



Flood Risk Reduction in a Dynamic Urban Context: Exploring the Urban-Water-Resilience Nexus

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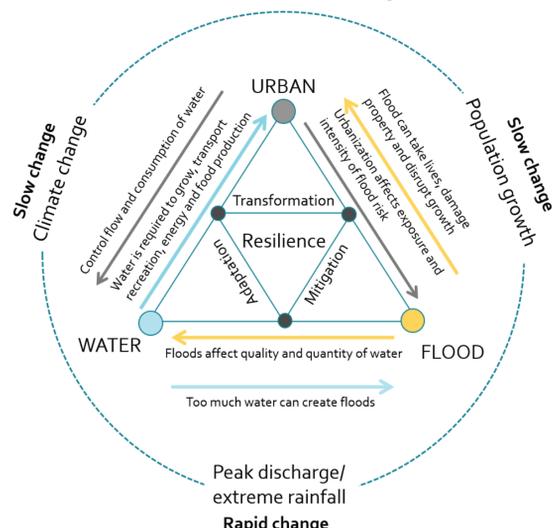
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In the context of dynamic environmental and demographic changes, one-directional, fragmented disaster management approaches are ineffective in delivering built-environment resilience across the temporal (from long-term to short term) and spatial (from macro to micro) scales. The proposed research aims to understand the urban-water-resilience nexus holistically as intersecting fields of urban planning, water management and disaster risk management, while emphasizing urban-water transformations over time and cross-scale interactions between urban form and disaster risk with particular reference to floods.

Australia's urban areas are vulnerable to a range of disaster risks. Along with other disaster events, flash flooding from increasingly concentrated rainfall events are becoming more frequent and severe. Climate change and population growth add a further critical dimension to this already challenging situation.

In response, the Victorian Government has prepared a revised draft 'Victorian Floodplain Management Strategy' in 2015 focusing on flood mitigation approaches in addition to flood response and recovery efforts.

The overarching challenge is how urban planning can contribute to flood resilient urban development in the context of urban infill and dynamic urban change.



Conceptualizing resilience as response to dynamic change

RESEARCH QUESTIONS

The specific research questions are:

- How have urban growth and water management policy and practices over time influenced the present flood risk in the study catchment?
- To what extent does urban form (and its associated elements) contribute to flood risk reduction in upstream and downstream areas?
- How do the various dwelling typologies and their characteristic morphologies respond to flood risk mitigation?
- Does urban planning adequately deal with flood risk in the catchment?

RESEARCH METHOD

The research will follow a systems approach (multi-scalar analysis) to empirically investigate the research questions in the context of urban catchment of Elster Creek, Melbourne.

Case study site selection criteria :

- Existing urban area of dynamic change and infill.
- Urban area exposed to the compound risks of fluvial, stormwater and coastal flooding.
- Area having ongoing infill and high built-up land coverage with least per capita open space in Metro Melbourne.

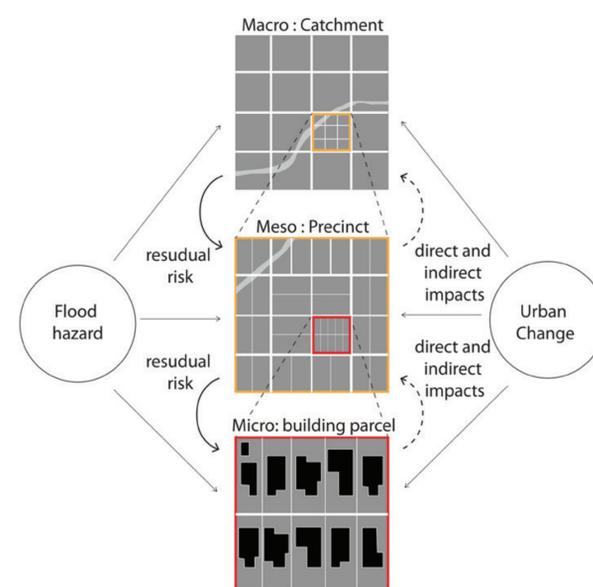


Figure 1: Diagram representing cross scale interactions and feedback loops within three spatial scales of an urban system.

EXPECTED OUTCOME

- Critical review of policy and practices to understand the anthropogenic drivers (root causes) of flood risk in the catchment.
- Assessment of risk reduction capacity of urban form at local level.
- Comparative performance outcome of dwelling typologies in terms of its capacity to runoff reduction.
- Assessment of the degree of preparedness and dynamic change management.