

Adapting our built environment to a changing climate

Background

Global warming is projected to increase the impacts of climate-related natural hazards, especially floods and bushfires, and, with less certainty, tropical cyclones and storm surges. The damage and costs from these impacts will also be increased if more infrastructure investment occurs in locations subject to these hazards or if the infrastructure is not built and managed to a standard that takes account of these hazards.

The case studies for this report involved literature reviews, document analysis, analysis of experimental and empirical structural engineering data, in-depth interviews, semi-structured surveys and a structured on-line survey.

Adaptation options for planning, building and insuring

OBJECTIVES

This project examined potential adaptation options to address the likely impacts on the built environment of increased intensities in floods, tropical cyclones and bushfires. These options were examined for three hazards:

1. using land use planning for floods at a regional scale;
2. applying altered building codes at a town scale to improve adaptation to tropical cyclones; and
3. encouraging insurance for bushfires at a household scale.

LAND USE PLANNING FOR STORM SURGES AND FLOODS: STAKEHOLDER RESPONSES

» Case Study 1: Mission Beach, Queensland

Mission Beach has been affected by storm surges, most recently when Cyclone Yasi hit in 2011. Residents of the area were surveyed about their attitudes to the three possible adaptation options: retreat, protect and accommodate. They strongly supported adaptation options that would protect existing buildings and infrastructure, such as sea walls and barriers, as well as options that accommodate storm surges, for example by raising coastal infrastructure and increasing new house slab heights. They did not support relocation, retreat or buy-back, clearly demonstrating a strong desire to continue living close to the coast.

» Case Study 2: Adapting to riverine flooding in Brisbane

This case study focussed on the understanding of flood risk and adaptation strategies among residents affected by the January 2011 Brisbane flood. Most residents chose raising the house as their most likely adaptation action, but said they would do nothing without mandatory legislation because of cost. Improved insurance was seen as the preferred long-term security solution to 'accommodate' floods.

The riverside lifestyle overrode concerns about flood risk. Respondents showed little knowledge about the vulnerability of their property to flooding, and poor understanding of current hazard terminology such as '1-in-100 year flood'. Generally, this lack of knowledge was recognized, and a strong desire was expressed for better flood and hazard maps, and better communication of these maps by local authorities.

» Case Study 3: Planning Review of Queensland Flood Inquiry

Responses to the findings of the Queensland Flood Commission of Inquiry into the Brisbane floods of 2011 differed for residents and planners. Planners preferred flood adaptation options such as flood proofing buildings and infrastructure, but flood protection options were preferred by the residents and other members of the public. There was only limited consensus on the part of professional planners about the Commission's recommendations, although they were clear that flood management plans should be a priority responsibility of local authorities.

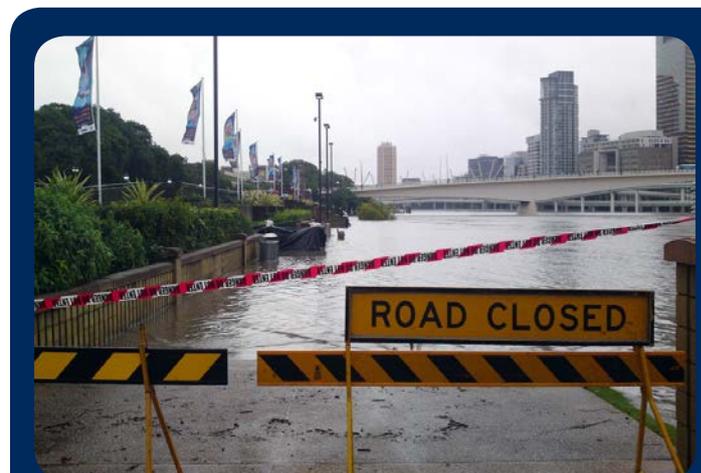


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THE CAPACITY OF BUILDING CODES TO LIMIT DAMAGE TO BUILDINGS FROM CYCLONES

Significant wind damage to housing in the 1970s (caused by Cyclone Althea in Townsville and Cyclone Tracy in Darwin) resulted in changes to Australian building codes with respect to wind loading. The potential for building codes to contribute to effective climate change adaptation to tropical cyclones was assessed by evaluating the effects of these changes.

The results of the changes are clear: houses built well and to the standards since 1980 in areas prone to cyclones are generally more able to withstand cyclone impacts than houses built before 1980, as demonstrated by impacts from Cyclones Larry (2006) and Yasi (2011) in Queensland.

Applying upgraded building requirements to existing houses, such as through ensuring openings such as doors and windows are cyclone proof, can make them more cyclone resistant. However, the cost effectiveness of these changes would need to be assessed.

THE POTENTIAL FOR INSURANCE TO INCREASE HOUSEHOLD RESILIENCE TO BUSHFIRES

The potential for insurance to support climate change adaptation and risk mitigation was examined in the context of bushfires in Tasmania, though findings are broadly applicable to other natural disasters. Several factors contribute to under-insurance or no insurance in areas of bushfire risk:

- » consumers struggle to take practical steps to address low-probability, high loss events;
- » low incomes can result in insurance not being affordable;

- » anticipated assistance after a bushfire occurs may reduce a commitment to independent risk management;
- » new residents without experience of local hazards may not perceive or understand these hazards; and
- » insurers may withdraw from high risk areas or events.

Three key limitations to the role of insurance in climate change adaptation and risk mitigation were identified:

- » insurance is not a priority or option for all;
- » insurance currently plays a limited role in adaptation and mitigation; and
- » the capacity of insurance is constrained by limitations in governance.

Further research is required to understand how these limitations can be addressed.



Image © Matthew Mason

Recommendations

Risk mitigation and climate change adaptation cannot be left to voluntary uptake or good practice. Good governance will need to drive the delivery of a more resilient nation.

Even under a stable climate, extreme weather events are under-considered in planning, building and insurance. Each of these can provide leadership and effective responses to changing climate-related hazards,

but each has its own independent professional knowledge and governance, making a consistent approach challenging.

Key stakeholders will need to agree about preferred adaptation outcomes for effective adaptation programs to be implemented, and professional planners will need to balance public views about preferred adaptation outcomes with their professional responsibility to deliver public safety.

This document summarises key findings from the NCCARF report *Planning, building and insuring: Adaptation of built environment to climate change induced increased intensity of natural hazards*. The project was led by David King, James Cook University. The full report is available at: www.nccarf.edu.au/publications/planning-building-insuring-adaptation

This work was supported financially by the Australian Government through the Adaptation Research Grants Program. The views expressed are not necessarily those of the Commonwealth and the Commonwealth does not accept responsibility for information or advice contained within.