

ISSUE 47 MARCH 2018

TOPICS IN THIS EDITION | FLOOD | LAND MANAGEMENT | POLICY | MITIGATION | RESILIENCE

FLOOD MANAGEMENT IN A CHANGING CLIMATE

ABOUT THIS PROJECT

This research was conducted as a PhD study: *Flood management in a changing climate: integrating effective approaches*, under the broader Bushfire and Natural Hazards CRC project: *Policies, institutions and governance of natural hazards*.

AUTHORS

Caroline Wenger, The Australian National University. Dr Wenger completed her Bushfire and Natural Hazards CRC PhD in 2016. Contact caroline.wenger@anu.edu.au

SUMMARY

Flooding is Australia's most expensive natural hazard and climate change will magnify risks. However, recent floods suggest that Australia has limited capacity to manage even current risks. Australian flood policy relies heavily on the twin concepts of disaster resilience and shared responsibility. While increased self-reliance is desirable, resilience strategies have been criticised for failing to address underlying development issues, while shifting



▲ Above: COMMUNITY RESISTANCE TO RELOCATION AT NORTH WAGGA: PLANNING FAILURE IS HARD TO REMEDY. PHOTO: CAROLINE WENGER.

responsibility onto communities. This begs the question as to whether resilience strategies will lead to essential adaptive outcomes over the longer term (see breakout box on page 2).

This research investigated the adaptive potential of alternative management options. Results have implications for policy, land planning and management.

CONTEXT

Australian natural hazard funding programs place little emphasis on flood prevention; where they do, the majority is spent on structural mitigation. However, some measures, such as levees, are inflexible in the face of climate change and, are arguably maladaptive when assessed against criteria (see breakout box on page two). Costly levee failures overseas have led to the development of innovative approaches in the Netherlands, the United Kingdom, China and the United States to address future climate threats. These approaches have potential for policy transfer to Australia.

BACKGROUND

Globally, levees have been important for flood mitigation. However, major levee failures (Yangtze River 1998; New Orleans 2005) have raised questions about whether such measures will be able to cope with

future, unpredictable climate conditions.

Unlike overseas reviews, Australian post 2010-2011 flood reviews failed to consider the adequacy of existing policies to address climate change risks, a serious omission for future policy development. Despite this, Australian reviews identified flood mitigation deficiencies including development planning and highlighted inadequacies of levee use and management.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

Case studies were prepared for four flood-prone countries: Australia, the USA, the Netherlands and China. Interviews were held with Australian flood experts and case studies were verified by international experts.

Academic literature relating to policy transfer, institutional theory, adaptation and resilience provided an analytical framework and criteria to assess the adaptive potential

of various management options.

Capacity to adopt adaptive options was then assessed in the Australian context to reveal institutional barriers and perverse incentives. Where adaptive options had been implemented, success factors were identified.

Finally, research was carried out into how disaster resilience is interpreted in different countries and whether resilience policies support adaptive approaches.

RESEARCH FINDINGS

Adaptive management options used overseas, such as flood compatible development planning, relocation and floodplain restoration, face significant barriers in Australia. Lack of development restraint in flood-prone areas generates ongoing demand for maladaptive remedies such as levees and dams. These will prove increasingly unreliable when confronted with climate change and 'unprecedented' flooding.

ADAPTATION CRITERIA

Adaptive: Long term planning over large areas; cross-sectoral synergies; 'soft' (i.e., management and planning); socially acceptable; equitable; flexible/reversible (can respond to climate uncertainty); economic efficiency (e.g. low cost safety margins).

Maladaptive: Negatively impacts other systems, sectors, social groups (especially the most vulnerable); reduces incentives to adapt; induces path dependency; increases greenhouse gas emissions; high opportunity costs.

While institutional differences hamper policy transfer, overseas examples help to identify opportunity and under-the-radar examples operating within the recipient country's institutional context for scaling up. For example, agricultural productivity may be the primary reason a measure is adopted, with flood mitigation viewed as a co-benefit, revealing the importance of a cross-sectoral approach.

Because it can be used to justify almost any activity, the usefulness of resilience as a guiding concept is limited. Resilience policies need to be more discriminatory so they can more clearly support activities likely to be adaptive over the longer term. To this end, one research outcome was a preliminary revision of the Prevent-Prepare-Respond-Recover (PPRR) Framework to make it easier to distinguish activities most likely to lead to adaptive outcomes.

HOW THIS RESEARCH COULD BE USED?

Policy conflicts continue to encourage the development of floodable areas. Meanwhile, state funding programs favour the use of structures such as levees to remedy poorly-sited development, in a pattern of path dependency commonly known as the levee paradox. These same programs may explicitly render options such as raising houses and

END-USER STATEMENT

While those who ignore the past may be condemned to repeat it, those who slavishly look to the past for direction may equally be condemned to compound its failures. New challenges to the social and physical construction of reality mean that what used to work may in future make things worse when it comes to disaster management. The interdependencies of areas such as planning, public policy and emergency management should be obvious and yet across all tiers of government, it is not always so. Similarly, public policy promoting a resilience approach founders if it simply falls back on old thinking for solutions. In this significant research, Caroline Wenger has used flood management to illustrate this dilemma and to suggest new pathways that suggest the wisdom of adaptation rather than resistance.

- John Schauble, Director, Emergency Management Resilience, Emergency Management Victoria

FURTHER READING

Wenger C (2016), Flood management in a changing climate, PhD thesis, Fenner School of Environment and Society, The Australian National University <https://openresearch-repository.anu.edu.au/handle/1885/117237>

Wenger C (2017), The oak or the reed: how resilience theories are translated into disaster management policies. *Ecology and Society* **22**(3):18. doi:10.5751/ES-09491-220318.

Wenger C (2017), Translating resilience theories into disaster management policies, Bushfire and Natural Hazards CRC.

relocation ineligible, despite them being more adaptive.

The levee paradox is a 'resilient' feedback loop whereby levee building/augmentation, increased development and higher damages go hand in hand, meaning that ever higher levees are not the answer for both economic and technical reasons. Resistance strategies are not resilient over the longer term: they accumulate risks for the future, ultimately resulting in catastrophic failure.

The challenge for policy makers is to deliberately break out of this loop into a more desirable resilience regime - 'living with floods', instead of resisting them.

Cross-sectoral planning (to achieve co-benefits), suitable project funding length and foreplanned integration into disaster recovery are needed.

The issue of ongoing development of floodable lands also needs solving. It can partly be attributed to the division of government responsibilities: private individuals and the federal government are largely responsible for

recovery, not the state and local governments that authorise development. Federal disaster recovery policies that reward states and local governments which have stronger development controls may go some way to rectifying incentives.

This research has the potential to be used by development planners and flood managers to aid selection of adaptive flood management options. It could also be used to inform policy at different government levels.

FUTURE DIRECTIONS

The theoretical groundwork has been laid. The next step is implementation, perhaps leading to Australia's own 'living with floods' program.

Flood-prone areas that could benefit from an ecosystems-based approach first need to be identified. Of these, some pilots could be selected. These would be designed to integrate and assess cross-sectoral costs and benefits.

This stage would require government/private sector buy-in to proceed.

The Bushfire and Natural Hazards CRC is a national research centre funded by the Australian Government Cooperative Research Centre Program. It was formed in 2013 for an eight-year program to undertake end-user focused research for Australia and New Zealand.

Hazard Notes are prepared from available research at the time of publication to encourage discussion and debate. The contents of *Hazard Notes* do not necessarily represent the views, policies, practises or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.

All material in this document, except as identified below, is licensed under the Creative Commons Attribution-Non-Commercial 4.0 International Licence.

Material not licensed under the Creative Commons licence:

- Bushfire and Natural Hazards CRC logo
- All photographs and graphics.

All rights are reserved in content not licensed under the Creative Commons licence. Permission must be sought from the copyright owner to use this material.