

NCCARF Highlights: Promoting excellence in adaptation



Learning from experience: A Synthesis of Historical Case Studies

Why study past extreme weather events?

The NCCARF consortium has developed a suite of historical case studies to examine present-day management of climate variability and the lessons that can be learnt for adaptation to future climate.

These projects examine case studies of seven historical extreme events:

- Cyclone Tracy, which struck Darwin on Christmas Day 1974;
- Drought in small inland agricultural communities: Donald, a dryland agricultural community in central Victoria, and Mildura, an agricultural community dependent on irrigation water from the Murray;
- Drought in mining communities: Broken Hill and Kalgoorlie;
- Heatwaves, taking the case of the late January early February 2009 heatwave in Melbourne and Adelaide;
- Queensland floods in 2008, looking at Charleville in southern central Queensland, which was flooded from Bradley's Gully in January, and Mackay, which experienced a flash flood in February;
- Storm tides, looking at the period from the 1950s to the mid 1970s when there was a series of severe storm tides along the coast of southern Queensland and northern New South Wales;
- An East Coast Low: the Pasha Bulker storm that struck Newcastle in June 2007.

Decision makers at all levels, from the community to the Federal Government, can relate their experience to historical events, and the successes and failures achieved. In this way, historical case studies provide a tool for planning adaptation measures for future climates.

The event: before, during and after

Preparedness and vulnerability

For most of the case studies, there was a history of similar events and pre-existing adaptation measures (e.g. a levee system near Newcastle during the 2007 Pasha Bulker storm). In some, but not all cases this resulted in successful reduction of vulnerability through either preparedness or infrastructure.

Immediate impacts and response

In each case study, both successful and failed actions were identified. In general, the responses of emergency services were well co-ordinated, with good escalation of response. Differences in the levels of community engagement and cohesion were important determinants of the severity of impact.

Post-event responses and actions

For all case studies reviewed, there were government and community responses targeted at reducing the impact of future events. For example, the rebuilding of Darwin following Cyclone Tracy was expensive, extensive and had long lasting consequences not only for Darwin, but for the Australian building industry as well through revision of the building code.

The passage of time between events can be both beneficial and detrimental. In Darwin, it allowed full recovery and resilience building. However, years of 'calm weather' along the east coast of Australia has meant that planning and development is no longer sensitive to the potential property losses related to storm tides.

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Reflections

Resilience or stoicism?

Many communities were described in case studies as resilient. However different definitions or understanding of the term were apparent – with it viewed as either a positive or a negative. One definition of resilience that was common was the ability to ‘bounce back’. However, returning a community to its pre-disaster state is not always the optimal action. Another understanding of resilience, common amongst drought affected communities, the ability to hold on until things got better or the problem goes away. This is stoicism and not resilience and is actually a barrier to increasing adaptive capacity.

Why does nothing happen? Barriers to translating knowledge into actions

Many of the common lessons or reoccurring failures in each of the case study events are widely recognised by stakeholders as needing to be addressed. Moreover the knowledge and tools to underpin action are available. Why, therefore, are adaptation actions not being implemented? In essence, what are the barriers to adaptation?

The costs and benefits of adaptation versus the cost of impacts

Where a clear adaptation strategy presents itself, there is the temptation to implement it without full consideration of the costs involved. However, the cost of adaptation should be weighed against the costs of the

impact. If the cost of the impact is less than the cost of the adaptation, then it may be a preferable strategy to bear the impact cost.

Who bears the cost? The burden of risk and the role of government

When an extreme event hits, a portion of the burden of the impact remains with the community – personal loss, adjustment, health risks, insurance costs, social displacement. It is a ‘resilient’ community that best recovers and adapts to this burden. Some part of the recovery process will be the responsibility of the government – repair of infrastructure, provision of emergency services and disaster funds. The placing of the line between community and government responsibility will fluctuate in response to a number of factors: the wealth of the community, government policy etc. Due to the chaotic nature of extreme events there will always be limits to adaptation and as such there will always be a role for government in absorbing some portion of the cost associated with natural disasters.

Adaptation in an uncertain climate

Even using the best available science, the ability to realistically predict or project what will happen in the future is associated with a high degree of uncertainty. Therefore, there is an urgent (and more achievable) need to quantify the uncertainties and develop tools to support decision making under uncertainty.

Eight broad lessons

- 1 *Governments at all levels need to provide frameworks to enable adaptation through incentives and regulation.* Following Cyclone Tracy a framework of regulations and certification ensured that best knowledge rather than traditional or historical techniques were used in rebuilding.
- 2 *Adaptation actions should be realistic, pragmatic and forward thinking.* Adaptation actions may not be fit for purpose (e.g. flood alleviation along the Warrego did not prevent flooding along Bradley’s Creek in Charleville).
- 3 *Non-holistic adaptation to a specific historical event may be inappropriate.* Some adaptation actions to a single event type could be a maladaptation to other event types (e.g. adapting to drought might magnify flooding effects).
- 4 *Short-term solutions are not always suitable for the long-term.* Strategies to deal with extreme events can become out-of-date under climate change e.g. providing emergency payments during a drought, when these events are likely to become more ‘typical’.
- 5 *Recognising a new type of disaster or knowing when to call a situation an emergency is critical to successful adaptation.* During the 2009 heatwave in southern Australia there was no clear threshold or trigger for disaster management or community awareness.
- 6 *Communities need to be aware and prepared.* Although not new, this was highlighted across all case studies. In the case of rapid onset of an event (e.g. flash flooding) community members need to have the knowledge to respond appropriately.
- 7 *Communities may have to recognise that something has changed.* Communities where extremes are becoming more common, or resources are being used unsustainably may ultimately need to recognise that the only long-term solution is transformational change.
- 8 *Some communities are more vulnerable because of their geographical, social, cultural or economic situation.* Small communities with limited access to resources are often more vulnerable due to their limited capacity to financially or geographically resource adaptation measures (e.g. limited access to water).

More Information:

The complete suite of case study reports is available online at www.nccarf.edu.au