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

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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

Methodology

- Scoping study on Systemic Risk, Cascading and Compound Disaster/Risk in the Asia-Pacific (2022)
- Review of existing literatures and case studies
- Secondary research
- Invited case studies
- Analysis of the data collected
- Origin and Evolution
  - Key Definitions
  - Area of Focus
  - Existing Frameworks/Guidelines
- Assessing Risk
  - Triggering Hazards
  - Triggered Hazards
  - Relationship of trigger and impact
  - Systems Impacted
- Managing Risk
  - Multi-sectoral coordination
  - Transboundary collaboration
  - Stakeholder management
- Identifying the key gaps and lessons learnt
- Expert consultation
- Deriving principles for management of compound, cascading, and systemic risks and developing framework for strengthening 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

<table>
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<th>Key definition</th>
<th>Key characteristic</th>
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| **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.” | • 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.” | • 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.” | • Simultaneous or successive  
• Combination of multiple events leading to extreme impacts  
• Events are independent of each other |
H, H1, H2, H3 = hazard events; V & E = vulnerability and exposure; CI, C2, C3 = consequences or effects; S1, ..., S5 = systems; and St1, ..., St4 = stressors.
Current knowledge base: Compound risk/ disaster (2000 to 2021)

Scoping Study on Systemic Risk, Cascading and Compound Disaster/ Risk in the Asia-Pacific (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.)

Type of underlying vulnerabilities

- 33% Physical
- 27% Environmental
- 19% Political
- 13% Economic
- 8% Social

Relationship between types of triggering and triggered hazards

Systems impacted

Scoping Study on Systemic Risk, Cascading and Compound Disaster/ Risk in the Asia-Pacific (2021)
Key findings from case study analysis (contd.)

1. Understanding the risks involved in different systems including fragile ecosystems

2. Crucial role of legislative and institutional mechanisms

3. Importance of co-producing solutions with local communities

4. Importance of long-term resilience building initiatives of communities-at-risk

5. Need for integration of development plans with DRR plans

6. Timely warning for mitigating losses to infrastructure and communities

7. Timely intervention and communication with stakeholders

8. Promoting local coping and adaptation strategies through government and private support

9. Promoting engagement of youth volunteers and young professionals

10. Imbibing lessons learnt in upgrading DRR policies and practices
Principles for management of risks

Six basic principles for management of systemic, cascading and compound 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
Framework for strengthening risk governance

Priority 1: Understanding risk

- Technical assessment
- Applied research
- Risk awareness
- Risk communication

Regional

National

Local

Emergency facilities management

Community-based disaster risk management

Capacity building

Innovation

Funding resources

Nature-based solutions

Technology-based solutions

Priority 2: Strengthening disaster risk governance

- Risk informed policy and planning
- Institutional mechanism
- Data and information management

Priority 3: Investing in disaster risk reduction for resilience

Framework for strengthening risk governance

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