

The Global Transboundary Climate Risk report 2023

#AdaptationWithoutBorders

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Online webinar
20 April 2023

The report provides a **first comprehensive package** analyzing and assessing transboundary climate risks. It provides a collection of evidence and case study analysis to better understand their dynamics and impacts; and insights into multi-scale policy and governance solutions.

Structure:

PART I. Characterization of transboundary climate risks

- characterization and dynamics
- identification of 10 risk themes

PART II Assessment of 10 transboundary climate risks

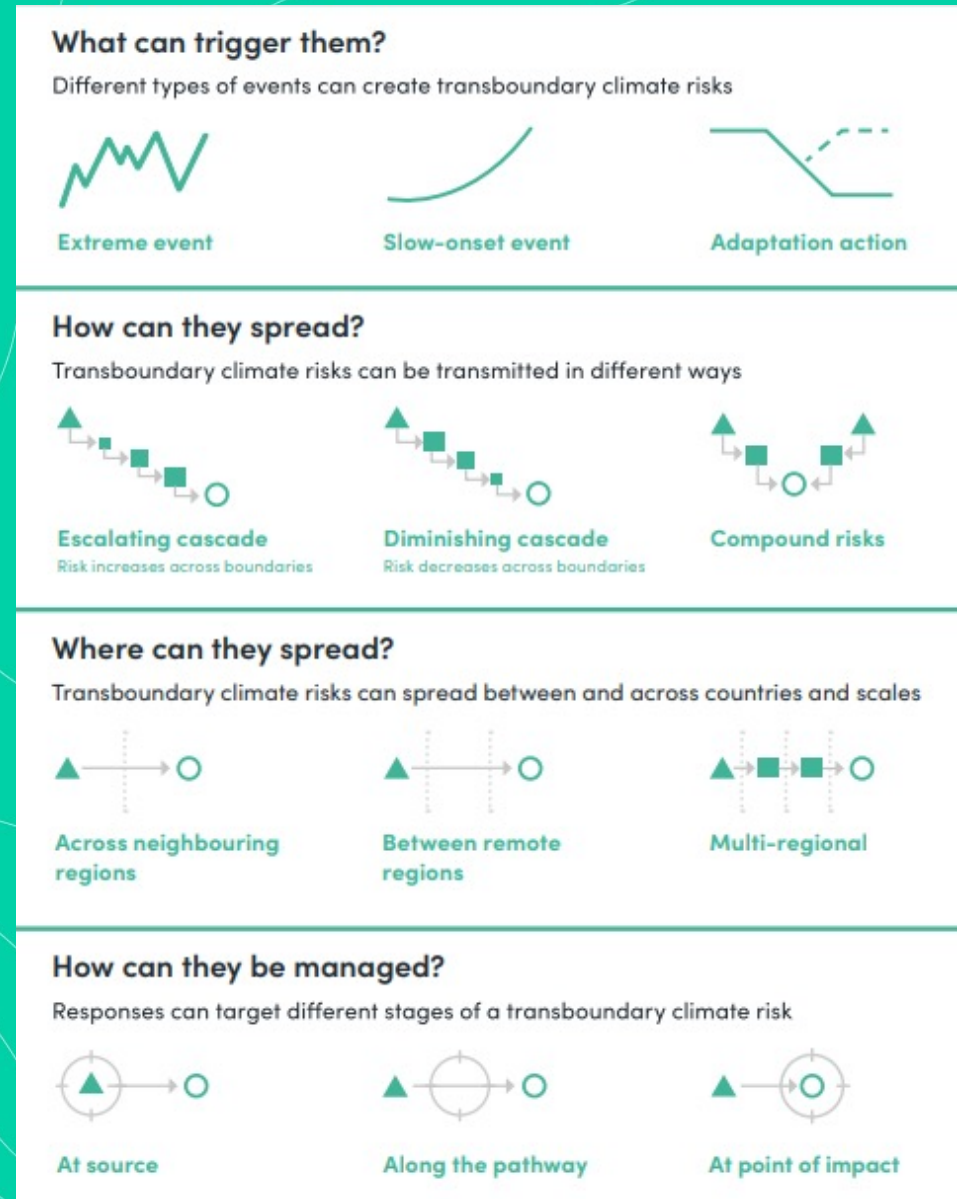
- illustrative case studies: assessment exercise and policy gaps

PART III policy solutions

- policy and governance across scales
- ways forward for a cross-TCR assessment

Characteristics of dynamic transboundary climate risks (cross border, cascading risks):

- **Triggers** - climate-related hazards and adaptation responses (maladaptation)
- **Spatial and temporal dynamics** – across networks (how & where they spread)
- **Impacts** (direct and indirect)– people, development, sectors
- **Stages of preparedness and management** (adaptation)



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The report identifies **10 globally significant transboundary climate risks** across ecosystems, economies and societies, and a cross-cutting theme

Ecosystems

Terrestrial shared natural resources



Ocean and coastal shared natural resources



Economies

Agricultural commodities



Industrial supply chains



Energy



Finance



Societies

Human health



Human mobility



Livelihoods



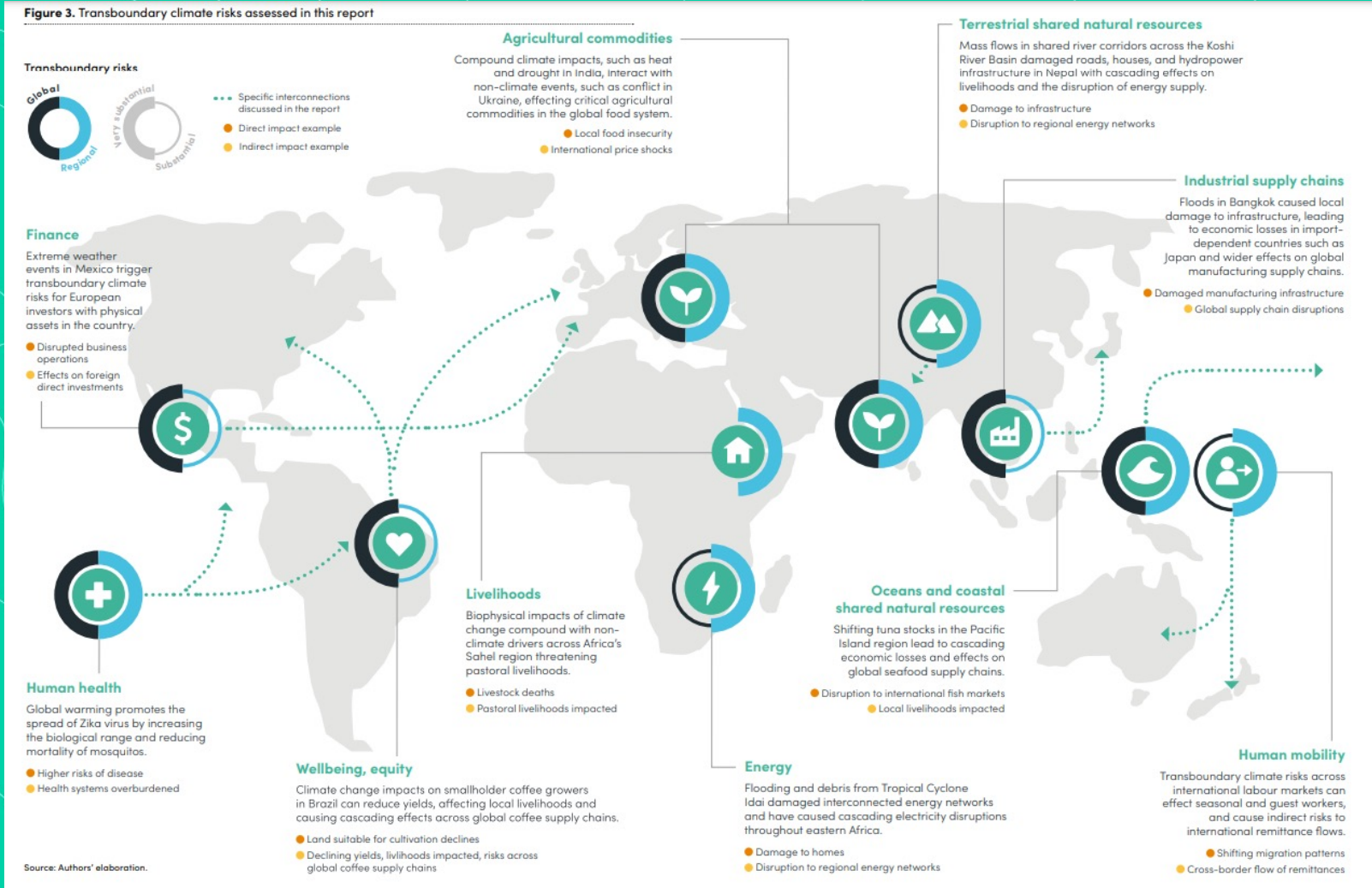
Cross-cutting

Well-being



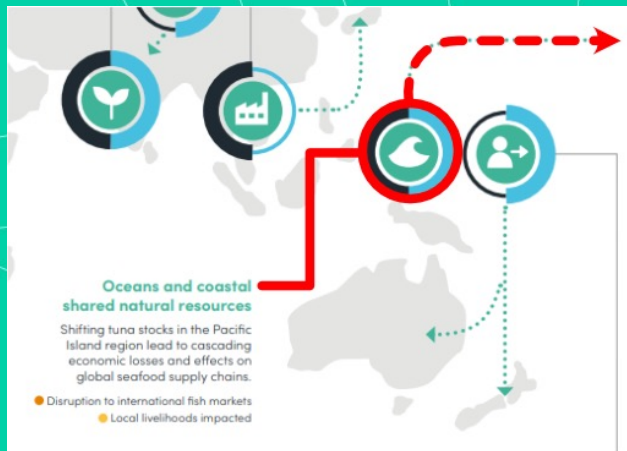
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Illustrative case studies across the 10 deep dive chapters:
 Highlight a story of transboundary climate risk, bring forward evidence of real-world impacts, direct and indirect, and first reflections on policy gaps.



Illustrative case studies example: Shared ocean and coastal resources

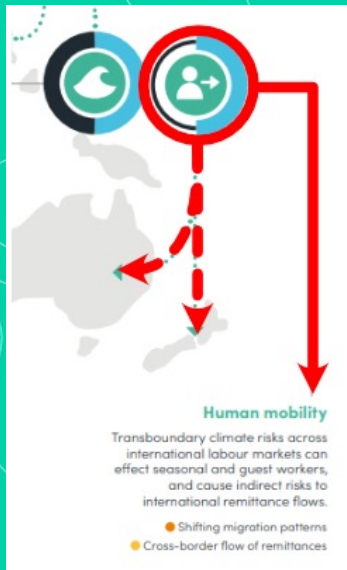
Geographical shifts of fish stock in the Pacific and implications for regional governance mechanisms such as Exclusive Economic Zones



- Triggers: ocean warming + El Niño/El/Niña trigger shifts in tuna movement
- Question raised: how to manage fish stocks outside of the national EEZ
- Response options: regional cooperation to reframe boundaries of shared EEZ zones for access
- Problem in the future: fish stocks will move in the High-Seas
 - > regional cooperation mechanisms could become obsolete
 - > Impacts of international fishing agreements (so consequences on distant regions such as Europe)
- What is the potential for existing agreements to address this problem, and which new agreements are needed ?

Illustrative case studies example: Human mobility

Temporary/seasonal labour schemes and remittances



- Climate and non-climate drivers interact and compound to influence and modify human mobility decisions, with impacts for both countries of origin and destination.
- Seasonal labour/temporary labour schemes can have indirect cross border risks on remittance flows, a financial pathway
- At the nexus of seasonal sectors and associated labour needs, and legal frameworks about borders and labour migration rules
- Climate justice issues: human rights and transformative adaptation in the governance of such schemes

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Ways forward identified:

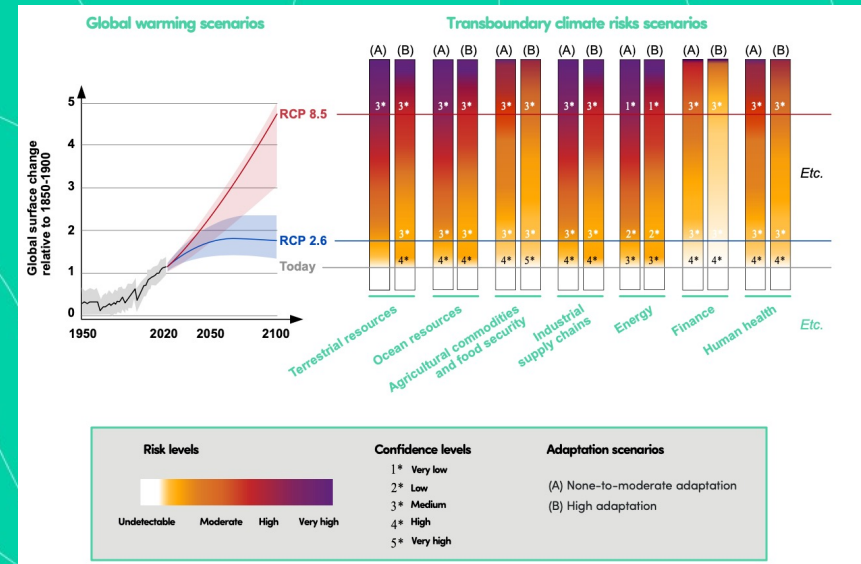
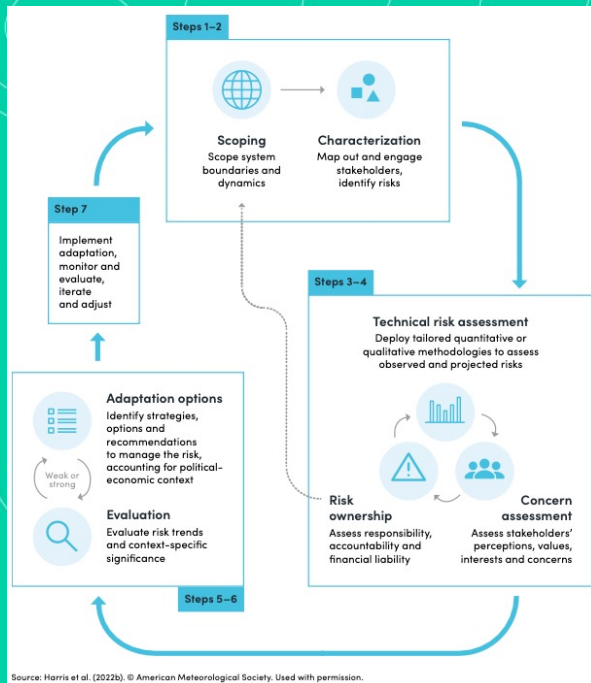
Need for a **cross transboundary climate risk assessment** to compare risk levels and prioritize actions:

- dynamic systemic risks, dealing with data availability
- opportunity: expert judgment approaches

Clarify a research protocol to understand TCRs...

... and identify indicators to describe TCRs today

+ develop methods to explore the (potential) future of TCRs (e.g. IPCC-like expert judgment)



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Identification of gaps in policy and governance:

Challenges of:

- risk ownership and coordination across scales
- Who does what and when to prepare for and manage these risks?

Opportunities:

- map out policy and governance arrangements building on existing and create new ones
- Regional arrangements as an entry level for exploration.



Ways forward:

Need for a **cross transboundary climate risk assessment** to compare risk levels and prioritize actions:

- dynamic systemic risks, dealing with data availability
- opportunity: expert judgment approaches

Gaps in policy and governance:

- Challenge of risk ownership and coordination across scales
- Who does what and when to prepare for and manage these risks?
 - Opportunity: map out policy and governance arrangements - building on existing and create new ones
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Understand **transboundary maladaptation**:

- adjust to political sensitivities
- but opportunity: reframe adaptation around shared risks and coordinated climate resilient development planning – e.g. multi-country financed adaptation projects



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Transboundary climate risks for terrestrial shared natural resources

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Mass flows across transboundary river corridors



Jakob Steiner, October 2021, Central Himalaya

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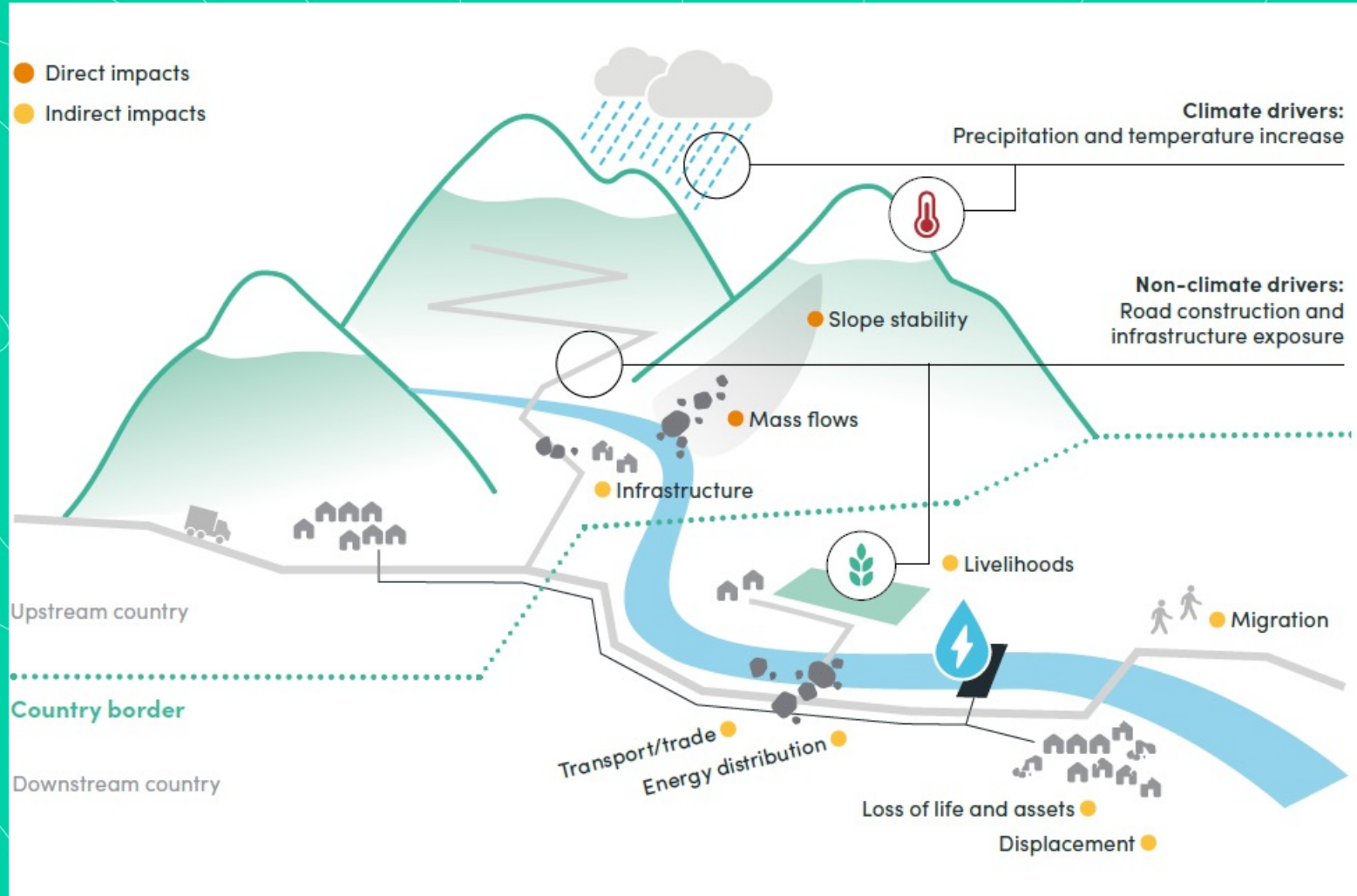
‘The disaster started the morning after the flood’



Jakob Steiner, June 2022, Central Himalaya

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Cascading risks along the corridor



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Trade



Jakob Steiner, November 2022, Central Himalaya

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Energy



Jakob Steiner, December 2022, Central Himalaya

Maladaptation

engineering responses can have **positive effects locally**, but **propagate negative effects** up-/downstream a river channel

country that hosts the **source of the mass flow** is often **not most impacted** by its downstream propagation

risks need to be **evaluated across the complete river corridor** (and eventually beyond)

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Maladaptation



Upper Indus Basin, June 2022

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Policy and Governance Mechanisms



Nepal-China Meeting at Miteri Bridge, Central
Himalaya, April 2021, Photo: DAO

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Policy and Governance Mechanisms

transboundary working groups (including scientists, technocrats and policy makers from across the river channels as well as from outside)

informal channels of communication across borders that bypass national capitals (temporarily)

lacking:

- coordination in policy responses across borders
- appreciation of the knock on effects/risks that propagate across borders (requires data and evidence)
- trust building in data sharing (the technology is long available)



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**Transboundary climate
risks in the energy sector**
Jinsun Lim



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1. TCR to Interconnected Electricity Networks

	Low Emissions Scenario	High Emissions Scenario
Temperature		
Precipitation (dry)		
Precipitation (wet)		
Wind (cyclones)		
Wildfires		

Source: IEA (2022), Climate Resilience for Energy Security

2. Impacts of TCR on Interconnected Electricity Networks

	Impacts on Interconnected Electricity Networks
Temperature	Reduce transmission capacity and lead to higher losses. Cause grid failures overheating networks beyond operational limit.
Precipitation (wet)	Cause floods and landslides that can physically damage networks.
Wind (cyclones)	Topple trees and branches, damaging lines, poles and transformers.
Wildfires	Cause fire and smoke which damage lines, poles and substation equipment. Causing short circuit failures, line trippings and thermal derating of overhead lines.

3. Impacts of TCR on Interconnected Electricity Networks - Case of Tropical Cyclone Idai

- Tropical Cyclone Idai hit the east coast of Africa



- Malawi: Damage to hydropower plants. Power supply disruptions
- Mozambique: Devasted coastal areas. Power supply disruptions

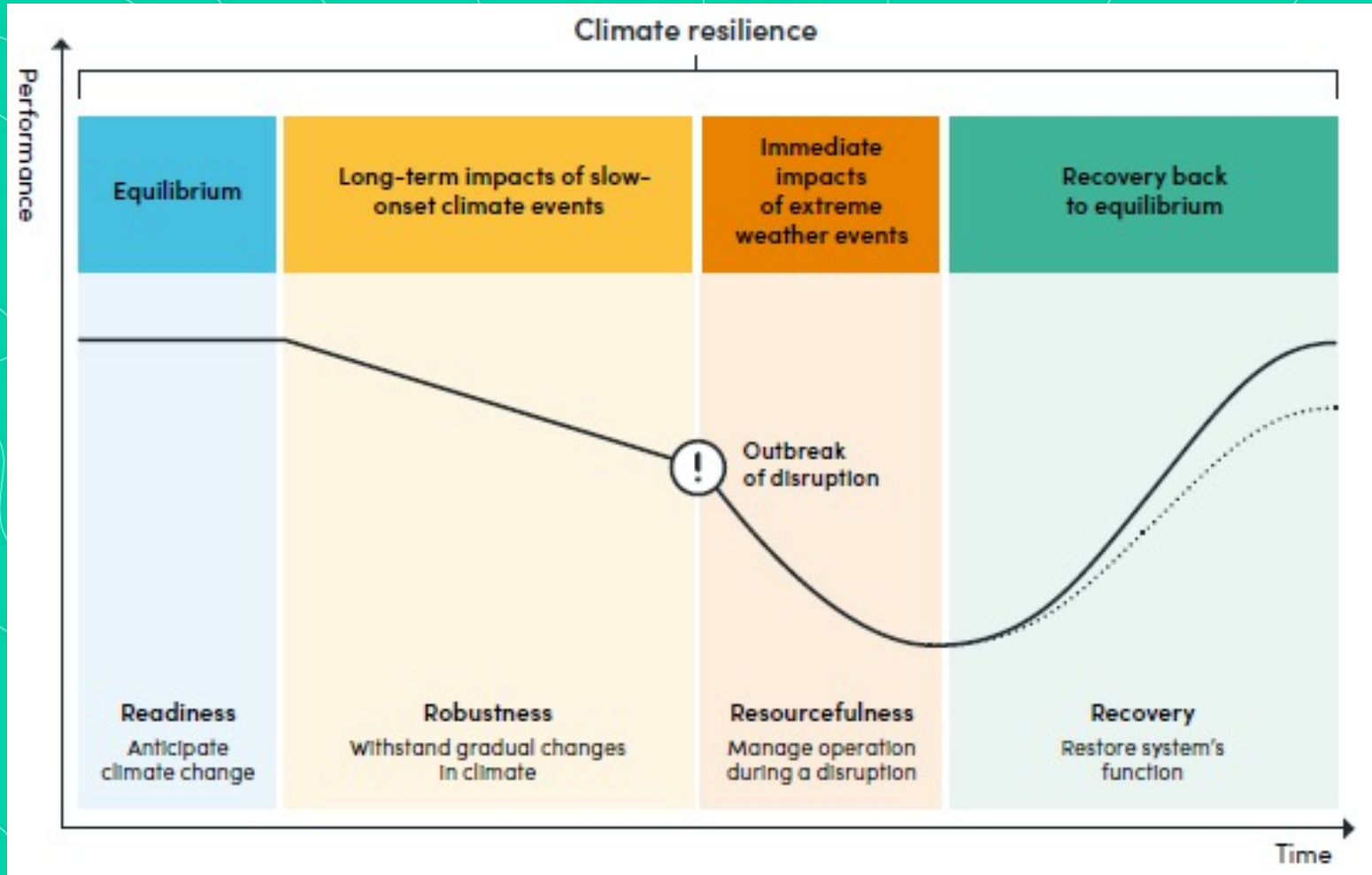


- Damage to pylons of interconnected electricity transmission lines



- South Africa: Load-shedding for weeks. Changes in demand pattern

4. Resilience against Climate Risk



5. Role of Policy Measures in Enhancing Resilience

- Why are policy measures so important in addressing climate risk?
- What should governments need to do to enhance resilience of electricity networks?
- What will be needed further for interconnected electricity network to cope with transboundary climate risks?



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The transboundary climate risk of infectious diseases

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**Imperial College
London**

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Climate change

Vulnerability



Vulnerability factors

- Demographic factors
- Geographic factors
- Biological factors & health status
- Sociopolitical conditions
- Socioeconomic factors

Exposure pathways

- Extreme weather events
- Heat stress
- Air quality
- Water quality and quantity
- Food security and safety
- Vector distribution & ecology

Health system capacity & resilience

- Leadership & governance
- Health workforce
- Health information systems
- Essential medical products & technologies
- Service delivery
- Financing

Climate-sensitive health risks

Health outcomes



Injury and mortality from extreme weather events



Heat-related illness



Respiratory illness



Water-borne diseases and other water-related health impacts



Zoonoses



Vector-borne diseases



Malnutrition and food-borne diseases



Noncommunicable diseases (NCDs)



Mental and psychosocial health



Impacts on healthcare facilities

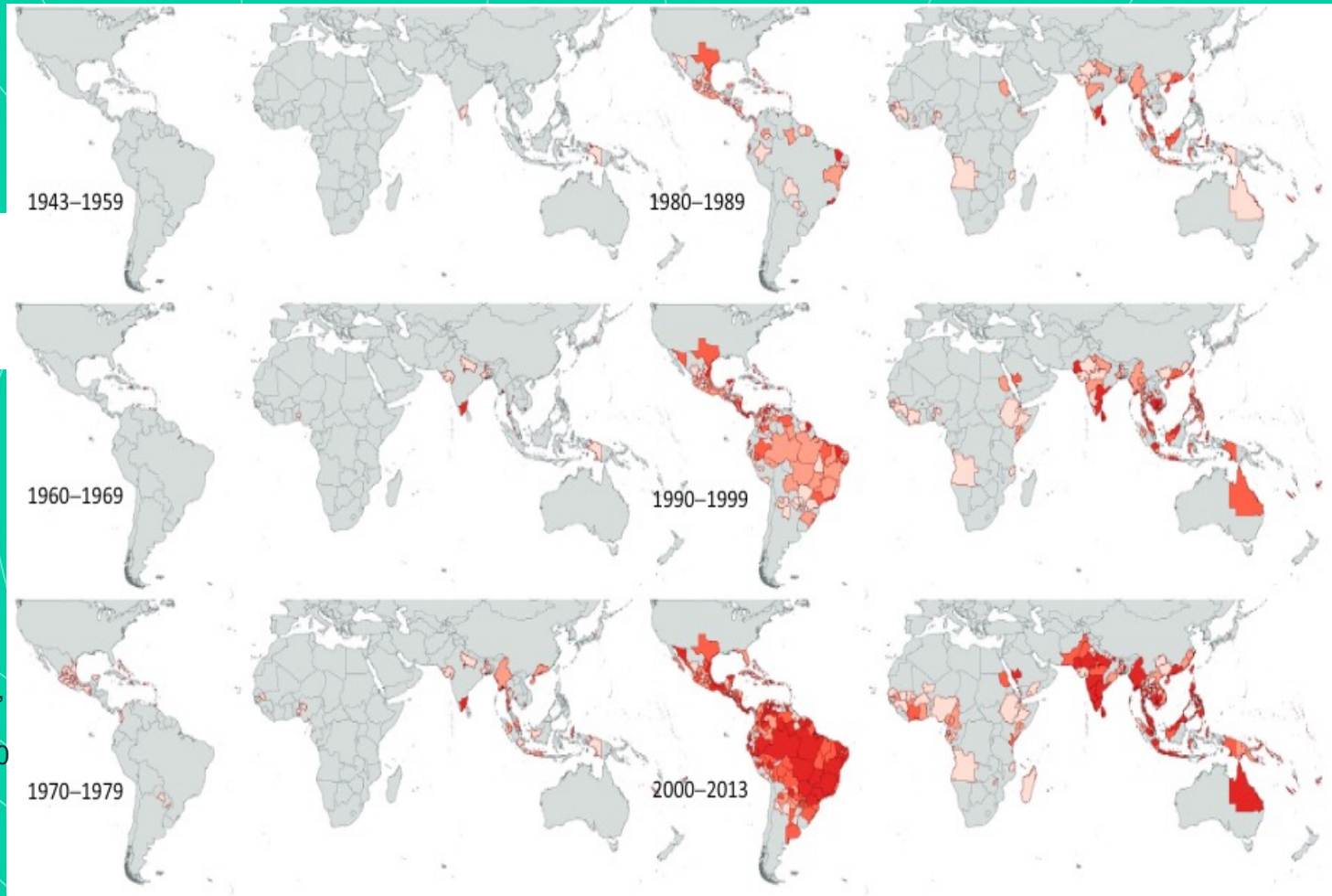


Effects on health systems

Current impacts

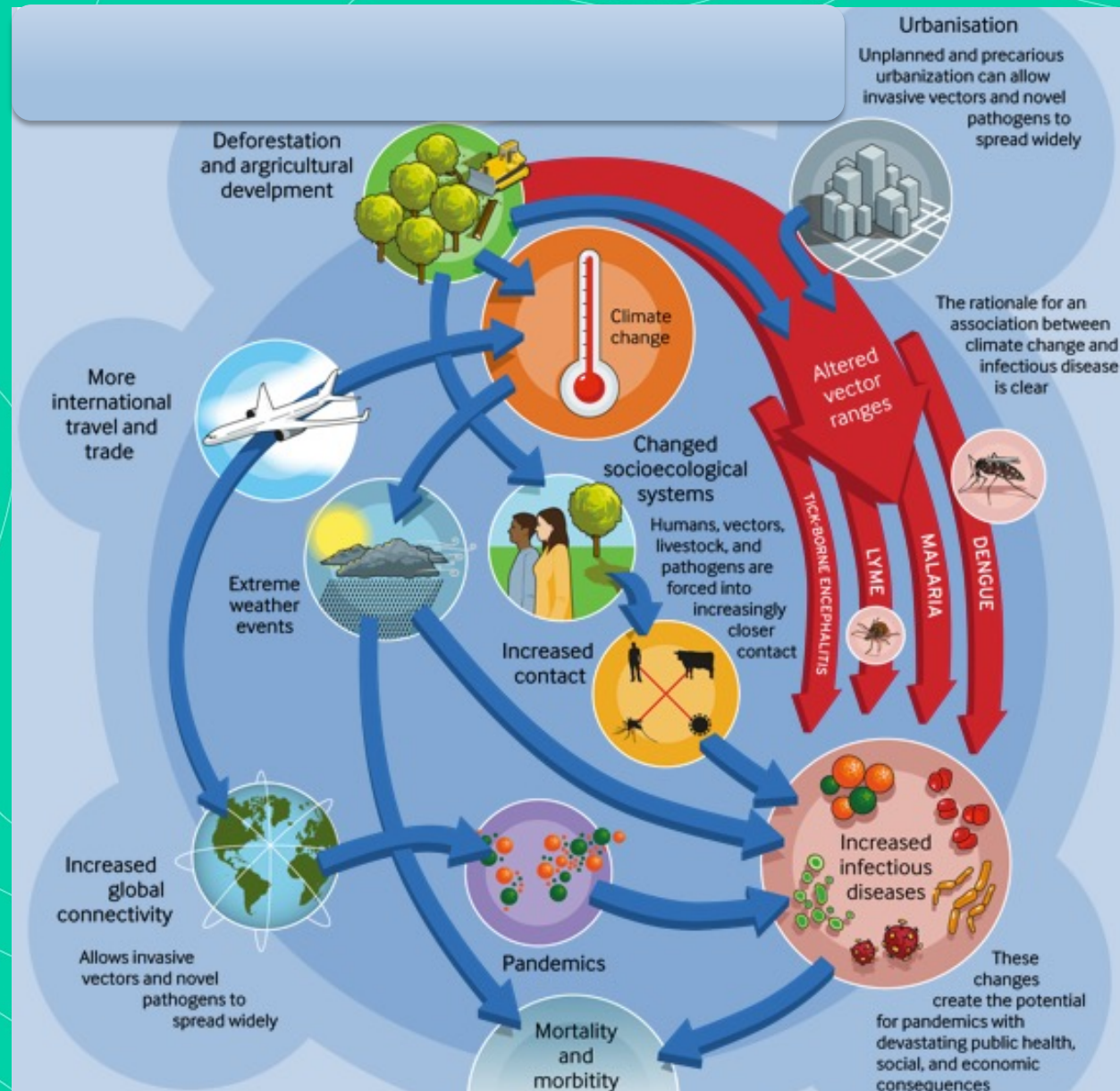
- Climate change has already influenced the spread of vector-borne infectious diseases over the past decade
- Climate sensitive diseases, such as malaria, dengue, Zika virus, Tick-Borne Encephalitis and salmonellosis, caused over 290 million cases of infection worldwide in 2019
- Changes in temperature, relative humidity and rainfall have been linked to:
 - spread of West Nile fever in south-eastern Europe
 - shifts of malaria to higher altitudes in Colombia and Ethiopia
 - shifts in Lyme disease in higher altitudes and elevations in North America and Europe
 - emergence of chikungunya virus in LAC, Italy, and elsewhere in Europe
 - increased risk in diarrhoea in areas lacking sanitation and hygiene but not only

Dengue



Messina, J. P., Brady, O. J., Scott, T. W., Zou, C., Pigott, D. M., Duda, K. A., Bhatt, S., Katzelnick, L., Howes, R. E., Battle, K. E., Simmons, C. P., & Hay, S. I. (2014). Global spread of dengue virus types: Mapping the 70 year history. *Trends in Microbiology*, 22(3), 138–146. <https://doi.org/10.1016/j.tim.2013.12.011>

Dynamics of spread



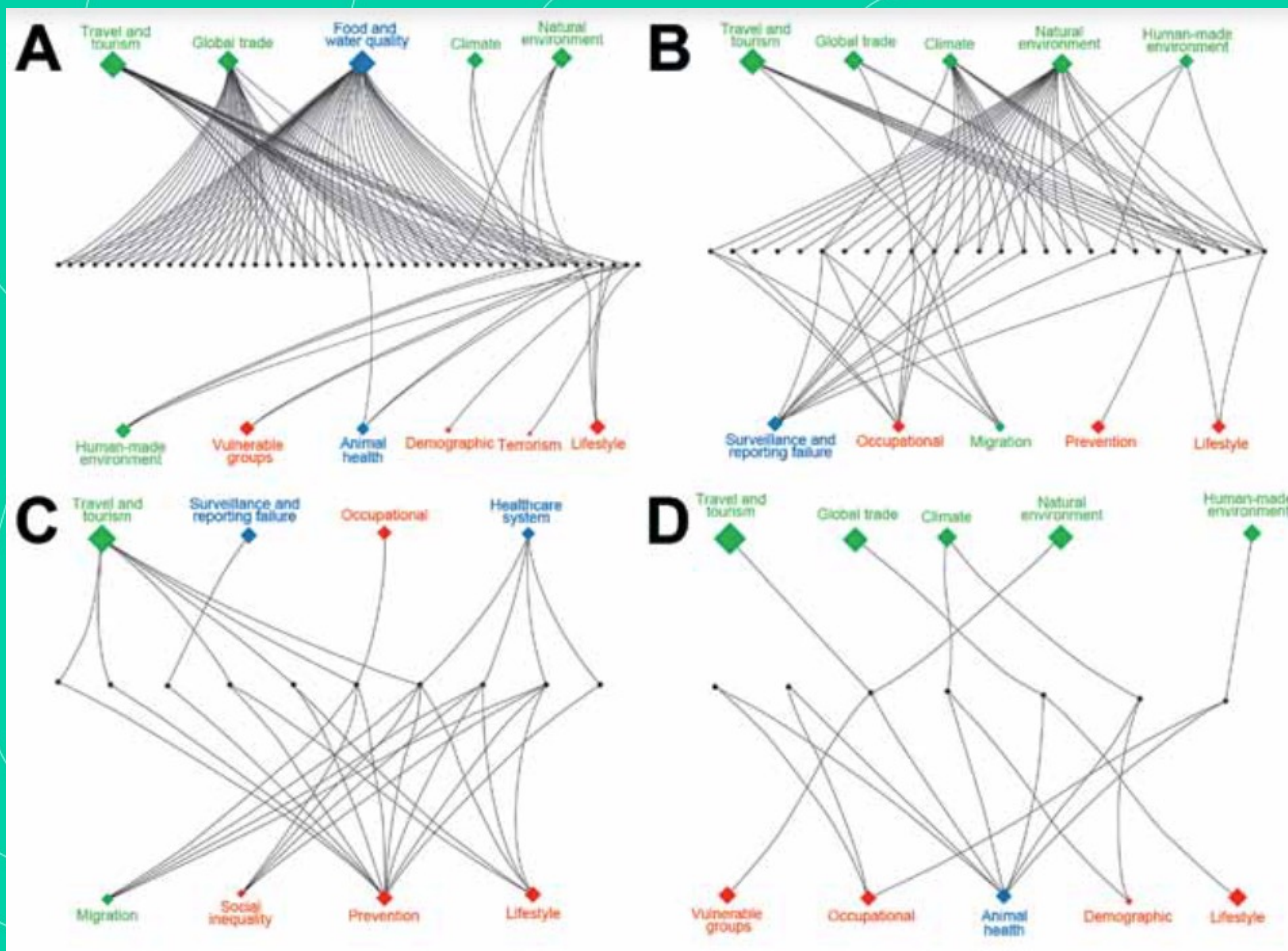
Hess, J., Boodram, L. L. G., Paz, S., Stewart Ibarra, A. M., Wasserheit, J. N., & Lowe, R. (2020). Strengthening the global response to climate change and infectious disease threats. *The BMJ*, 371(October), 1–7. <https://doi.org/10.1136/bmj.m3081>

Infectious disease threat events by contributing drivers, observed in Europe, 2008–2013

- A) Foodborne, waterborne
- B) Vectorborne, rodentborne
- C) Other zoonoses
- D) Vaccine preventable

◆ globalization, environment
◆ sociodemographic
◆ public health systems

Size indicates proportional frequency of the driver



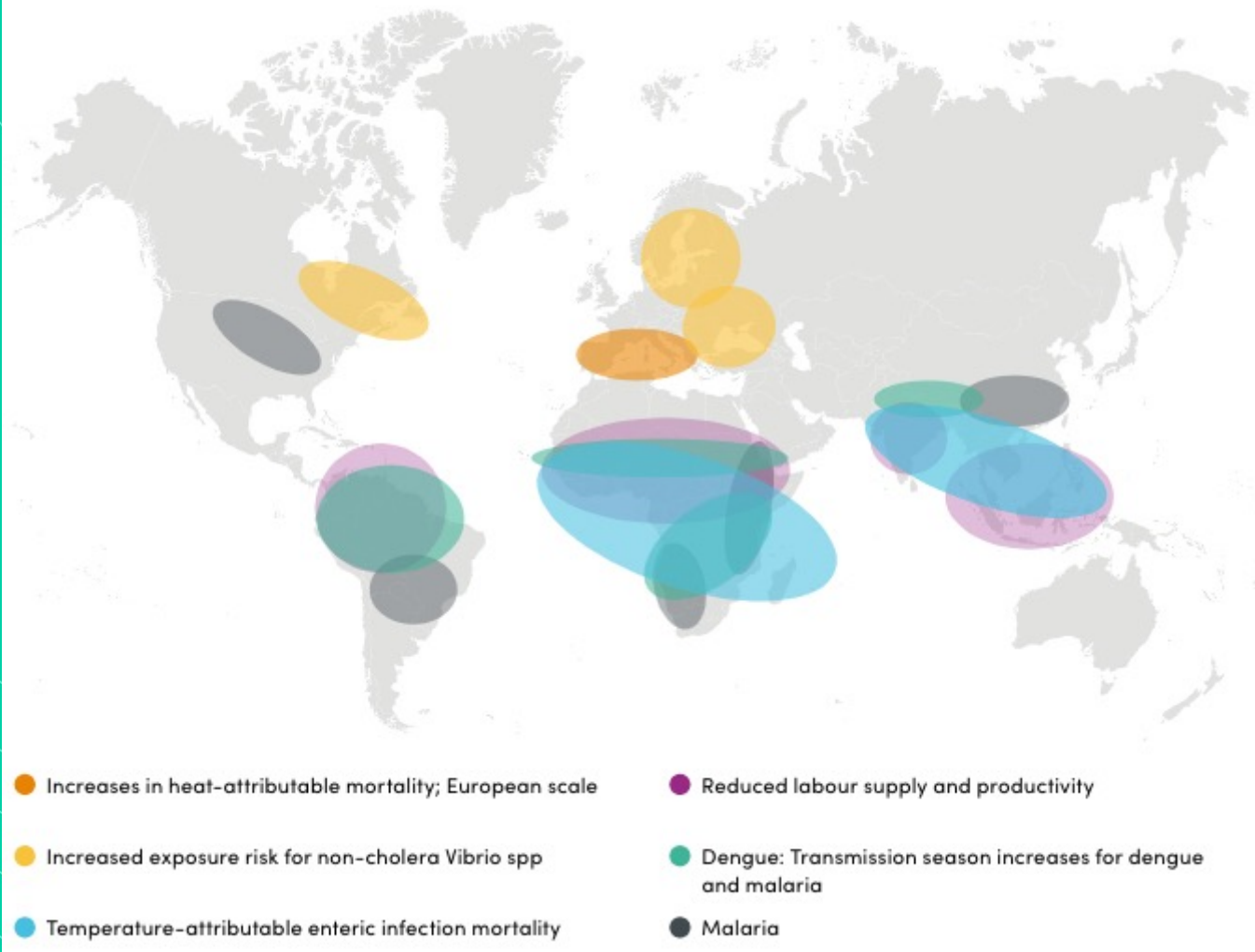
Semenza, J. C., Lindgren, E., Balkanyi, L., Espinosa, L., Almqvist, M. S., Penttinen, P., & Röcklöv, J. (2016). Determinants and drivers of infectious disease threat events in Europe. *Emerging Infectious Diseases*, 22(4), 581–589. <https://doi.org/10.3201/eid2204.151073>

Future risks

Under a scenario of 2.8°C warming:
50% of the global population will be exposed to malaria vectors by 2050

2.7 billion people could be exposed to temperatures suitable for Zika virus transmission by 2050 in the event of high global warming

Figure 12. Hotspots of climate-sensitive infectious disease risk and other climate-health risks



Responses and adaptation

- **Reactive responses**

- Integrated care management
- Integrated vector control management

- **Anticipatory responses**

- Disease surveillance
- Early warning systems
- Health system strengthening
- Vaccination
- Awareness rising about self-protection practices
- Improved water, sanitation, hygiene conditions
- Improved food processing and preservation, enhanced storage and cold chains
- Housing improvements, e.g., closing eaves, installing mosquito screens



How to address for transboundary risks

- International research collaboration
- Coordinated action, e.g., International Health Regulations
- Support to countries with limited response capacity
- Integrated climate-informed disease surveillance and early warning response systems
- Global Framework on Climate Services
- Transboundary and transdisciplinary lens in the development of appropriate adaptation solutions



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**Thank
you!**



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Cross-border risks to livelihoods

Dr Sarah Opitz-Stapleton



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Livelihoods underpin economic sectors

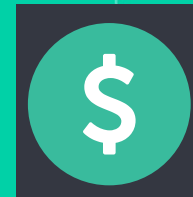
Primary



Secondary



Quaternary



Tertiary



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Livelihoods underpin economic sectors

Primary

Chapters 2.2, 2.3, 2.8 and
Chapter 2.9



Secondary

Chapters 2.4, 2.5



Tertiary

Chapter 2.7



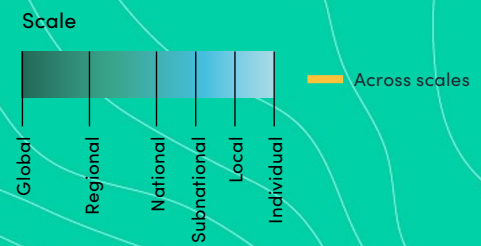
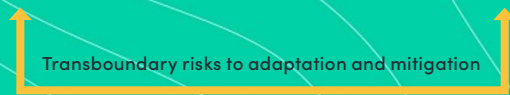
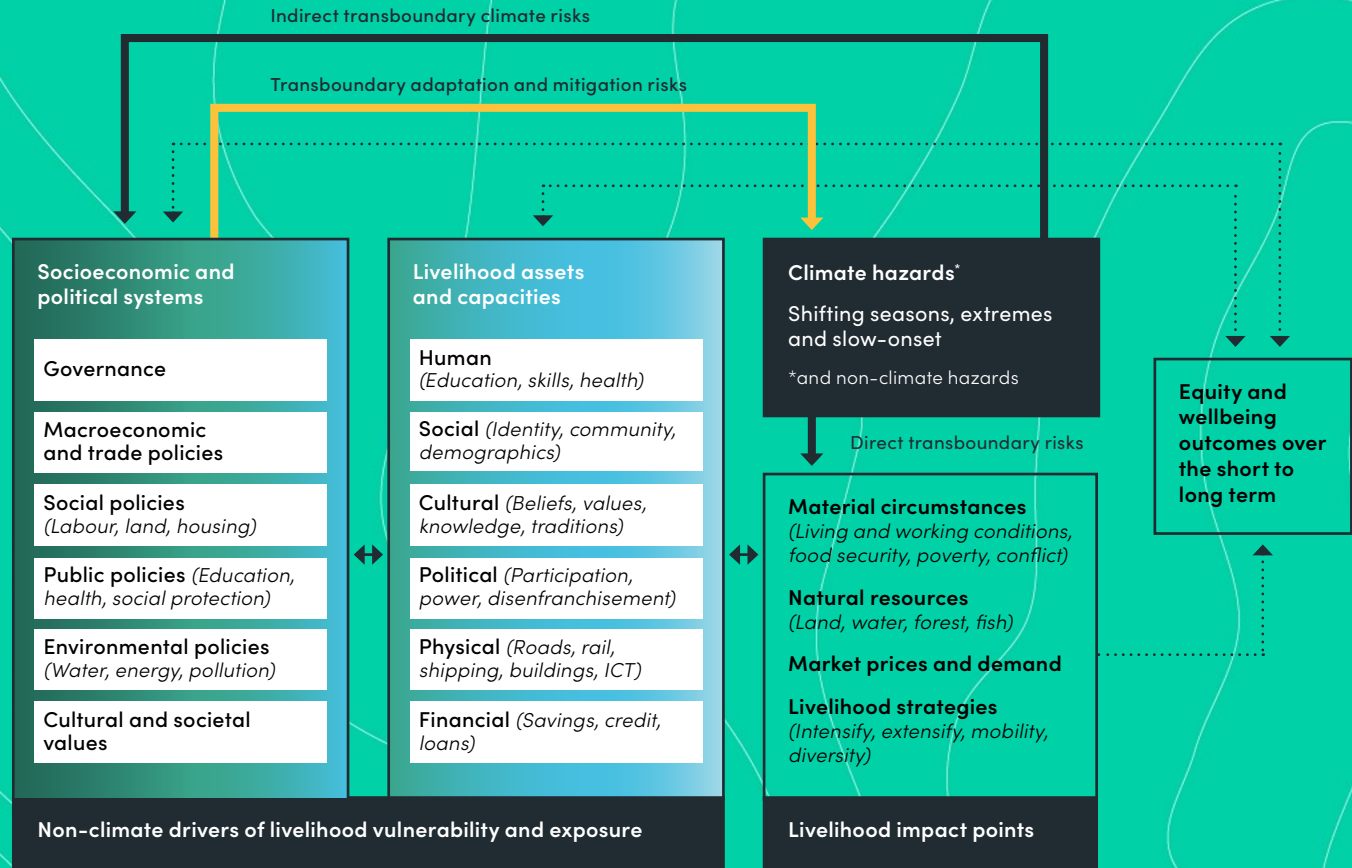
Quaternary

Chapters 2.6, 2.8



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Transboundary risks to the systems and assets upon which livelihoods depend



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Direct and Indirect TCRs: some pathways

Direct

- ❖ Impacts on terrestrial, ocean and coastal multi-country natural resources – including decline in areas suitable for agriculture, livestock and fisheries
- ❖ Multi-country droughts and subsequent large-scale displacement (e.g. Somalia, Ethiopia, Kenya)
- ❖ Livestock disease and export/import bans
- ❖ Human disease and wellbeing

Indirect

- ❖ Disruptions to livelihood inputs and outputs
- ❖ Spread via supply chains, finance, energy systems, transportation, etc.
- ❖ Geopolitics and control of natural resources, human mobility and labor markets
- ❖ National policies – economic planning, land tenure security, trade priorities

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Spotlight: TCRs and pastoral livelihoods in the Sahel



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- ❖ Characteristics: highly dependent on mobility
- ❖ Non-climate threats: lack of land tenure security; conflict, policy preferences for farming; subnational anti-movement bans; geopolitics of cross-border mobility
- ❖ Climate hazards: drought, heatwave, locusts, disease
- ❖ Equals -> multi-country impacts on livestock, livelihoods, food security, value chains and exports