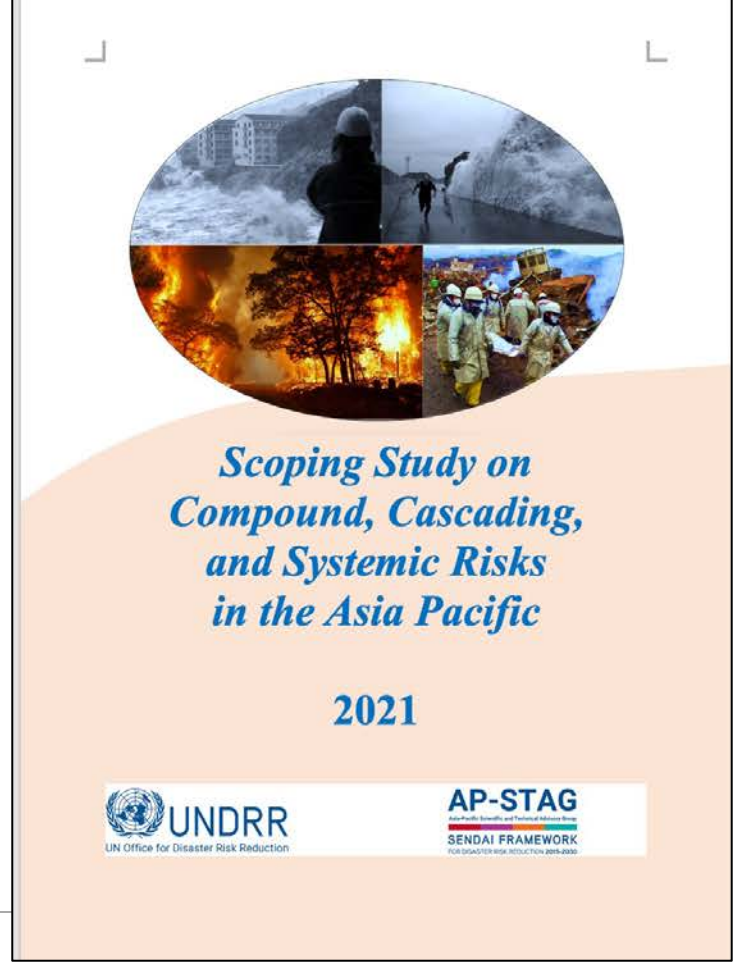
Scoping study on Compound, Cascading and Systemic Risk in the Asia-Pacific



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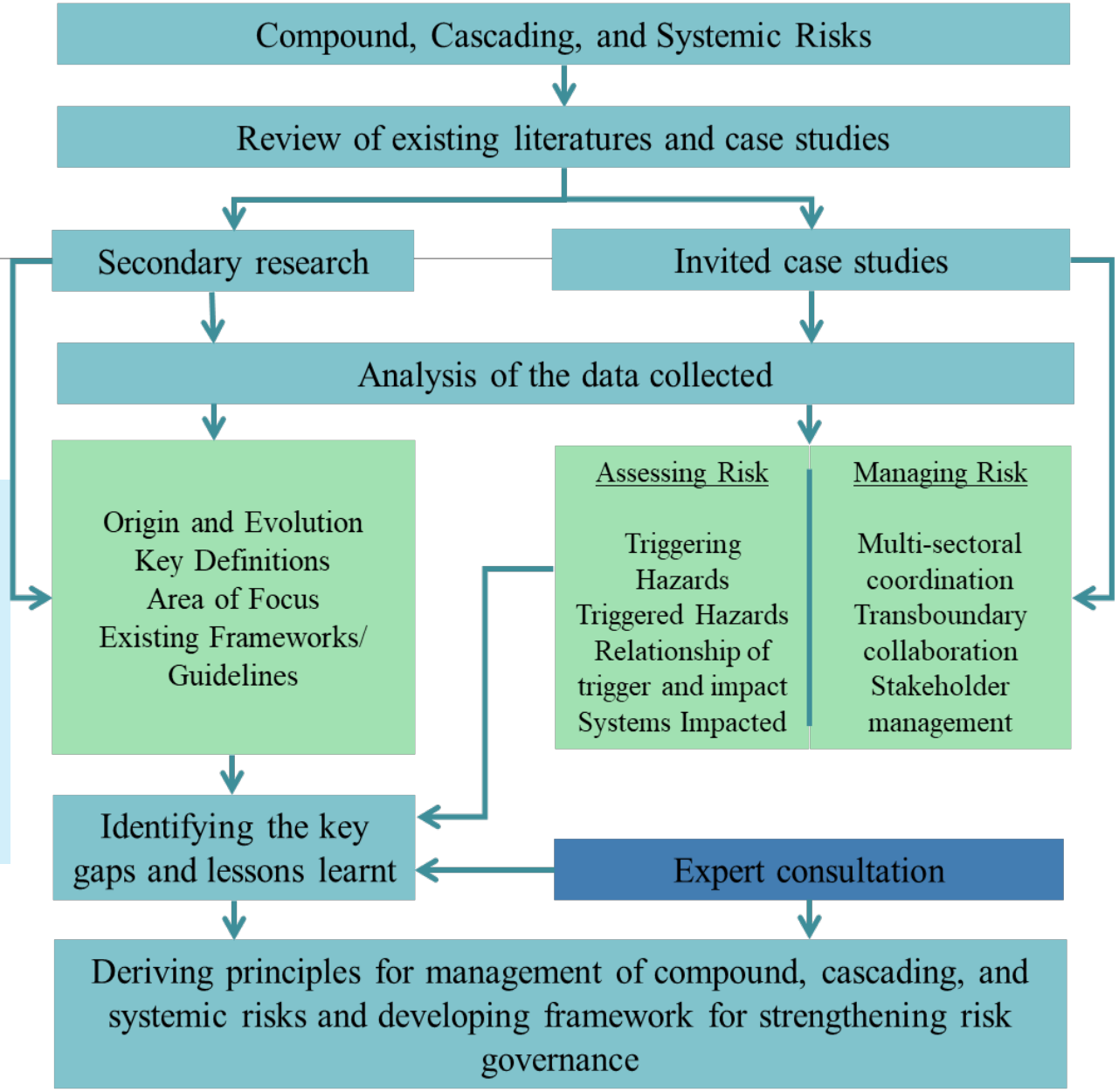
UNDRR
UN Office for Disaster Risk Reduction

AP-STAG
Asia-Pacific Scientific and Technical Advisory Group
SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

Objectives and Methodology

Objectives

1. To analyze and learn from the good practices
2. To understand the gaps and key challenges
3. To develop a basic framework for enhancing risk governance



Case study analysis

- Case studies covering **16 countries** from the Asia-Pacific Region

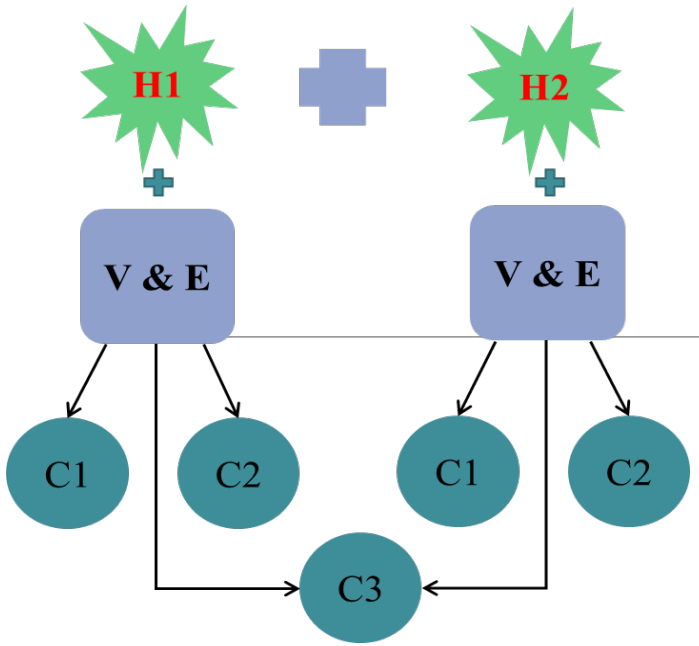
- Total **40 nos. of case studies** submitted
  - 22 nos. → Cascading and Compound Risk
  - 10 nos. → Systemic Risk
  - 08 nos. → Cascading and Compound + Systemic Risk

- Key hazards covered
  - Cyclone induced floods/ landslides
  - Drought
  - Forest fire
  - Locust attack during COVID-19
  - Rainfall induced floods/ landslides during COVID-19, and so on

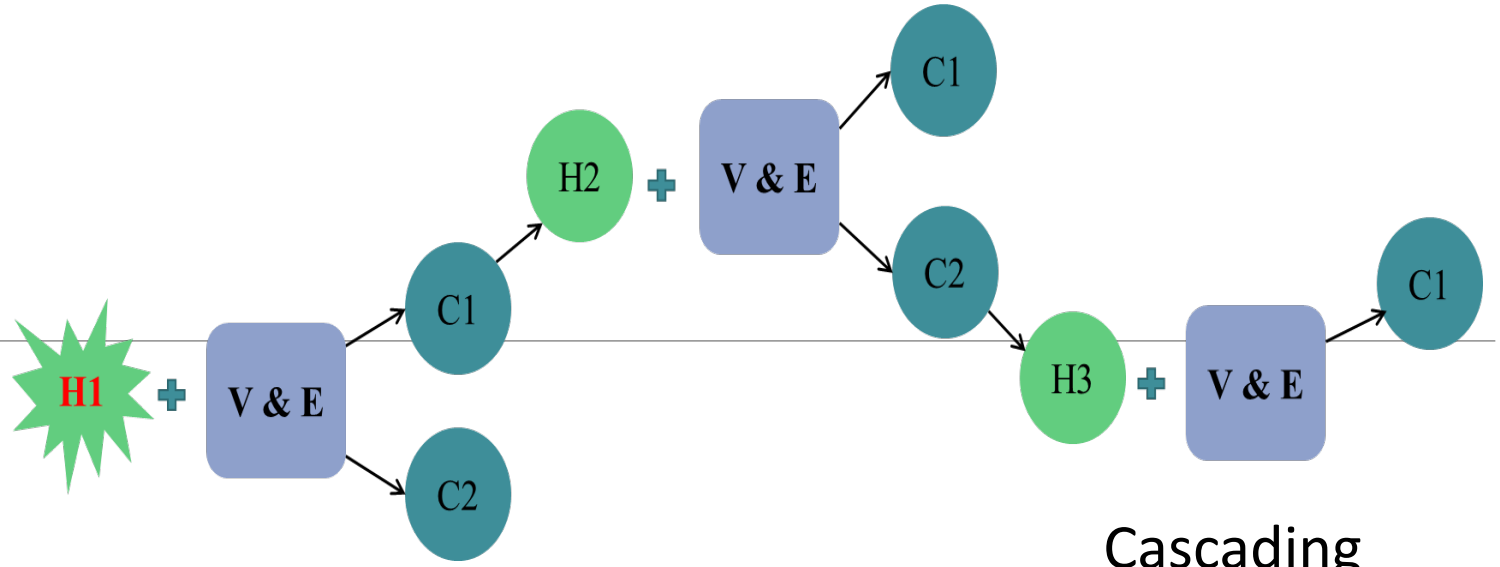
Map showing location of case studies

Definitions

Key definition	Key characteristic
Systemic risk *is defined as "Endogenous to, or embedded in, a system that is not itself considered to be a risk and is therefore not generally tracked or managed, but which is understood through systems analysis to have a latent or cumulative risk potential to negatively impact overall system performance when some characteristics of the system change."* ***– UNDRR in GAR 2019 report***	• Complex • *Transboundary and global* • Random and unexpected • Non-linear with tipping points • *Unnoticed prior to disasters* • Failure of a system
*"****Cascading disasters*** *are extreme events in which cascading effects increase in progression over time and generate unexpected secondary events of strong impact. These tend to be as serious as the original event, and contribute significantly to the overall duration of the disaster's effects. These subsequent and unanticipated crisis can be exacerbated by the failure of physical structures and social functions that depend on them. In cascading disasters one or more secondary events can be identified and distinguished from the original source of disaster."* ***– Pescaroli and Alexander, 2015***	• Chain of events • Standalone impacts of each event • Multisector vulnerability
Compound risk *is defined as "Two or more extreme events occurring simultaneously or successively, combinations of extreme events with underlying conditions that amplify the impact of the events, or combinations of events that are not themselves extremes but lead to an extreme event or impact when combined."* ***– IPCC in SREX 2012 report***	• Simultaneous or successive • Combination of multiple events leading to extreme impacts • Events are independent of each other

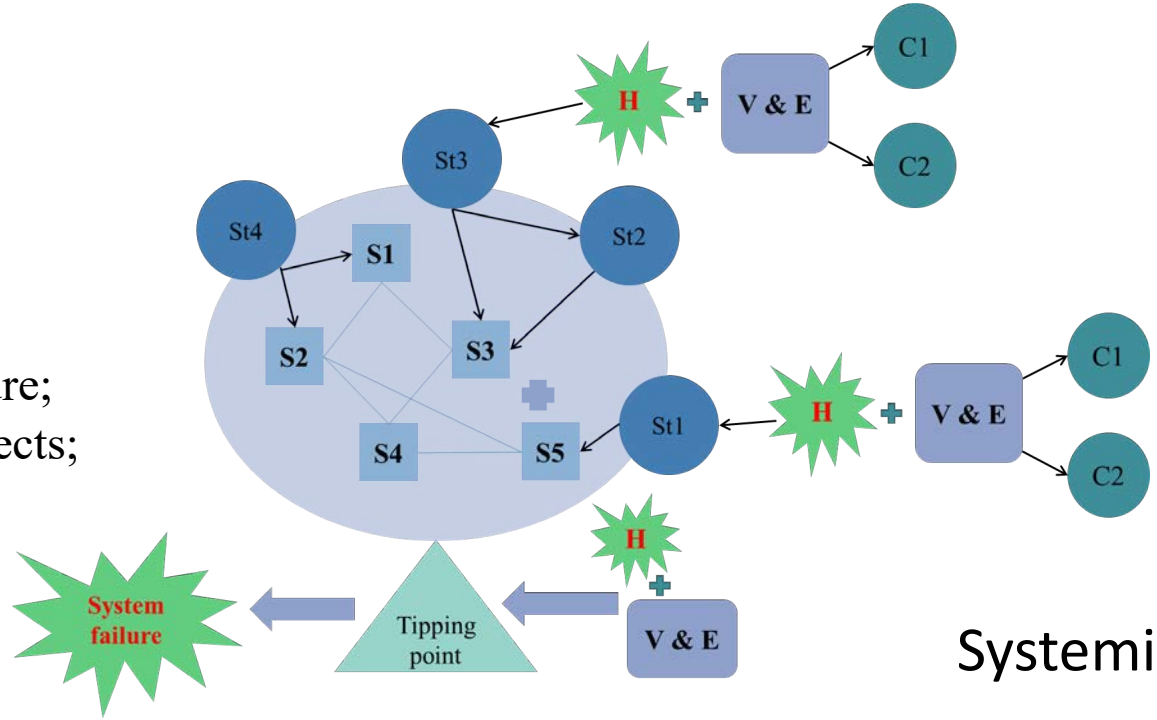


Compound



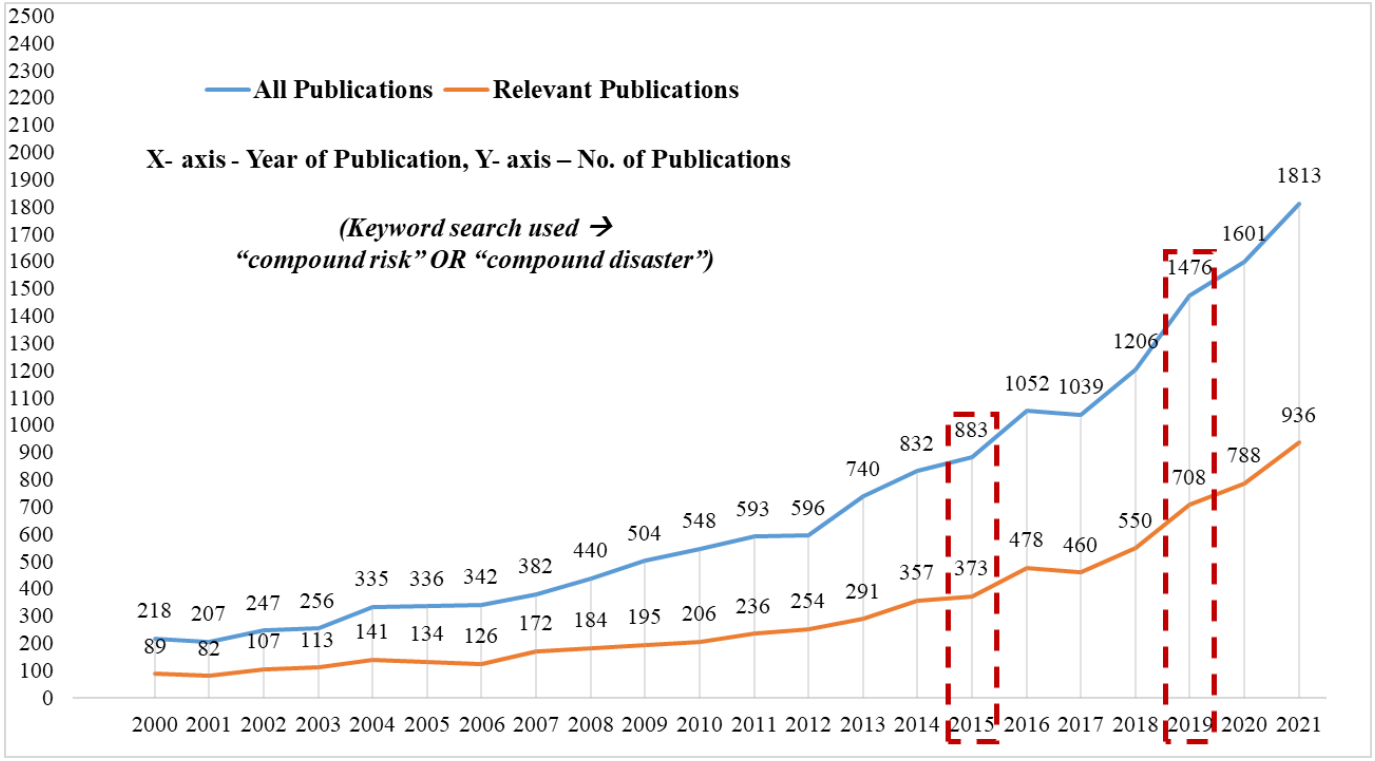
Cascading

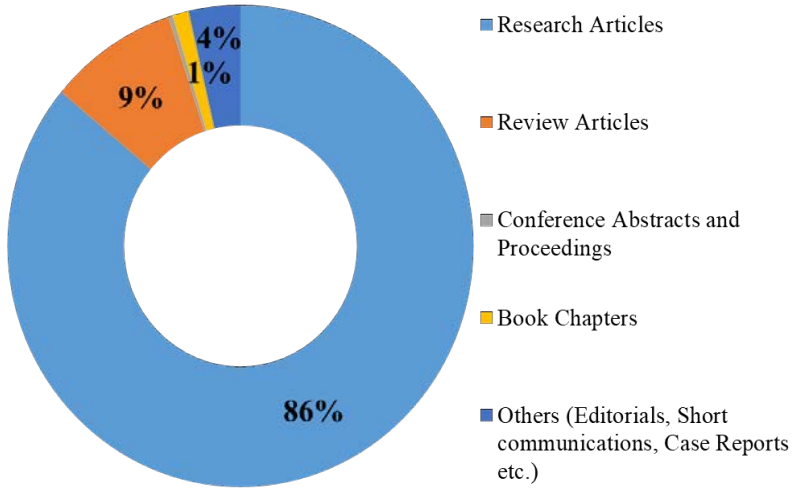
H, H1, H2, H3 = hazard events;
V & E = vulnerability and exposure;
CI, C2, C3 = consequences or effects;
S1, …, S5= systems; and
St1, ..., St4= stressors.



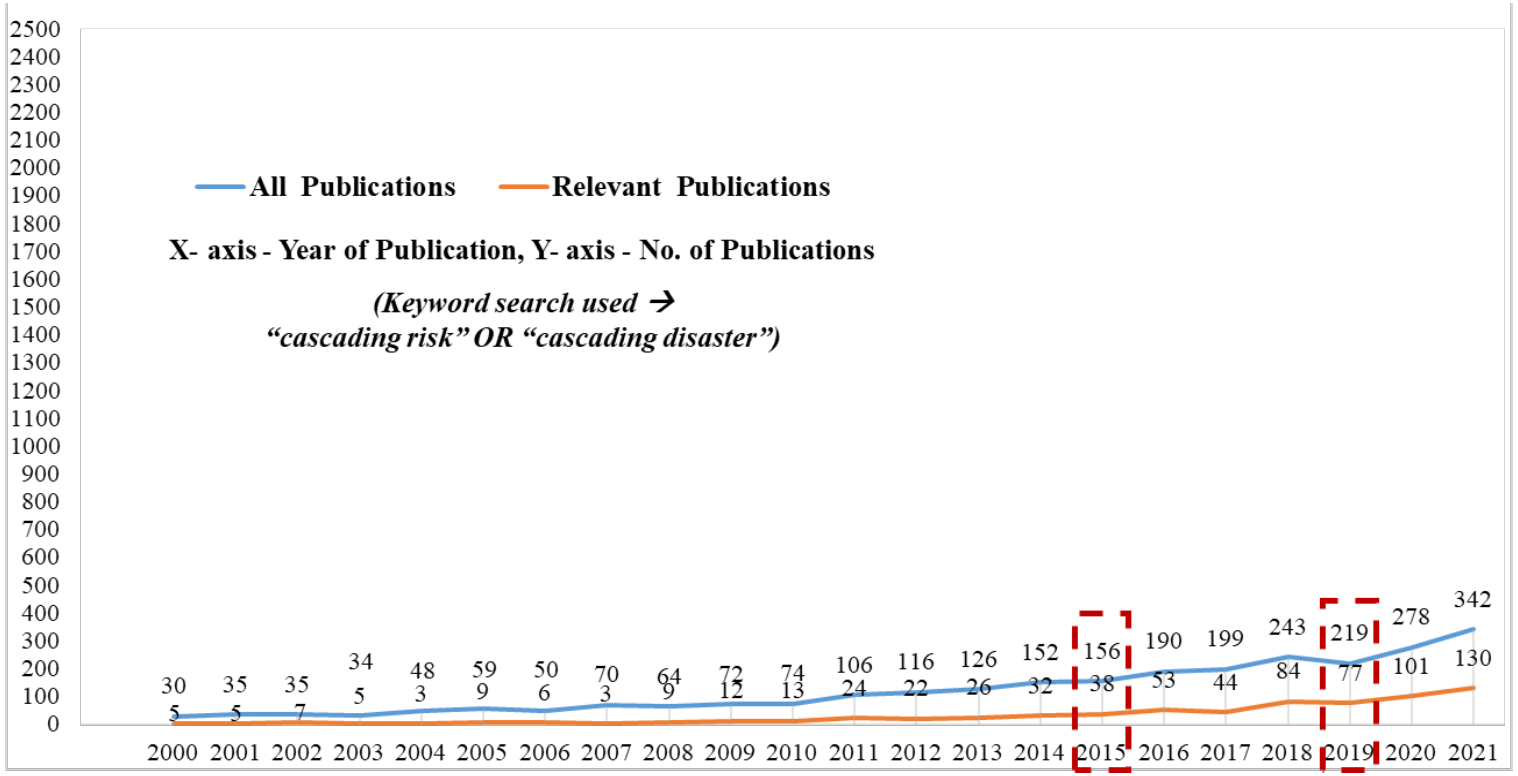
Systemic

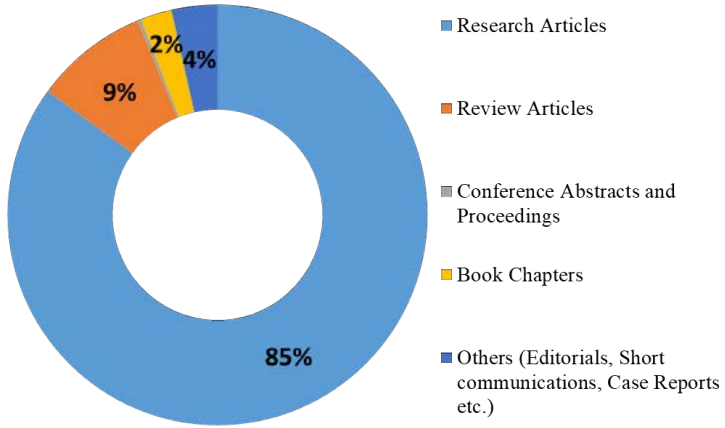
Current knowledge base: Compound risk/ disaster (2000 to 2021)



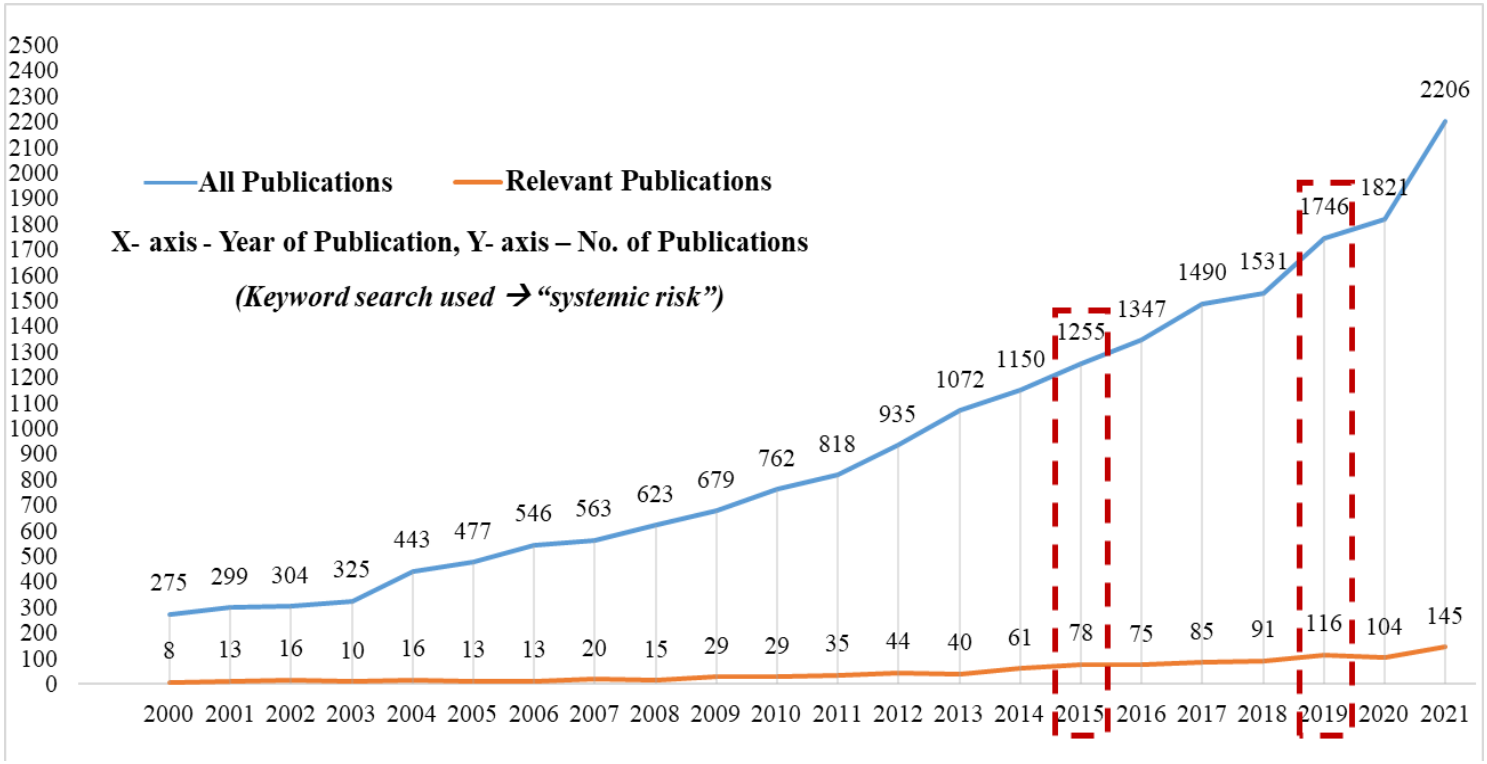


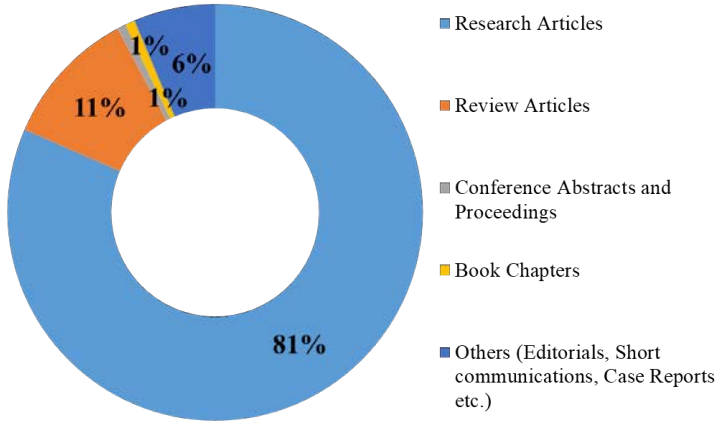
Current knowledge base: Cascading risk/ disaster (2000 to 2021)



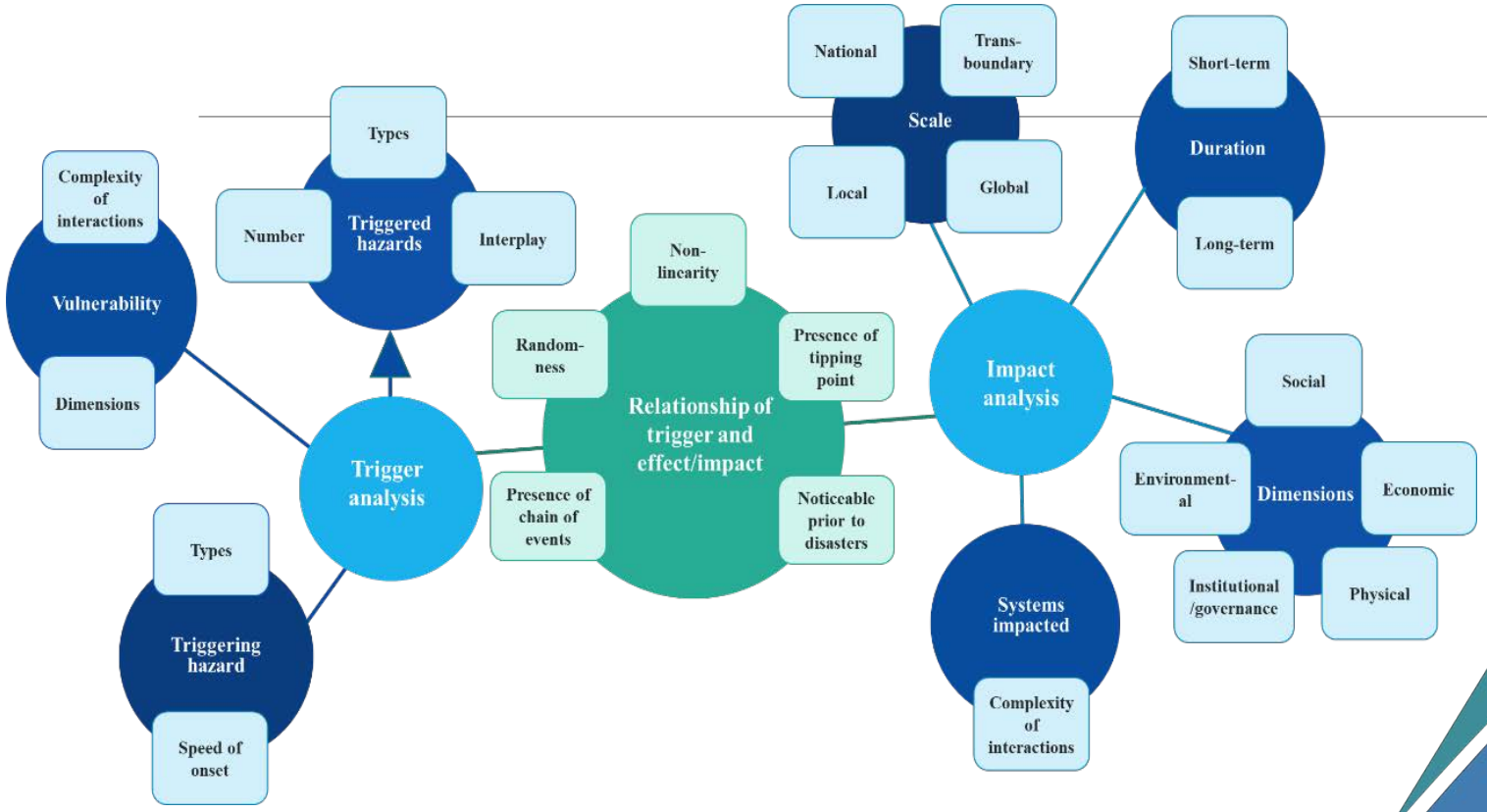


Current knowledge base: Systemic risk/ disaster (2000 to 2021)

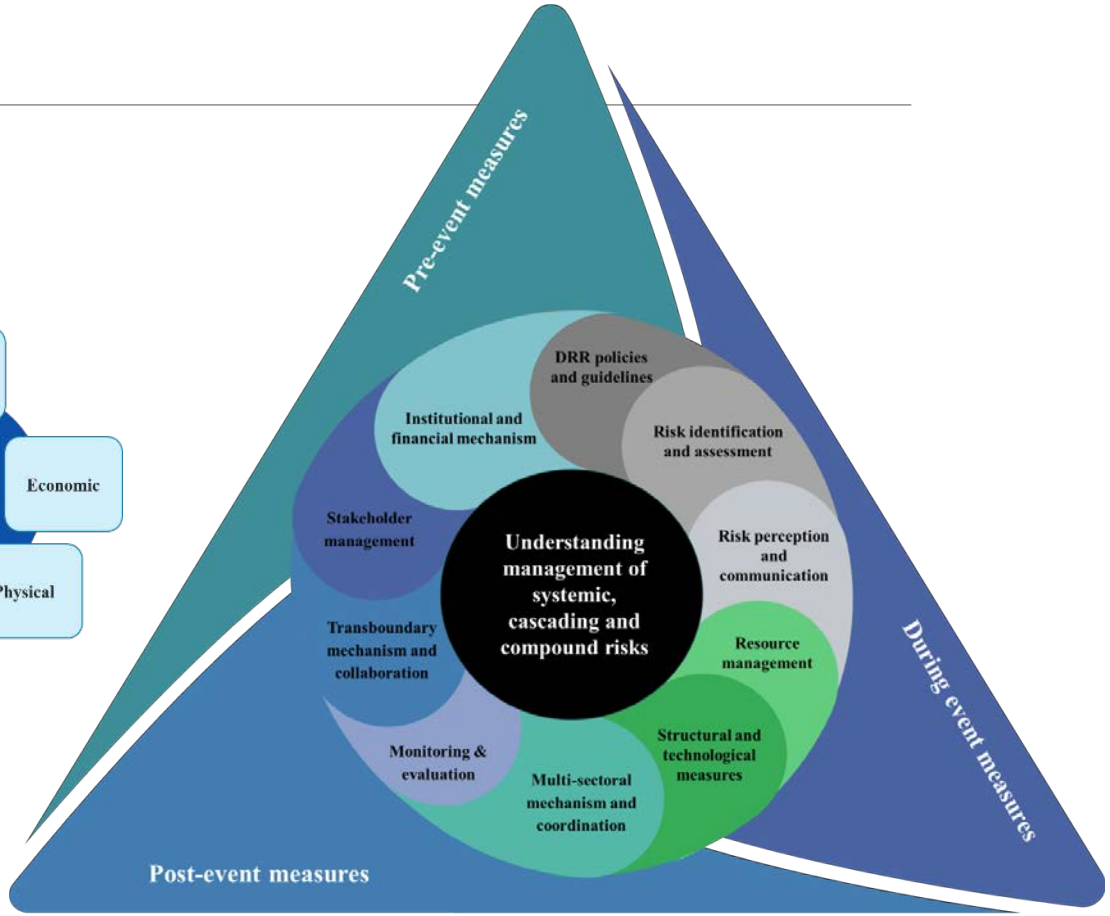




Framework for case study analysis

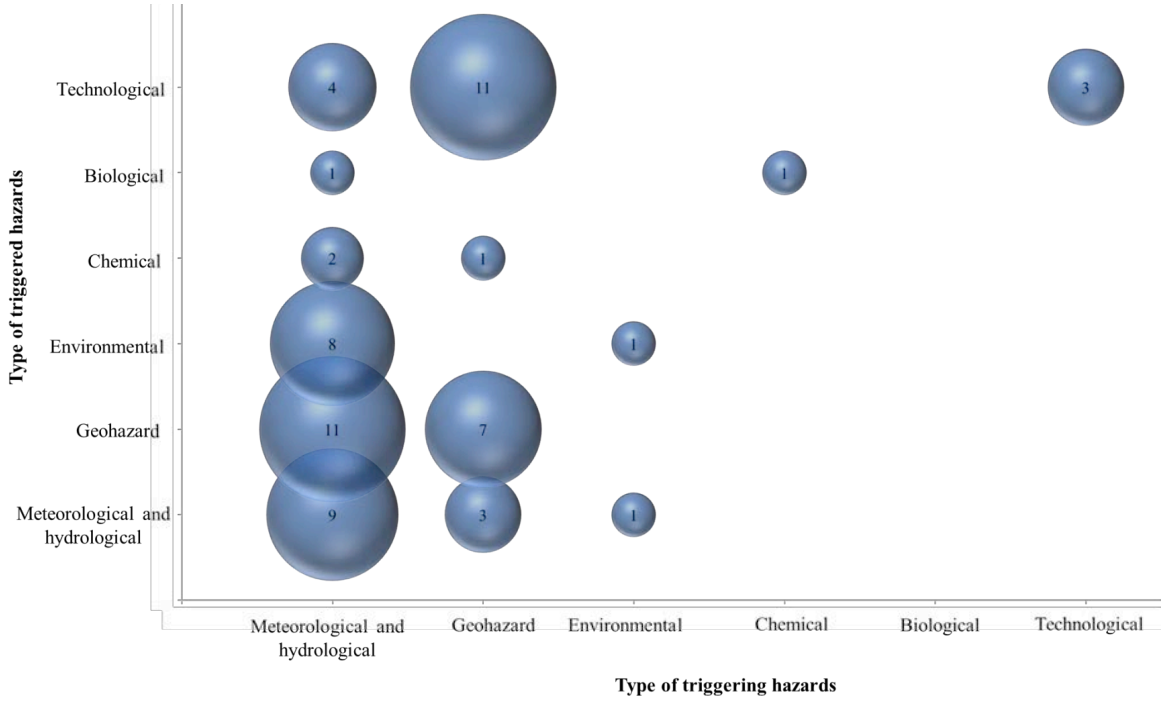


Framework for analysis of risk (Part 1)

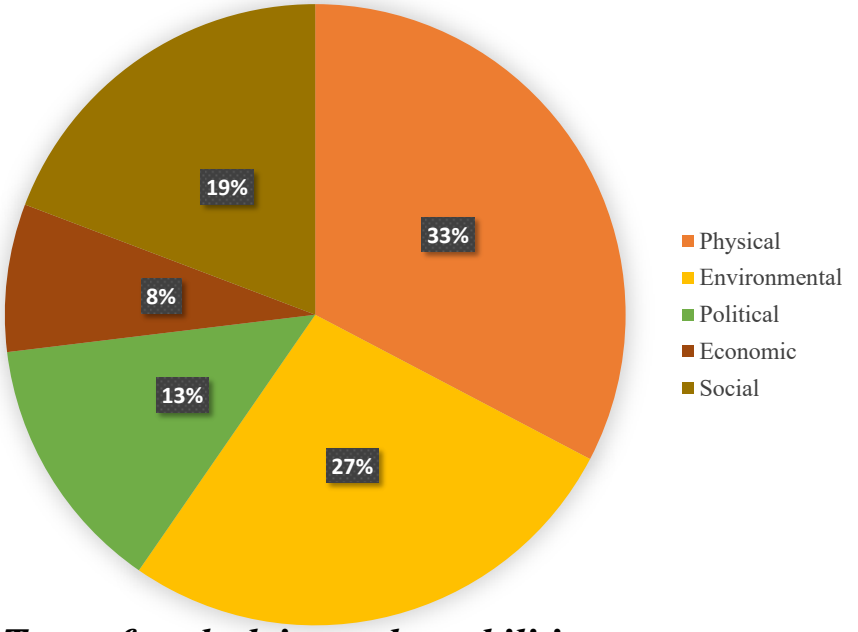


Framework for analysis of Risk Management (Part 2)

Key findings from case study analysis (contd.)

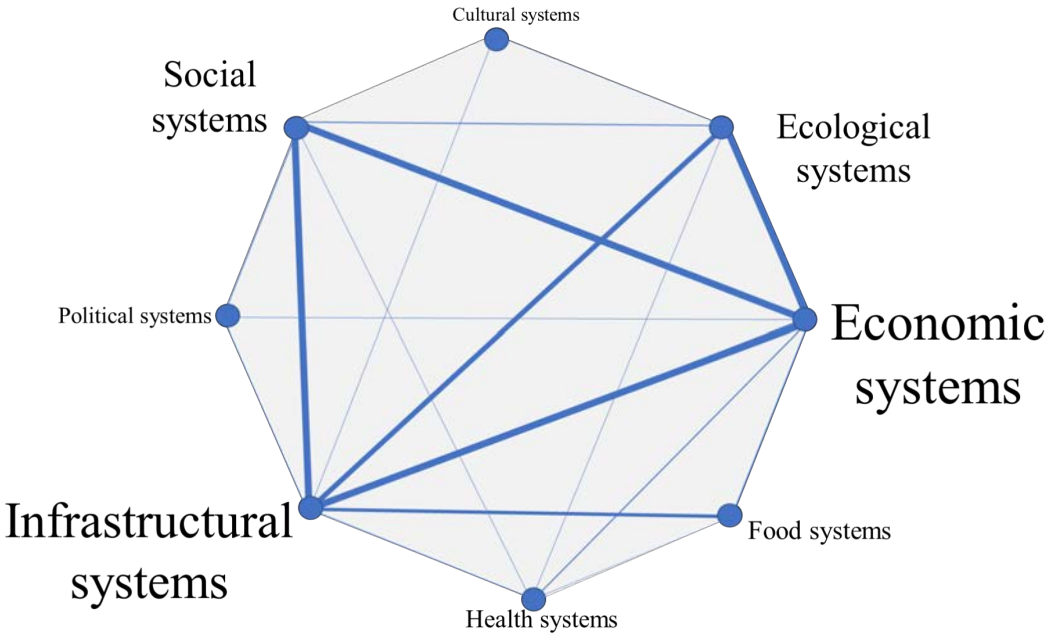


Relationship between types of triggering and triggered hazards

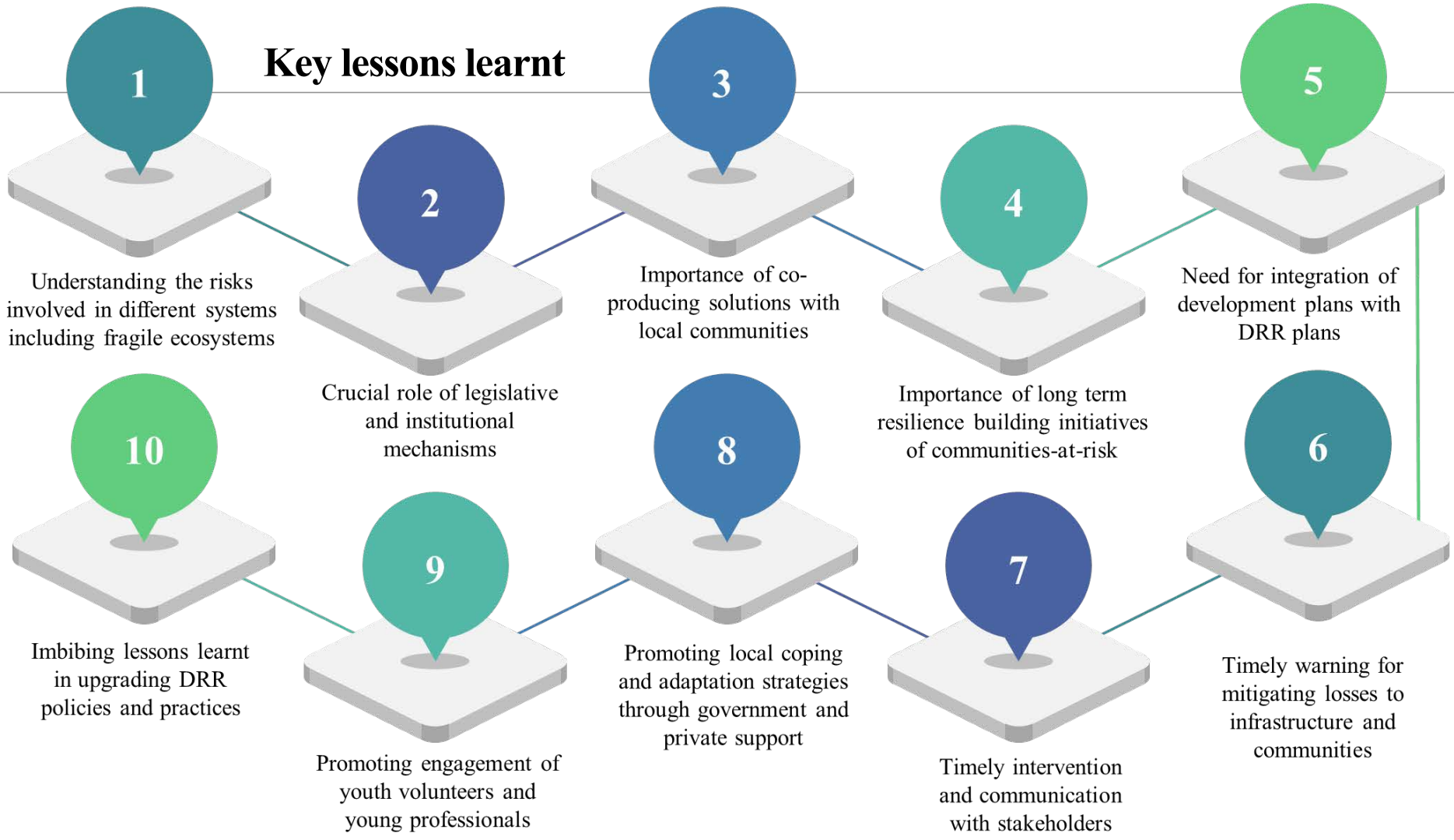


Type of underlying vulnerabilities

Systems impacted



Key findings from case study analysis (contd.)

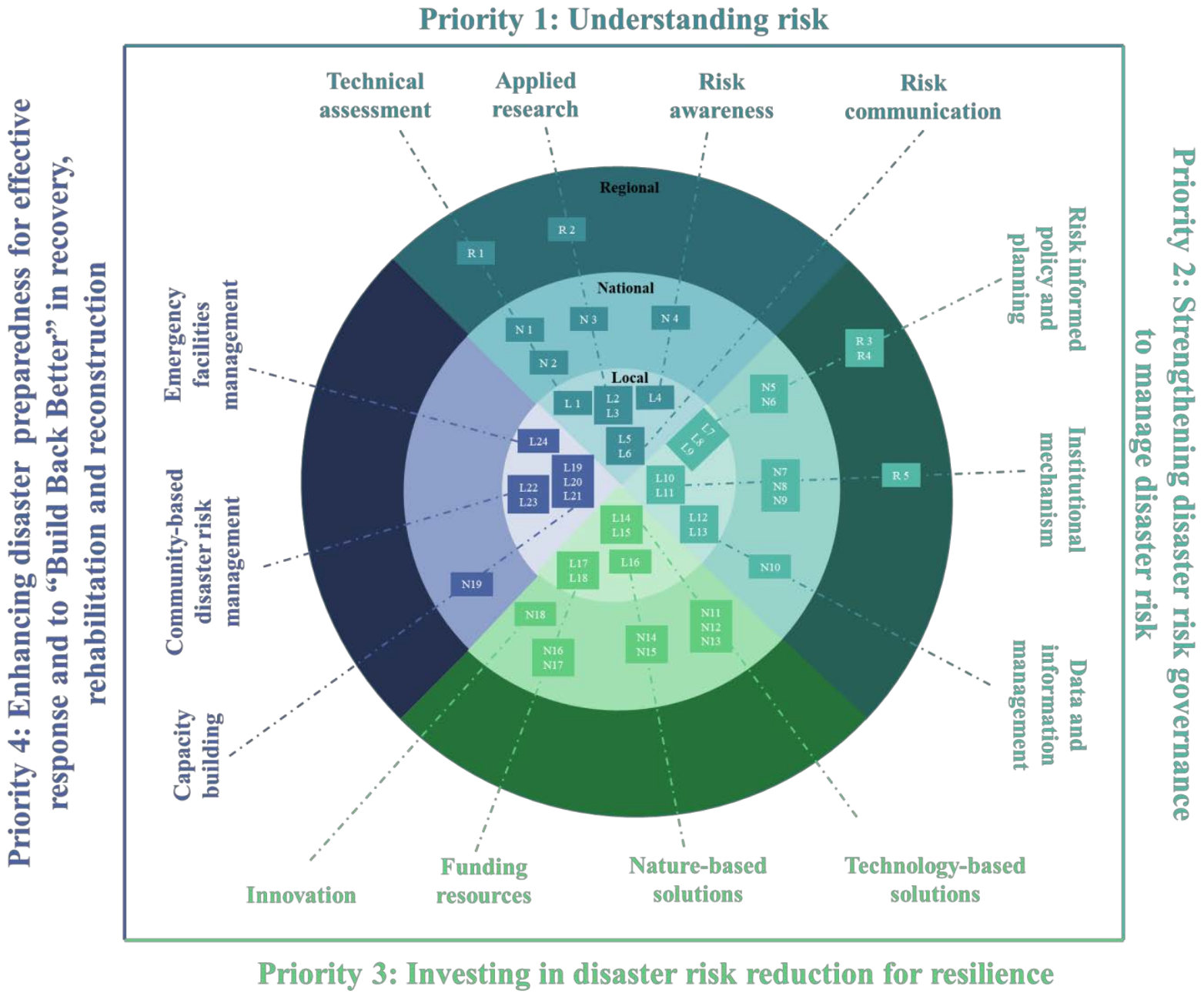


Principles for management of risks

1. Identify interconnectedness between drivers and effects of all dimensions of risks
2. Focus on strengthening resilience of interconnected systems through 'systems approach'
3. Strengthen transboundary risk governance through coordinated policy and planning
4. Invest in social systems for reducing vulnerability and advancing social well-being
5. Promote ecosystem-based approaches for building resilience to complex risks
6. Invest in innovative risk-informed multi-sectoral planning and interventions

Six basic principles for management of systemic, cascading and compound risks

Framework for strengthening risk governance



Framework for strengthening risk governance