

## Climate change impacts factsheet:

# 7. Emergency management

Climate change is expected to increase the frequency and intensity of some extreme climatic events and natural disasters, including storms, droughts, heatwaves, bushfires and floods. There are varying degrees of uncertainty about projections of increasing severity for specific hazards, from virtually certain for heatwaves to highly uncertain for cyclones. Nevertheless, increasing our resilience and preparedness is likely to be a 'no-regrets' option.

Emergency management organisations are on society's frontline in preparing for such events: preventing damage, responding to damage and harm when they occur, and managing recovery. Increasingly, disaster risk reduction (or emergency management) is seen as nearly synonymous with climate change adaptation. It provides the conceptual basis and institutional arrangements to deal with increasing uncertainty and complexity in our weather, and most sectors of society now incorporate emergency management principles and approaches into their adaptation planning.

### Present-day climate and emergency management

The emergency management sector already faces considerable strain from extreme climatic events. Figure 1 shows the distribution of high-cost extreme weather-related events in Australia from 1999 to 2011. In Australia, the sector relies heavily on volunteers and non-government organisations for prevention, preparedness, response and recovery. Increasingly, there are attempts to share the risk across Australian society with, for example, media campaigns at the beginning of every fire season encouraging householders to re-visit their bushfire emergency plans.

There are about 500,000 volunteers in the sector, with approximately 350,000 involved in response and recovery. Recent research has found that many volunteers struggle to balance full-time paid work and family responsibilities with higher expectations of training and compliance, as well as emergency callouts.

The impacts of climate change will exacerbate the difficulties and increase the stresses on individuals working in the sector. However, increasing levels of risk are not only due to climate change: they may also be the result of socio-economic change, as tree-changers and people seeking cheaper housing move into at-risk areas, and demographic change, in particular an ageing population.

### Future climate trends

Increases in the frequency and intensity of extreme events, and changes in their location, are expected to place additional strain on emergency services. Our best guess for the future of extremes in Australia due to climate change is:

- Heatwaves – high level of certainty of increased frequency and intensity.
- Bushfire danger – strong evidence that south-east Australia will experience more high fire-risk days, but uncertainty about the magnitude of change.
- Rising sea levels – high level of certainty of sea-level rise resulting from thermal expansion, but rates and extent of rise caused by ice melt uncertain.
- Storm surge – little certainty on changes in extent and frequency due to storm system change, but likely to be exacerbated because of sea-level rise.

Figure 1:  
Major insured loss events greater than  
\$100 million in Australia from 1999-2011



#### Sources:

1. Risk Frontiers - PerilAUS disaster database

2. Insurance Council of Australia - Historical disaster Statistics

\*Note: costs are in dollars of the day. For normalised losses of 1967-2006 events see:

Crompton RP and McAneney KJ, 2008, Normalised Australian insured losses from meteorological hazards: 1967-2006. *Environ Science & Policy* 11: 371-378.

- Rainfall events – high level of agreement that some areas will become drier, while others are likely to experience intensified rainfall events and increased risk of flooding, but uncertainty over which areas will be affected and how.
- Tropical cyclones – considerable uncertainty remains over changes in the location, frequency and severity of tropical cyclones.
- Hail – significant uncertainty over the potential for hail events to increase

In addition to the obvious risks of increasing severity and frequency of extremes, climate change affects the sector in other, less obvious, ways:

- It increases the already pervasive uncertainty that confronts emergency management arising from, among other things, high year-to-year climate variability.
- Gradual changes that alter thresholds may cause smaller climate and weather events to trigger large impacts. For example, gradual drying may result in chronic water deficits for environmental and human needs.
- There is a possibility of non-linear effects, such as the combined impact of extreme drying and higher temperatures on wildfire behaviour.
- An additional risk is the potential for an increase in concurrent events, which may limit the capacity of each jurisdiction to draw on resources from interstate or the region. Equipment and personnel-sharing arrangements between Australia and the United States, for example, may be jeopardised by the increasing overlap of fire seasons.

### Social and economic impacts

Future increased risks from climate change will coincide with other pressures on emergency management. Demographic, socio-economic and political factors, such as population growth and residential development, can all influence exposure to climatic hazards. For example, in Victoria the projected 44% population growth by 2036 is largely expected to occur in coastal and inland areas that are potentially at risk from bushfire, flooding and sea-level rise. Growth in high hazard areas is predicted for most Australian states.

Vulnerability is shaped by factors that influence individual, collective and organisational capacities to anticipate, prepare, respond and recover from the impacts of hazards. These factors include age, gender, disability, access to information, socio-economic status, capacity to mobilise financial and other resources, and participation in social networks. Elderly people may be particularly vulnerable to increases in the frequency and severity of heatwaves due to limited physiological capacity for heat regulation.

### Adaptation: practices, options and barriers

Strategies adopted by emergency services to facilitate adaptation include:

- mitigating exposure by providing input into land use planning (strategic and statutory) and construction requirements (e.g. building codes);
- community education and engagement to raise risk-awareness and promote protective action;
- identifying vulnerable locations, groups and individuals who may require assistance; and,
- facilitating and supporting emergency management research.

### Research priorities

Emergency management is about dealing with uncertainty, by reducing it where practicable (preventative actions), and having mechanisms to deal with it even where the extent and sources are unknown. Fundamental to achieving these outcomes is enhancing resilience. The National Climate Change Adaptation Research Plan: Emergency Management identifies four priority research topics to inform adaptation:

- *Understanding risk*: developing a 'baseline' understanding of current risks and considering how climate change may change or create new risks.
- *Community and organisational resilience*: developing a better understanding of what 'resilience' means in a changing climate and the strategies and practices through which resilience can be fostered.
- *Adaptive strategies*: considering the strategies required for adaptation in the emergency management sector, including the potential role of the private sector in supporting disaster response initiatives.
- *Regional linkages*: the implications of climate change for emergency management in the Asia-Pacific region, in particular how the adaptive capacities of neighbouring countries may impact upon the Australian emergency management systems and services.

### Costs

Both sudden and slow onset disasters and emergencies impose a large financial burden on Australia and can lead to tragic loss of life. The Queensland and Victoria floods of January 2011 and the 'Black Saturday' bushfires of February 2009 cost the nation billions of dollars and, in the case of the floods, led to a nationwide tax levy to repair the damage. At this stage it is not possible to attribute any of this directly to climate change. Attempts to cost adaptation are at an early stage.

### About the Network

The NCCARF Adaptation Research Network for Emergency Management fosters information exchange and collaboration among researchers, policymakers and practitioners in the sector and seeks to support and facilitate research to inform adaptive responses to climate change. Network membership is open to any individual or organisation with an interest in emergency management, and currently comprises more than 300 researchers, policymakers and practitioners from over 80 organisations. A number of research projects have been funded by NCCARF through the Network.

The Network hosts seminars and interactive workshops on topics related to climate change and emergency management.

For more information visit the Network website:

<http://emergencymanagement.org.au>