- **Security of supply** and **Climate change adaptation**



# From a European and Swedish perspective

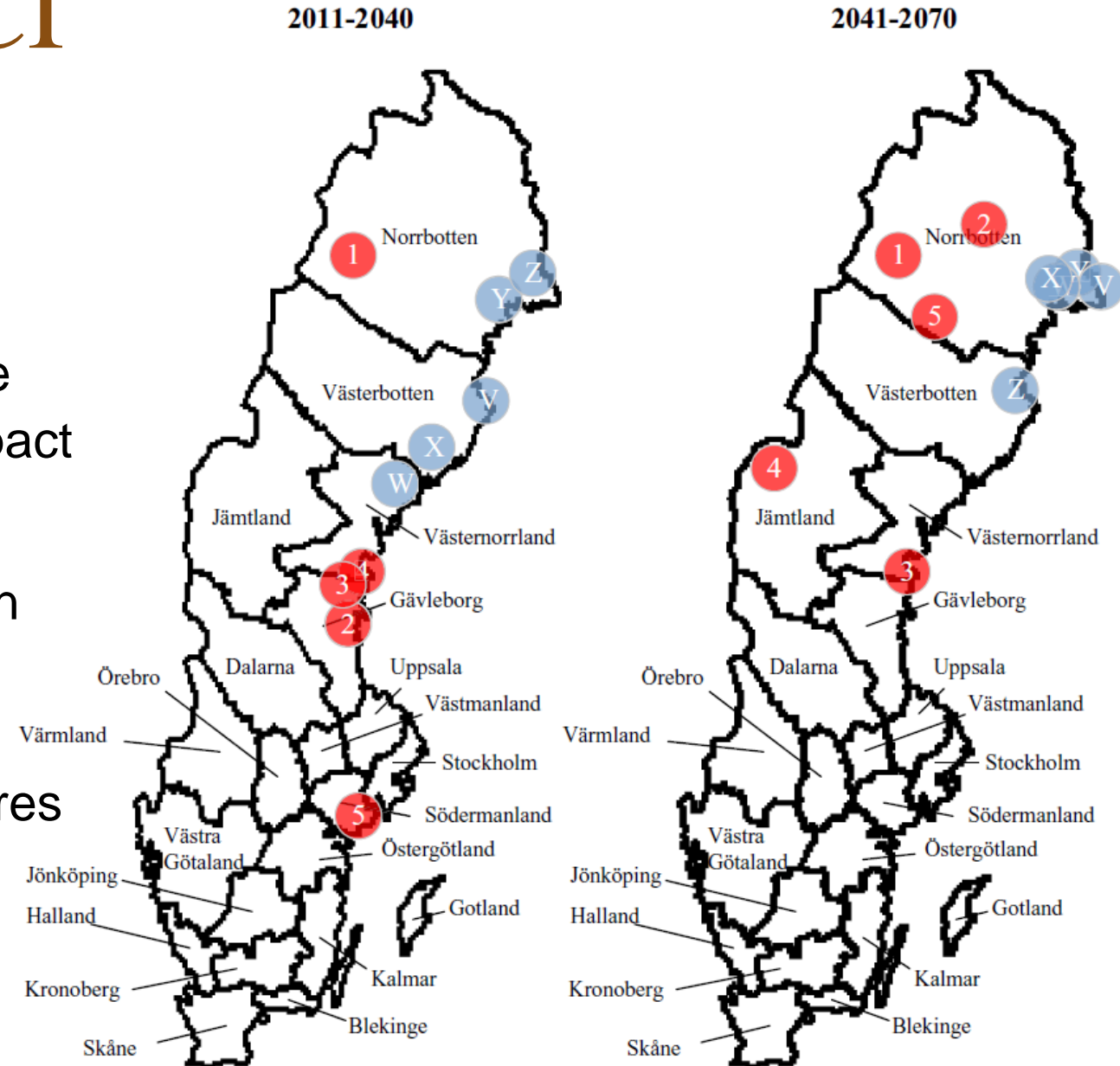
- Some requirements on national cross-sector analyses
  - EU National Risk Assessments for Disaster Risk Management (EU, 2019/420)
  - EU Critical Entities Resilience Directive (EU, 2022/2557)
  - NATO Seven baseline requirements for civil preparedness
  - Swedish national security of supply concerns in defence context
- Hence a need of a Swedish national capability for cross-sector analyses of interdependent critical infrastructures
  - Total defence context
  - Identification of critical entities
  - Climate change adaptation actions
  - Addressing systemic cross-sector risks
  - Policy and regulation of sectors



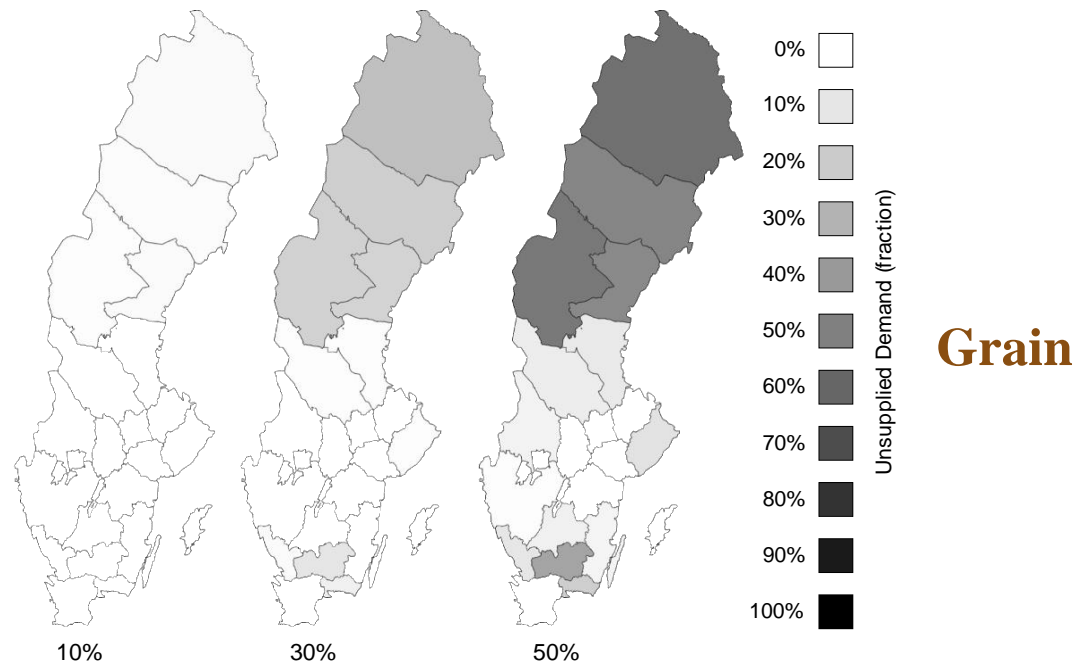
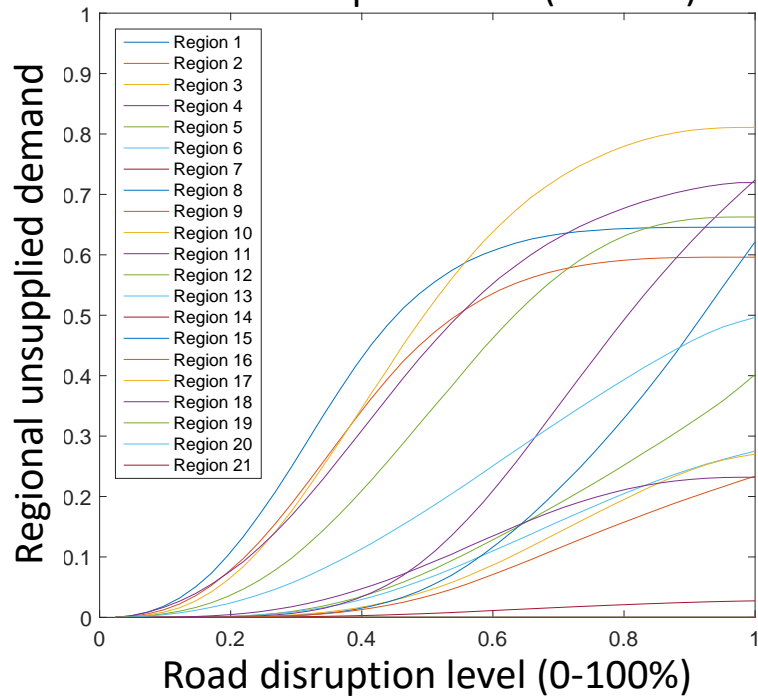
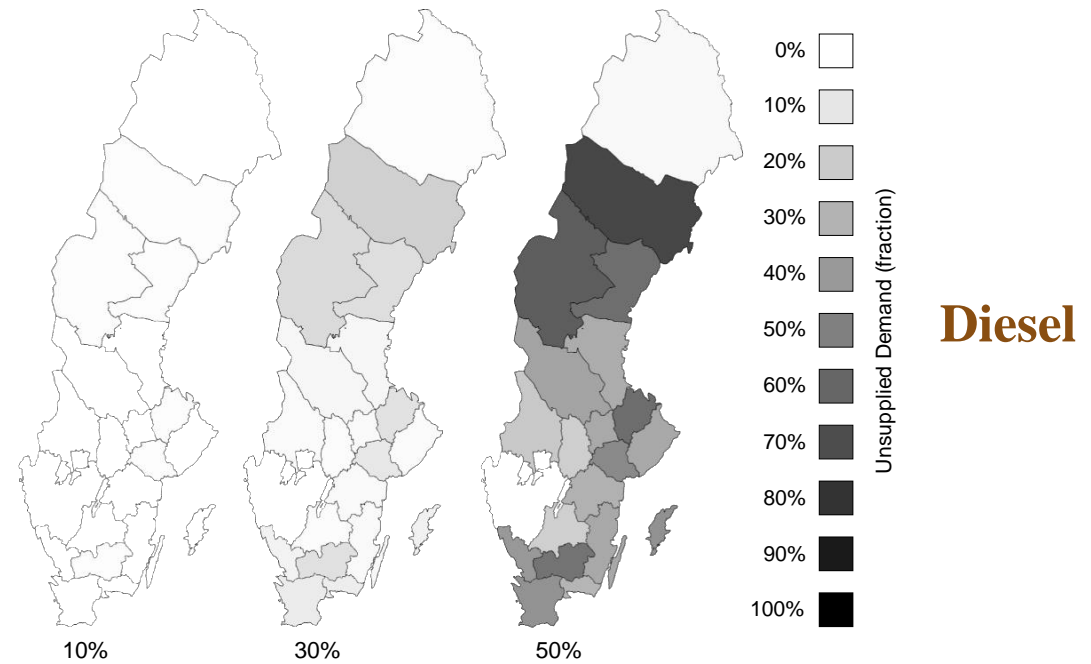
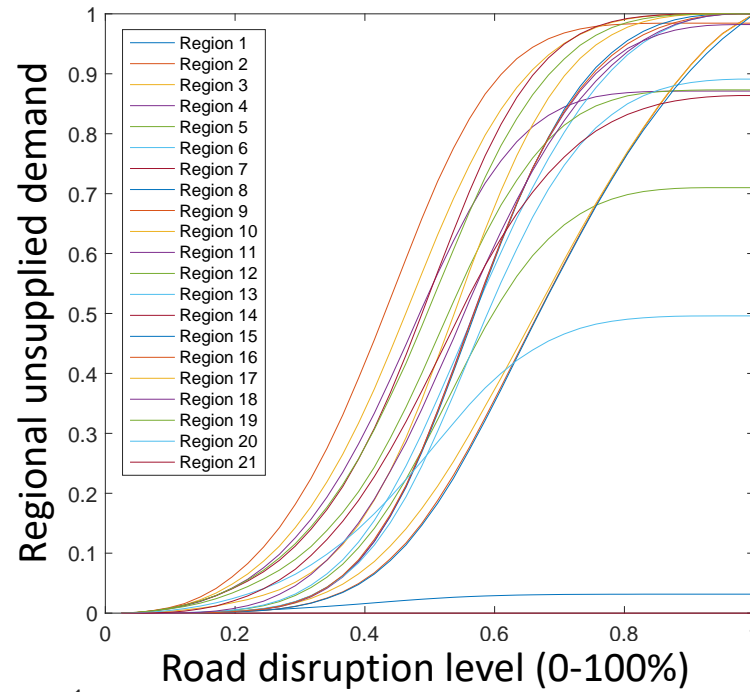


# Climate adaptation CI

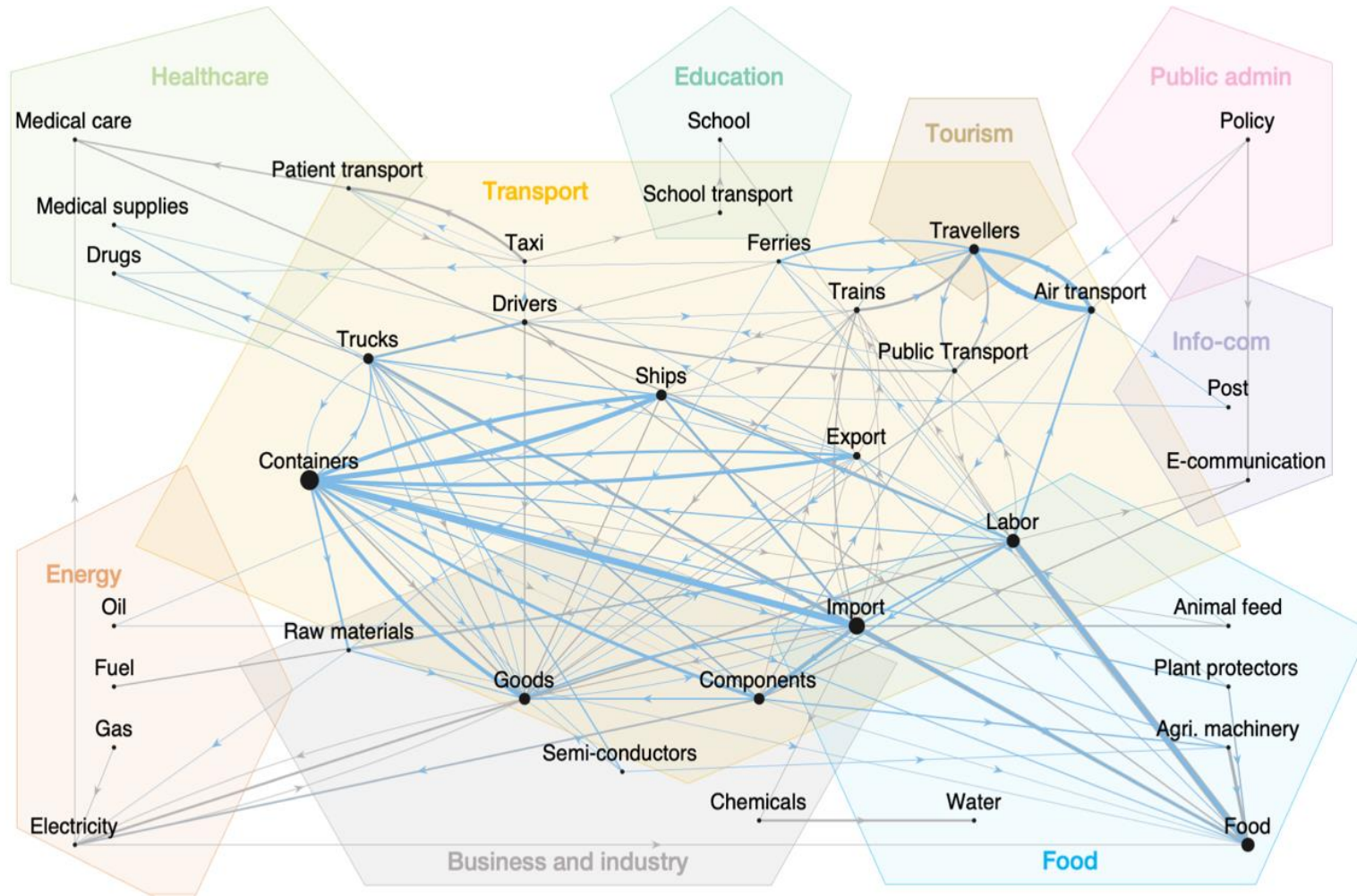
- Areas of risk for local scour of bridge fundamentals varies depending on projected climate change time horizon
- Not certain that a worse climate change scenario (RCP8.5) results in higher impact than a less severe (RCP2.6)
- Need of research to guide CI adaptation
  - From national to local resolution
  - Actual impact on infrastructures
  - Compound effects across infrastructures
  - Future infrastructure designs, e.g. large scale penetration of offshore wind power in combination with a changing climate



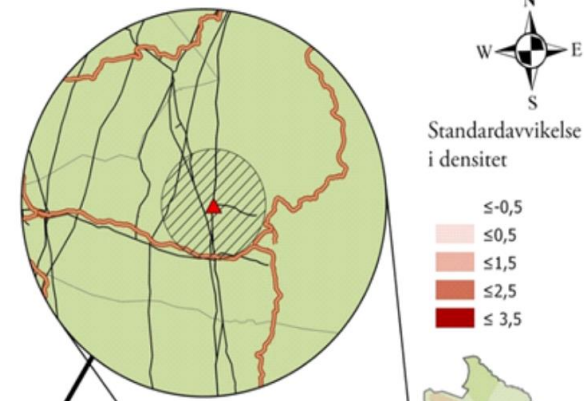
Need to integrate and understand national critical infrastructure resilience impact on supply chain resilience



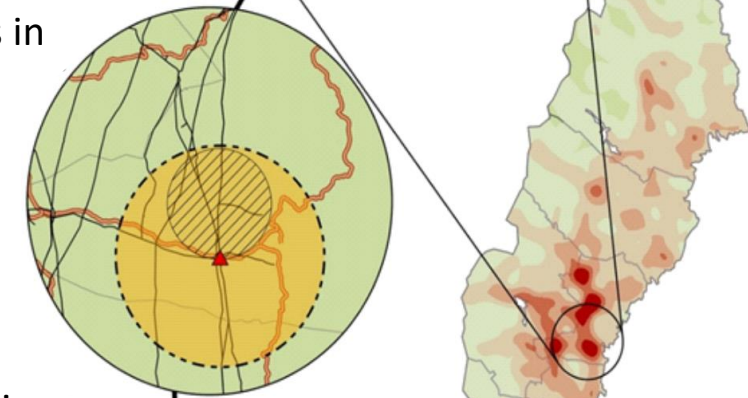
# Need of data for analysing and addressing interdependencies and cascading effects



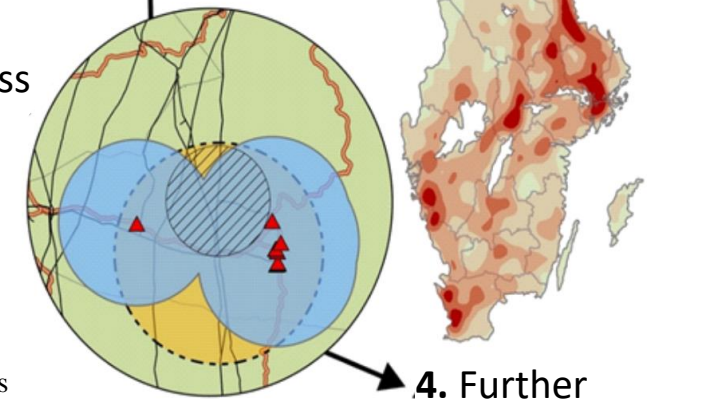
1. Initiating flood event disrupting power station



2. Impacting railway operations in larger area



3. Disrupting industries and business

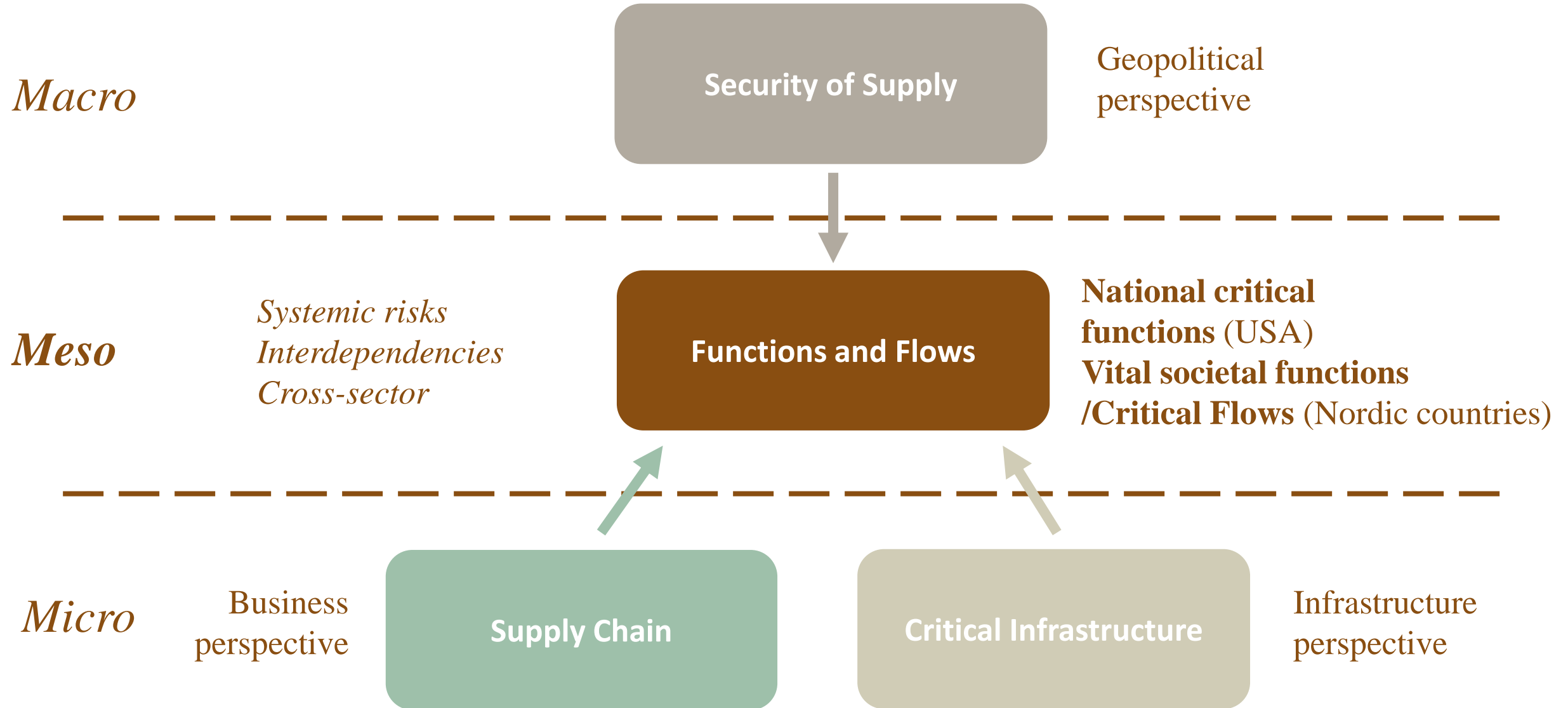


4. Further disruptions to other vital societal functions

- Railway
- Power
- ▲ Disruptions
- ▨ Impacted areas due to disruptions
- ▨ Power supply
- ▨ Business and industry
- ▨ Rail transportation

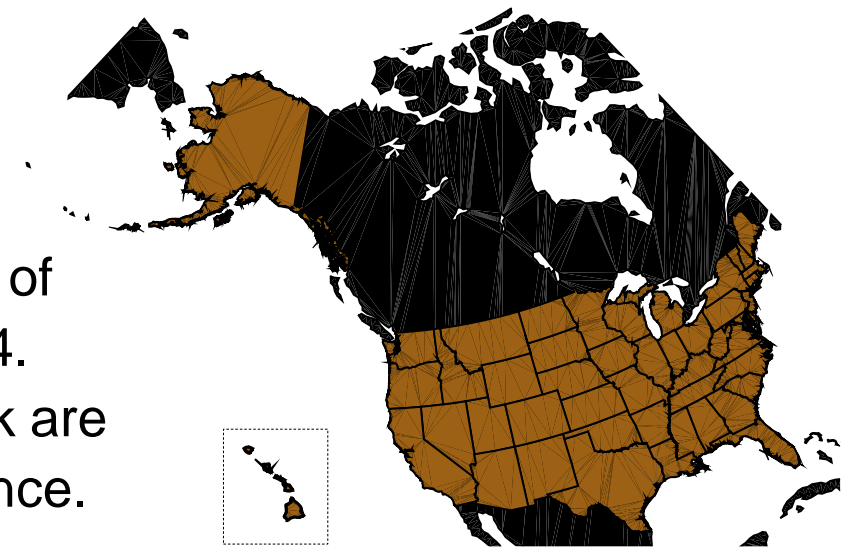


# Need of a Meso perspective to complement traditional



# JEDI-CI

- The U.S. DHS and Sweden’s MSB initiated the Joint Exchange of Data and Information on Critical Infrastructure (JEDI-CI) in 2024. Challenges in analyzing and managing critical infrastructure risk are not unique to any nation – collaboration across nations of essence.
- Focusing on
  - Developing methods addressing the interdependent nature of national critical functions from a systemic (meso) perspective across sectors and infrastructures
  - Proof-of-concept study with case application in both the U.S and Sweden
- Aiming at
  - Towards improved analysis capability and cross sector governance related to systemic questions such as “what societal impacts and cascading effects arises given disruptions in a specific function?”





# Contact

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