

# Natural hazards and resilience in complex urban systems

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# Project aims

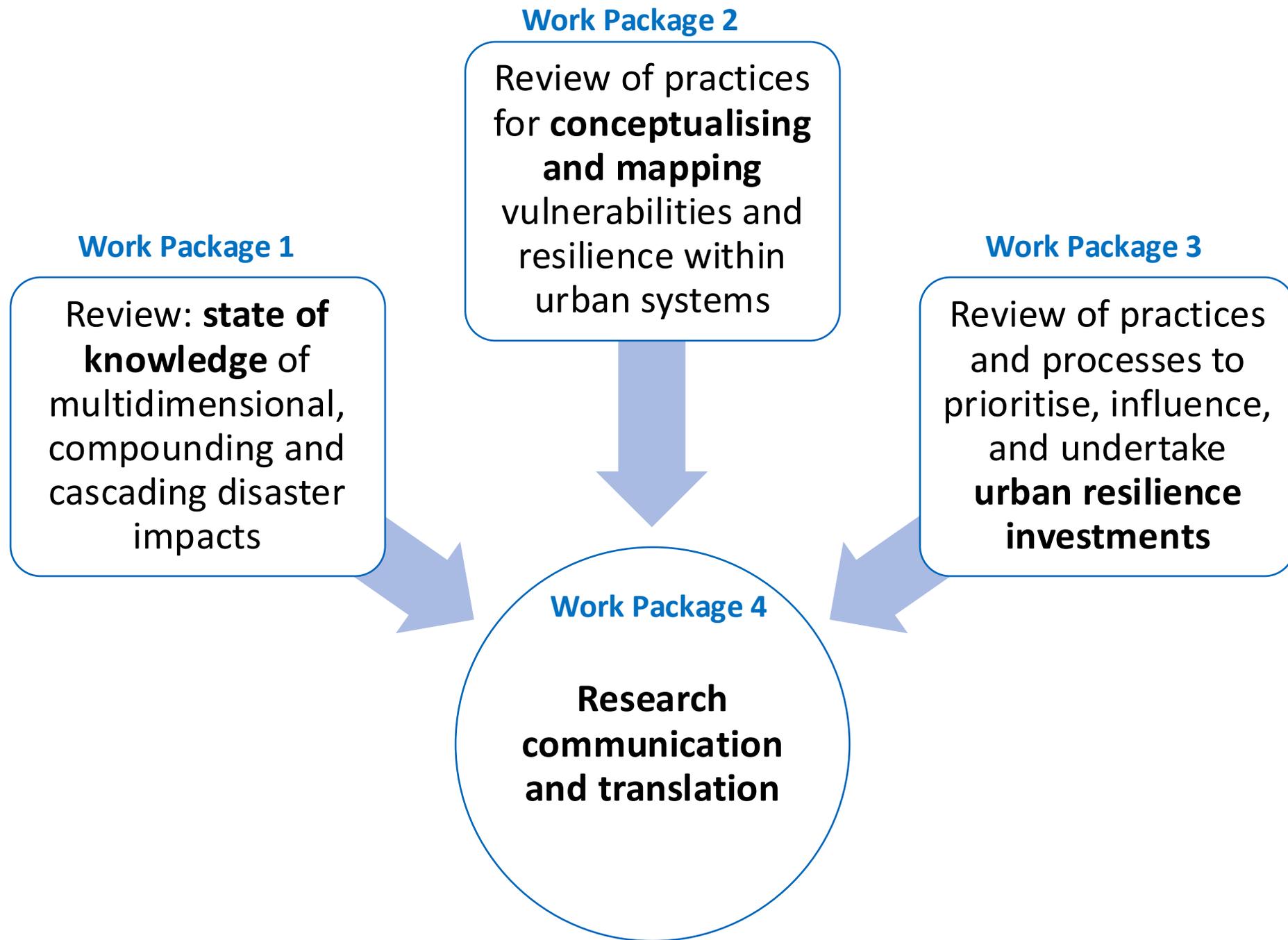
- Understanding of vulnerabilities to multi-dimensional, compounding and cascading disaster impacts within complex urban systems
- Better understanding of how to build urban resilience and reduce disaster risk
- Resilience strategies and investments
- Communicate and disseminate insights



Source: Adobe Stock



# Project approach



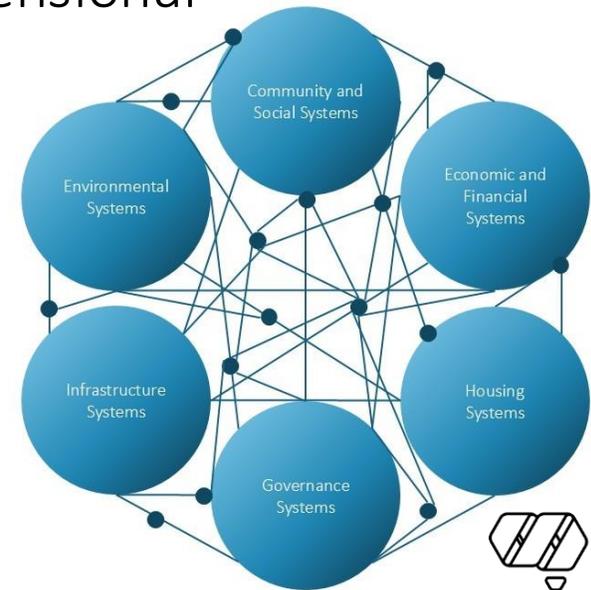
# Research methods

- **Literature review** of academic and non-academic literature
  - Cities as complex urban systems, cascading and compounding disaster impacts, urban disaster risk
- **Document analysis**
  - Practices and processes of mapping vulnerabilities and resilience
  - Practices and processes of influencing and prioritising resilience investment
- 39 semi-structured **stakeholder interviews**
  - Emergency management, climate change adaptation, community resilience, planning, insurance, utilities etc.
  - Local, state and national government, NGOs, private sector, research sector, and utility providers



# State of knowledge

- Awareness of cities as complex urban systems and high likelihood of greater impacts in future due to climate change and rapid urban growth.
- However, implementing systems thinking into practice is challenging, due to the complexity and uncertainty of the outcomes of the interactions within, between and across urban systems and subsystems.
- Unclear language around ‘compounding’, ‘cascading’, ‘multidimensional’ and many synonyms and differing definitions for these terms:
  - Compound hazards, risks, disasters etc.
  - Cascading disasters, risks, impacts etc.
  - Disasters as aggregate, compound, multidimensional, etc.



# Conceptualising vulnerability & resilience

- **Many approaches** – conceptual and spatial
- **Scales:** national, state, city-region, bio-region, local council, community etc.
- **Domain foci:** (specific) infrastructure, communities in specific areas, specific community groups, place-based, hazard-focused, climate resilience etc.
- **Understanding/definitions of vulnerability and resilience** differ, particularly between foci on infrastructure and community, also emergency management & climate change adaptation

“ Even though [...] the qualitative stuff [...] is always seen as a bit less than the stats, I actually think it is way more important in the sense that [...] you need both. [...]

You need to do that social mapping as well and you need to [...] understand those connections to be able to really understand how community functions. ”

Interviewee SG2



# Prioritising and influencing urban resilience investment

- Resilience investment = investment in activities/ infrastructure that increase resilience
- Several resilience investment frameworks but often challenging to implement
- Some detailed cost-benefit analysis approaches on state level
- Complex funding landscape
- Monitoring and evaluation of investment often difficult

“ So, we've invested a lot [...] around educating people on being resilient, because if a person is resilient and they don't need our help, that makes their life a lot easier because they can weather the storm. ”

Interviewee LG4

“ For us, the end outcome is how do we prioritise investment in resilience. So to me, that means that a dollar value needs to unfortunately be attached the whole way through. It's very economical sort of flavoured. ”

Interviewee SG1



# Research translation / Outcomes

- **Practical guidance tool:** Considerations for conceptual mapping of vulnerabilities and resilience at local scales
- **Proof of concept case study** for practical guidance tool
- **Draft process principles and standards** for prioritising and influencing urban resilience investments
- **Draft guidance on monitoring and evaluation** of urban resilience investments – work in progress
- **Capability resources** – work in progress



# Practical Guidance Tool



- **Not another tool...** complementary to the work already undertaken
- Aims to **support the prioritisation** of areas of focus for resilience investment
- Five components:
  - Fit-for-purpose base concepts, definitions and visualisations
  - Addressing Compound, Cascading and Multidimensional Disaster Impacts in urban systemic risk assessment
  - Integrating urban systemic risk assessment into decision-making processes
  - Making sense of the landscape of existing practices (database of relevant sources)
  - Self-Reflection on current practices, identifying gaps and ways to address them (checklist)



# Proof-of-concept study

- Seeking people to test the tool and provide feedback
- On specific components or overall
- Via an **online survey** and/or **focus groups**
- Plus add to
  - **FAQs** (you add the questions we add the answers...)
  - **Real world examples** (long term goal: community of practice)
- Please let us know if you're interested and we will contact you about an introduction to the tool and the testing phase

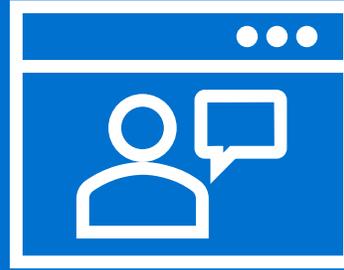


## PROOF-OF-CONCEPT

### Practical Guidance Tool for Systemic Risk Assessment in Complex Urban Systems

Welcome! And thank you for supporting the development of this practical guidance tool. Your views on the overall structure, scope, elements and potential for usability are highly valued, and we look forward to your feedback.

**Disclaimer:** this practical guidance tool is work-in-progress and its content must not be shared outside the group of end-users participating in this proof-of-concept.



(Introduction Video)

#### Explore the Tool



Take the time to explore the tool and its five components in any sequence that is appropriate to you.

[Take me to the Tool](#)

#### Respond to the Survey



Provide us targeted feedback by answering a short survey. Your responses will help shape how the tool evolves.

[Take me to the Survey](#)

#### Participate in a Focus Group



Take the chance to discuss the tool with other end-users and help build collective insights by participating in a focus group.

[Book my spot in a Focus Group](#)

## Upcoming events

[See all](#)

[+ Add event](#)

JUL  
23

Introduction to the Practical Guidance Tool  
- Indicative Date Only  
Wed, Jul 23, 1:30 PM

### Quick links to specific modules and elements of the Practical Guidance Tool

-  **MODULE 1**  
Fit-for-purpose base concepts, definitions and visualisations.
-  **MODULE 2**  
Addressing compound, cascading and multidimensional impacts
-  **MODULE 3**  
Integrating systemic risk assessment into decision-making.
-  **MODULE 4**  
Making sense of the landscape of current and emerging practices.
-  **MODULE 5**  
Self-reflection on current practices and identifying gaps.
-  **Glossary**  
Quickly access definitions for key terms used in the tool.
-  **FAQ**  
Find answers to Frequently Asked Questions and/or add new questions, and we will respond.
-  **Survey**  
Provide us targeted feedback by answering a short survey.
-  **Focus Group**  
Help build collective insights to support further development of the tool.

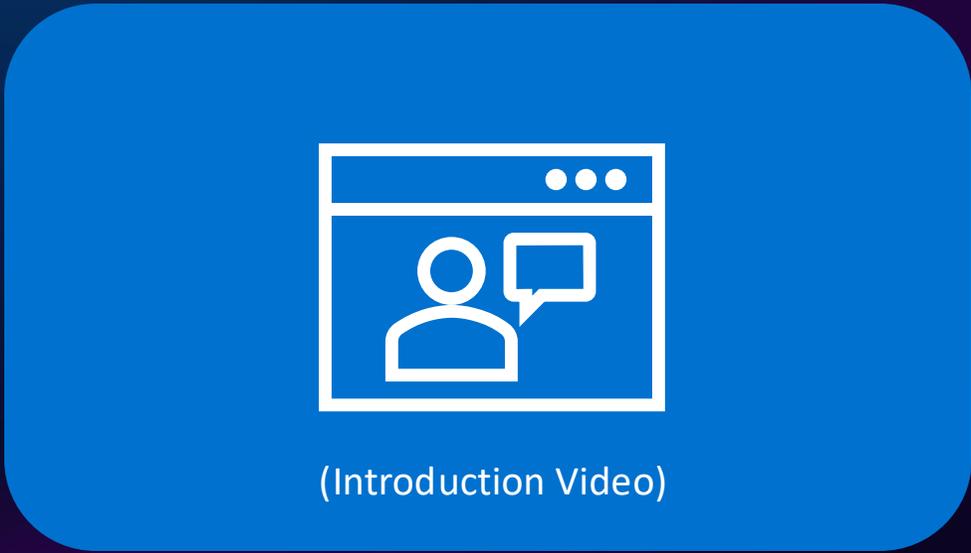


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# Draft Principles and Processes for Resilience Investment

- 7 Principles for prioritising and influencing resilience investment
- Plus recommendations for prioritising, influencing and operationalising investments
- Plus checklist – work in progress
- We are also seeking feedback on the draft principles. Please let us know if you would like to be involved!



Principles	Processes
<b>Shift from a reactive to a proactive approach</b>	Shift focus of resilience investment from the response phase to preparedness, mitigation, adaptation, transformation Adopt a systems approach. Incentivise preventative investments Enhance socio-spatial and economic justice Promote proactive planning for investment
<b>Shift from single hazard to systematic risk approach</b>	Adopt a systems approach. Recognise the interconnected nature of risks Prioritise projects considering multidimensional and compound impacts Consider interactions between multiple hazards Move beyond assessing individual hazards Consider stress and deficiencies from damage and disruption: Consider intensifying effects
<b>Prioritise vulnerability and risk exposure</b>	Consider vulnerability in the context of risk exposure Consider differences in risks of exposure Prioritise areas and groups at high-risk exposure
<b>Prioritise long-term, sustainable solutions over short-term investment</b>	Promote long-term planning and adaptability Shift towards sustainable investment Overcome traditional business practices
<b>Embed resilience building in investment mechanisms and projects</b>	Embed resilience investment in multiscale policymaking Build capacity for resilience investment Facilitate capacity building Embed resilience in general projects Leverage existing programs and services
<b>Consider interdependencies across scales and sectors</b>	Enhance coordination and relationships Foster a shared understanding of risks Pursue collaborative financing and funding Foster multisectoral and multiscale coordination Support community-led initiatives Ensure accountability
<b>Prioritise investment in communities to create value and reduce negative effects</b>	Emphasise long-term planning and adaptability Create value through resilience investment Empower communities for successful resilience delivery

# Next steps

- **Proof-of-concept study** (until October) > update Practical Guidance Tool
- **Feedback on Resilience Investment Principles** (until October) > update Principles
- **Guidance on Evaluation and Monitoring** (by October)
- **Final Report** (December)
- **Hazardous Webinar** (August) and more



# Acknowledgement

Contact: [annette.kroen@rmit.edu.au](mailto:annette.kroen@rmit.edu.au)

## Project Team



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Esther  
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Expression of interest for  
involvement in 'testing phase'



**Thanks also to our  
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and Stakeholder Advisory Group!**

