

Total economic cost of natural disasters

Direct tangible costs

Costs incurred as a result of the hazard event and have a market value such as damage to private properties and infrastructure

Indirect tangible costs

The flow-on effects that are not directly caused by the natural disaster itself, but arise from the consequences of the damage and destruction such as business and network disruptions

Intangible costs

Capture direct and indirect damages that cannot be easily priced such as death and injury, impacts on health and wellbeing, and community connectedness

1. Introduction

Key points

- Natural disasters have a devastating impact on individuals, families, local communities, businesses and governments. In particular, the social impacts are complex, interrelated and difficult to quantify
- There is clear evidence social impacts account for a substantial part of the total economic cost of natural disasters
- This report focuses on placing a monetary value, where possible, on these social impacts to better understand the total economic cost of natural disasters and thereby strengthen the case for building individual and community resilience.

Natural disasters have devastating financial and social impacts on individuals, families, local communities, businesses and governments. The evidence shows that the social impacts are complex, interrelated and difficult to quantify; yet, it is clear they account for a substantial part of the total economic cost of natural disasters.

This report fills this recognised gap in the research by placing a monetary value on some of these broader social impacts. This enables a better understanding of the total economic cost of natural disasters in Australia, thereby strengthening the case for a national, long-term approach to managing natural disasters and protecting our communities.

Australia is vulnerable to a range of natural hazards including bushfires, severe storms, cyclones, floods and earthquakes. In recent years, natural disasters have included: the Black Saturday bushfires in Victoria; Cyclone Yasi in Northern Queensland; widespread flooding across Queensland, Victoria, Tasmania and New South Wales (NSW); and several damaging East Coast storms that, particularly in NSW, have claimed more than 200 lives and directly affected hundreds of thousands of people. These disasters have had long-lasting and far-reaching social impacts on the health and wellbeing of individuals and communities.

The findings from this report build on previous work commissioned by the *Australian Business Roundtable for Disaster Resilience & Safer Communities* in 2013, which estimated that financial losses, deaths and injuries in Australia cost more than \$6 billion in 2012 and was expected to average \$23 billion per year by 2050. The report noted that these disasters also had a wide range of social, psychological and community repercussions that were difficult to quantify but no less important – and could affect individuals, their communities and the broader society over a long period of time.

The 2014–15 Productivity Commission *Inquiry into Natural Disaster Funding Arrangements* noted that these social impacts can't be easily priced as they do not involve the purchase of products or services. The report recognised that these costs are difficult to quantify, can accrue over the long term and can have serious impacts. Data constraints and the complexity of estimating the social impact of natural disasters have made it difficult to estimate these costs.

It is important to note that this paper assumes natural hazards will be as frequent in the future as in the past; that is, the rate of natural disasters will be constant over time. Given the evidence for climate change, this is unlikely to be the case – extreme weather events will probably occur more regularly in the future than in the past (Box 1). Thus, since this paper does not factor in the impact of climate change, the estimations here are conservative, with future costs likely to be even bigger than anticipated.

1. Introduction

Box 1: The impact of climate change on natural disasters in Australia

There is virtually unanimous agreement among climate scientists that human activity is substantially contributing to climate change. The human impact on climate since the start of the industrial era greatly exceeds the impact due to known changes in natural processes (Intergovernmental Panel on Climate Change, 2007). The Intergovernmental Panel on Climate Change released its fifth *Assessment Report* into climate change in 2014. The second Working Group paper, *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, states that climate change will generally (though not uniformly) increase the severity and rate of natural disasters in Australia. It states with 'high confidence' that there will be an 'increased frequency and intensity of flood damage to settlements and infrastructure in Australia', an increase in 'the number of days with... extreme fire weather' and 'greater frequency and intensity of droughts'.

The most recent report from Commonwealth Scientific and Industrial Research Organisation (CSIRO) into climate change, *Climate Change in Australia: Projections for Australia's Natural Resource Management Regions* (2015), likewise concludes that climate change will almost certainly increase the frequency and severity of natural disasters. As temperatures rise, the atmosphere is able to hold more water, increasing the possibility of extreme rainfall events and flash flooding. It is also projected that higher temperatures will increase the number of days with harsh fire weather.

Geographical shifts in the distribution of natural disasters are likely too, potentially affecting communities who are unfamiliar with preparing, responding to and recovering from natural disasters. The climatological distribution of rainfall will change, which translates to a change in catchment hydrology. Climate change will thus change the frequency and severity of river flood risks in Australia, but not in a uniform manner. Some rivers will flood more severely and frequently while others will not.

At the 21st Conference of Parties to the United Nations Framework Convention on Climate Change (COP21), member countries agreed by consensus in the Paris Agreement to 'reduce their carbon output as soon as possible and to do their best to keep global warming to well below two degrees Celsius'. The agreement, which comes into force in 2020, represents a turning point for multilateral action to limit climate change below dangerous levels. Despite the commitment to limit global warming to two degrees, sea levels are still expected to rise by around six metres, posing a great risk to coastal regions and small island nations (Dutton et al, 2015).

The COP 21 Agreement was a landmark commitment to focus on adaptation, resilience and response to climate impacts. All countries will need to submit adaptation priorities, support needs and action plans. Developing countries will receive increased support for adaptation actions and the adequacy of this support will be assessed through a transparent framework.

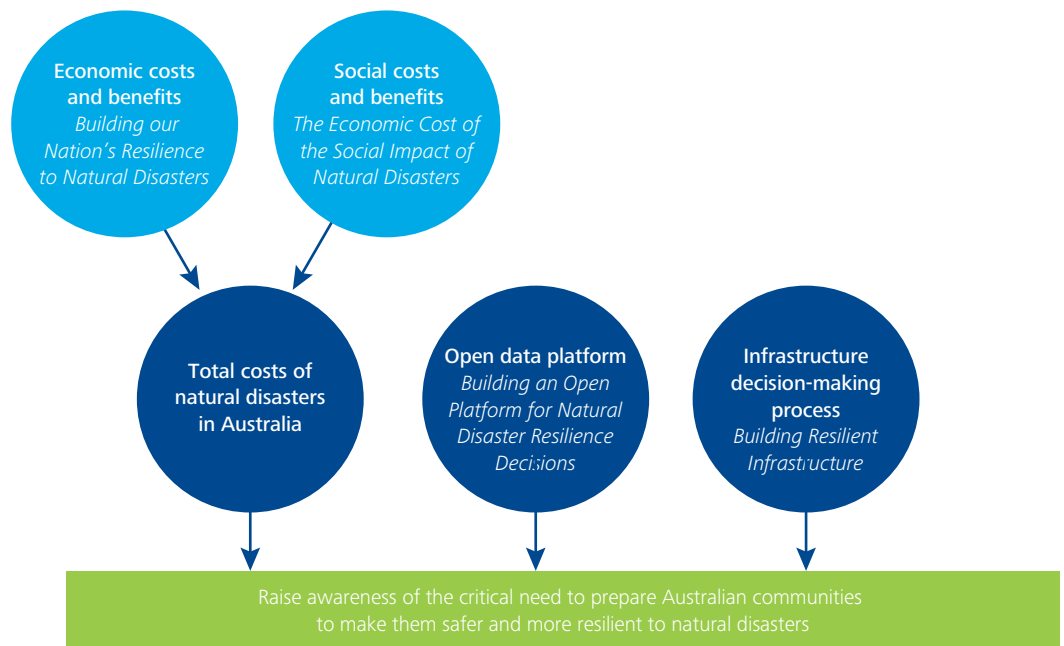
1. Introduction

Given the cost of extreme weather events is expected to continue increasing over time, as well as the large and long-term costs of social impacts associated with these events, there is an even greater need for emergency management across government, businesses and the not-for-profit sector. There has been a greater recognition of the need to build a more resilient Australia and some disaster recovery measures have recognised social impacts. For example, in 2007, the Australian Government Disaster Recovery Payment, which is intended to assist with short-term or emergency recovery needs, was extended to include those who were seriously injured in a disaster. In 2009, this was further extended to include those who experienced psychological trauma, who were unable to return to their home for 24 hours, or who experienced a utility failure for 48 hours. However, this extension of funding was removed in 2013.

This report supports the Roundtable's aim to raise awareness of the critical need for cost-effective resilient infrastructure, and to drive change in governments, businesses and communities. It directly supports the recommendations of *Building our Nation's Resilience to Natural Disasters* (2013) by demonstrating how important it is to consider the cost of social impacts in the disaster mitigation and infrastructure decision-making process. The report strengthens the case for a long-term approach to managing natural disasters, in line with the Roundtable's aim to build safer communities and generate broader economic and social benefits.

This paper has been developed in conjunction with a second paper, *Building Resilient Infrastructure*, which investigates the decision-making process for new 'hard' infrastructure in light of disaster risks. That report discusses the importance of taking a holistic view of economic costs when making investment decisions (Figure 1.1).

Figure 1.1: Summary of the Roundtable's work on natural disaster resilience



1. Introduction

1.1 The structure of this report

This report is set out as follows:

- **Chapter 2:** provides an overview of the complex web of tangible and intangible impacts that make up the total economic cost of natural disasters
- **Chapter 3:** quantifies the tangible and intangible cost of three case studies, and forecasts the total cost of an average year of natural disaster events in Australia
- **Chapter 4:** summarises the importance of building resilience at the individual and community level through community awareness, education and engagement programs that aim to strengthen social capital
- **Chapter 5:** provides recommendations for future action in pre-disaster resilience.

Supporting information is provided in five appendices:

- **Appendix A:** provides a summary of the Roundtable's related companion papers and how this paper fits in overall
- **Appendix B:** provides an overview of the recent Productivity Commission inquiry into natural disaster funding arrangements
- **Appendix C:** looks at some key examples of natural disasters in other countries and the social impact of those disasters
- **Appendix D:** details the methodology for estimating natural disaster costs
- **Appendix E:** details the evidence on the social impacts of natural disasters.



People were left isolated by flooding in the Hunter region, NSW, 2007 (Guy Carpenter)



A local resident sits in his home surrounded by flood waters on January 6, 2011 in Rockhampton, Australia (Jonathan Wood / Getty Images)