Implementing Disaster Resilience Policy in the Australian Federation

by

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Candidate's Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of the author's knowledge, it contains no material previously published or written by another person, except where due reference is made in the text.

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Acknowledgements

Abstract

Australia adopted the National Strategy for Disaster Resilience in 2011. This officially set it on a path to change the attitudes and behaviours of all sectors of society to share responsibility for disaster risks. This would require a shift away from the traditional emphasis on disaster, response, relief and recovery toward prevention, preparation and planning, and risk mitigation. Eight years later, disaster resilience policy continues to be implemented at all levels of government as well as influencing resilience-based approaches in the Not-for-Profit and business sectors. Much progress has been made in disaster resilience research, especially in the area of measurement, including the development of indicators that can potentially inform evaluation of the effectiveness of disaster resilience policy. However, there is shortage of research and a lack of awareness about the significance of policy implementation and governance for achieving successful policy outcomes. This thesis seeks to address this gap and investigates whether the implementation of disaster resilience policy in Australia reflects good practice and how current practice is shaped by the characteristics of the Australian Federal (multi-level) system of government. The methodology involves three parallel linked avenues of inquiry that includes the development of a Provisional Disaster Resilience Policy Implementation Framework (the Provisional framework) to guide implementation, the application of the Provisional Framework to a number of case studies of implementation to identify principles and practices relevant to multi-level governance systems that will enhance disaster resilience, and the evaluation of the Provisional framework to incorporate these findings.

A key research outcome is the Disaster Resilience Policy Implementation Framework that confirms the inclusion of the Policy Domains of Social Capital, Community Competence, Economic Development, Information and Communication, with the addition of a fifth and complementary Policy Domain, Subsidiarity. Subsidiarity is an organising principle that is closely associated with federalism and states that '*that any particular task should be decentralized to the lowest level of governance with the capacity to conduct it satisfactorily'* (Marshall, G.R., 2008, 'Nesting, subsidiarity, and community-based environmental governance beyond the local scale'. *International Journal of the Commons,* 2(1) p.80). This has implications for practice that have fundamental regard to the operation of disaster resilience within a system consisting of component parts that must work together to synergise disaster resilience efforts. For this system to work effectively activities must be coordinated using effective feedback mechanisms and facilitated by open and shared access to information, devolved to the appropriate level with approaches that nurture capacity, and with roles and responsibilities that are negotiated and clearly defined through an authentic process of stakeholder engagement.

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Glossary and Terms

Term	Definition	Source
Build back better	The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies and the environment. The term "societal" will not be interpreted as a political system of any country.	(United Nations International Strategy for Disaster Reduction, 2019)
Betterment	Rebuilding an asset to a more disaster resilient standard and a form of mitigation that is done following a disaster in order to reduce future disaster impacts.	(Productivity Commission, 2014:xiii)
Catastrophic disaster	An extreme hazard event that effects one or more communities, resulting in widespread, devastating, economic, health, social and/or environmental consequences, and that exceeds the capability of existing state and territory emergency and disaster management arrangements. An event could be of sudden impact or sustained impact over an extended time frame.	(Australian Institute for Disaster Resilience, 2014:23)
Complex emergency or disaster	May involve multiple hazards over long periods of time with damage to infrastructure, disruption to entire communities and long-term recovery. The response will require extensive interagency cooperation and may take place over a long period	(Eburn, 2013:155)

	of time, across large areas and across state and territory boundaries	
Community	The word "community" can be defined in many ways. It can denote those who live in a specific region, those who share certain characteristics (e.g., cultural history, religious belief) and identify as being part of a community, and those who come together through shared interests or concerns (Maguire & Cartwright, 2008). Communities can be located within a bound physical space or geographically dispersed, as with "online" or "virtual" communities (Porter, 2004). The word community can even be used to describe a feeling of connection, reciprocity and positive interaction, as in the statement "a real sense of community has developed". For the purposes of this paper, the term community refers to individuals and families who live in a similar geographic area. Furthermore, as this document focuses on challenges faced more frequently by those in regional and rural areas, "community" identifies towns or small cities, rather than major cities or large geographical areas such as whole states or territories.	Australian Institute of Family Studies Price-Robertson and Knight, 2012:3)
Cost-benefit analysis	The appraisal of an investment project which includes all social and financial costs and benefits accruing to the project. Cost-benefit analyses are techniques used to evaluate and decide whether a proposed project should proceed based on whether its benefits will exceed its costs.	(Bannock et al, 1998, p. 82)
Disaster management	The body of policy and administrative decision and operational activities which pertain to the various stages of preparing for, responding to, and recovering from disasters.	(Australian Institute for Disaster Resilience, 2020; United Nations Office for Disaster Risk Reduction, 2020)
Disaster risk	The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society, or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.	(United Nations Office for Disaster Risk Reduction, 2020)
Disaster risk Mitigation	Measures taken in advance of, or after a natural disaster aimed at decreasing or eliminating the impact of a natural disaster impact on society and environment. The lessening or minimizing of the adverse impacts of a hazardous event. The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques and hazard-resistant construction as well as improved environmental and social policies	(Australian Government, 2017:7)

	and public awareness. It should be noted that, in climate change policy, "mitigation" is defined differently, and is the term used for the reduction of greenhouse gas emissions that are the source of climate change.	
Disaster risk reduction	Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans.	(Australian Institute for Disaster Resilience, 2020)
Exposure	The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. Annotation: Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability and capacity of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.	(United Nations International Strategy for Disaster Reduction, 2019)
Framework	Purpose is to "identify the elements (and the relationships among these elements)...to consider for analysis...organize diagnostic and prescriptive inquiry...[and] provide the most general set of variables that should be used to analyze all types of settings relevant for the framework."13	(Ostrom, 2005; cited in Longstaff *et al.*, 2010:2)
Grey literature	The term grey literature refers to research that is either unpublished or has been published in non-commercial form. Academics, pressure groups, and private companies are only some of the sources of grey literature. Much grey literature is of high quality. Grey literature is often the best source of up-to-date research on certain topics, Examples of grey literature include: government reports, policy statements and issues papers, conference proceedings, pre-prints and post-prints of articles, theses and dissertations, research reports, geological and geophysical surveys, maps, newsletters and bulletins, and fact sheets.	(University of New England, 2019)
Hazard	A source of potential harm or a situation with a potential to cause loss. * A potential or existing condition that may cause harm to people or damage to property or the environment. * An	(Australian Institute for Disaster Resilience, 2019)

	intrinsic capacity associated with an agent or process capable of causing harm. A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socionatural in origin.	(United Nations International Strategy for Disaster Reduction, 2019)
Localism	An umbrella term which refers to the devolution of power and/or functions and/or resources away from central control and towards front-line managers, local democratic structures, local institutions and local communities, within an agreed framework of minimum standards'.	Evans *et al.,* 2013:405)
Moral hazard	A distortion of the market due to the presence of incentives for individuals to act in ways that incur costs that they do not have to bear.	(Bannock, 1998 pp. 284-285).
Multi-level governance	The reallocation of authority upwards downwards and sidewards from central states'	(Hooghe and Marks, 2003:5).
Natural Disaster	A serious disruption to a community or region caused by the impact of a naturally-occurring, rapid-onset event that threatens or causes death, injury or damage to property or the environment, and which requires significant and coordinated multi-agency and community response.	(Council of Australian Governments, 2002)
Policy	A course of action by government designed to attain specific results A statement of government intent and its implementation through the use of policy instruments	(Bridgman and Davis, 2004:5). (Bridgman and Davis, 2004:184).
Policy implementation	A process of interaction between the setting of goals and actions geared to achieving them.	(Pressman and Wildavsky, 1984:xxi)
PPRR framework	Prevention, Preparedness, Response and Recovery	(Australian Institute for Disaster Resilience, 2019)
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. The ability to absorb and then recover from an abnormal event; being ready and prepared to face threats and events which are abnormal in terms of their scale, form or timing; an ability and willingness to adapt to a changing and sometimes threatening	(United Nations International Strategy for Disaster Reduction, 2019) (McAslan, 2010:11)

	environment; a tenacity and commitment to survive; and a willingness of communities and organisations to rally round a common cause and a shared set of values"	
	A process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance.	(Norris *et al.*, 2008:131).
	Resilience is the capacity of a social system to proactively adapt to and recover from disturbances that are perceived within the system to fall outside the range of normal and expected disturbances	(Comfort *et al.*, 2010:9).
	Resilience is the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organize, change, and learn in response to a threat.	(Cutter *et al.*, 2008:599)
Risk	The chance of an event that will have an impact. It is measured in terms of consequences and likelihood.	(Australian Institute for Disaster Resilience, 2019)
Social capital	The information, trust and norms of reciprocity inherent in one's social networks'	(Woolcock, 1998:153).
	A variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors –whether persons or corporate actors - within the structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence.	(Coleman, 1988:S98)
Subsidiarity	..any particular task should be decentralised to the lowest level of governance with the capacity to conduct it satisfactorily	(Marshall, 2008:80}
	Power should be devolved to the lowest level of government where there is shared community interest	(Head, 2007:136)
	Powers and responsibilities should be left with the lowest level of government practicable. Such a devolved system means there is greater local input into decision-making and states/territories can customise policies and services to suit local preferences	(Council for the Australian Federation, 2014)
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.	(United Nations International Strategy for Disaster Reduction, 2019)

	Vulnerability is the pre-event, inherent characteristics or qualities of social systems that create the potential for harm.	Adapted from (Adger, 2006)
	Vulnerability is a function of the exposure (who or what is at risk) and sensitivity of system (the degree to which people and places can be harmed)	Adapted from Cutter, 1996).

Chapter 1: INTRODUCTION

1.1 Introduction

Natural disasters have always been a regular occurrence around the world. In 79 AD the eruption of Mount Vesuvius destroyed the cities of Pompeii and Herculaneum (Kozák and Čermák, 2010:45). In 1815 the eruption of Mount Tambora in Indonesia killed more than 88,000 people with even more deaths occurring in 2016 due to the volcanic dust causing abnormally low summer temperatures and associated crop failure during 1816 (Stothers, 1984:1191). More recently, an earthquake in Sumatra triggered a tsunami, on 26 December 2004, which resulted in the deaths of approximately 230,000 people. Closer to home, Cyclone Tracy in 1974 caused the loss of 65 lives and totally destroyed or badly damaged most of Darwin's buildings (Australian Government Bureau of Meteorology, 2019). The 2009 bushfires in Victoria are described as Australia's worst peace-time disaster (Linnenluecke and Griffiths, 2013; Forrest, 2010) resulting in 174 deaths, 414 injuries and the destruction of 2029 homes (Deloitte Access Economics, 2013).

Indeed, in Australia during the period spanning 1967 to 2012, there was an average of four major disasters per year, where the insured losses alone exceeded $10 million (Deloitte Access Economics, 2013 p.15). The extent of human, material and environmental loss and damage that occurs as a result of these events is enormous and rising. This creates an imperative to explore every opportunity to alleviate these impacts. One way to do this is to support the development of public policy for effective hazard and disaster management; and indeed, this is the motivation for this thesis. In the following chapters, I present a case for implementing a national disaster resilience policy which incorporates approaches that operationalise the known determinants of disaster resilience.

A disaster is defined as:

A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. The effect of the disaster can be immediate and localized, but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels. (United Nations International Strategy for Disaster Reduction, 2019)

This definition covers the full range of disasters and causes, including natural disasters which are the focus of this thesis. Natural disasters are precipitated directly or indirectly by natural hazards. Meteorological, seismic and other naturally-occurring phenomena interact with vulnerabilities created by human activity to produce disaster impacts. The types of disasters that are excluded from the category of 'natural' are technological (industrial and transport accidents),

biological (plant or animal disease outbreak) and drought (Commonwealth of Australia, 2001a, International Federation of Red Cross and Red Crescent Societies, 2016, Handmer, 2018). Individual studies may choose to exclude certain natural causes, mainly for data quality and availability reasons. For example, tsunami, landslide and earthquakes were omitted from a 2018 study on the costs of natural disasters in Australia (Handmer *et al*., 2018) Heatwave was included as an additional category because it caused half of all fatalities from naturally occurring hazards in the period 1967-2013 (Handmer *et al.*, 2018:45). Climate change is counted as a 'natural disaster' although it is significant because it potentiates existing hazards to produce more frequent and extreme weather events (Commonwealth Scientific and Industrial Research Organisation, 2016, IPCC 2014).

1.2 The costs of natural disasters in Australia

The cost of natural disasters in Australia is increasing. The average annual cost of insured losses from natural disasters, between 2000 and 2012 in Australia, was $1.2 billion (Deloitte Access Economics, 2013:19). This figure, however, omits the cost of the social impact of such disasters, a large proportion of which is not generally quantified in monetary terms. This includes the cost of injury and lives lost, and other negative health and welfare outcomes for individuals and communities (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2016; Young, 2016). When the full range of costs of natural disasters is considered, the estimate for 2015 rises to at least $9 billion. To make matters worse there is a trend toward rising costs over the longer term, and it is predicted that by 2050 total costs will reach an average of $33 billion per year (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2016). The costs of natural disasters is discussed further in Chapter 2.

1.3 Australian natural disaster policy

Given the frequent and long-standing occurrence of natural disasters in Australia, the government has devised public policy responses to manage them. The origin of government disaster management policy in Australia can be traced back to the period post World War II when 'civil defence' measures were established to respond to emergencies (Handmer and Dovers, 2013:20). The modern Australian disaster management system with its national relief and recovery assistance programs originated following Cyclone Tracy in 1974 (Handmer and Dovers, 2013). Since then Australia's disaster management policy has been relatively stable although 'there is a shortage of longer-term strategic thinking' (Handmer and Dovers, 2013:9). This is despite a number of government reviews that recommended system reform, including at least one, in 2002, that recommended more investment in disaster preparedness, planning and risk mitigation (Council of Australian Governments, 2002). Meanwhile, the Prevention, Preparedness, Relief and Recovery (PPRR) Framework (Australian Institute for Disaster Resilience, 1998:19) provided a model to understand the disaster management system. The PPRR Framework can be

applied to all-hazards and it conveys the four different phases of a natural disaster in an operational and temporal sense. It is not without its critics, some of whom see the PPRR framework as too broad and linear (Cronstedt, 2002; Linnenluecke and Griffiths, 2013).

The Newcastle earthquake in 1989 and the Sydney hailstorms in 1999 resulted in unprecedented costs. The National Framework for Disaster Resilience was adopted in 2008 (Commonwealth of Australia, 2008). However, the Victorian fires in 2009, the Victorian and Queensland floods, as well as Cyclone Yasi in 2010-11 further escalated the costs; hence, the more comprehensive National Strategy for Disaster Resilience (NSDR) (Commonwealth of Australia, 2011a) was adopted in February 2011 and continues to be implemented today. Although it is the National Strategy for Disaster Resilience, the policy document does not define what resilience means. The NSDR says 'Community resilience can be defined in many ways. Rather than define disaster resilience, the Strategy focuses on the common characteristics of disaster resilient communities, individuals and organisations' (Commonwealth of Australia, 2011:5). As noted community resilience can be defined in many ways and there is a plethora of resilience definitions, many of which are discipline-specific. Two definitions that are appropriate for this thesis are provided below. Some more definitional issues are discussed in Section 1.6 and in Chapter 2, Section 2.1.

Resilience is: 'A process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance' (Norris *et al*., 2008:131). The definition for disaster resilience that was adopted by the former United Nations International Strategy for Disaster Reduction, now the United Nations Office for Disaster Risk Reduction is also relevant and is referred to from time to time in the context of national government policy:

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (United Nations Office for Disaster Risk Reduction, 2020).

The NSDR aims to encourage all levels of government and the community to share responsibility to prevent, reduce, withstand and recover from the impacts of natural disasters. While these principles can be applied across the whole spectrum of disaster prevention, preparedness, relief and recovery the NSDR emphasises the need for all sectors of the community to take action and to understand and reduce their disaster risks *before* disasters happen (Council of Australian Governments, 2011; Commonwealth of Australia, 2011). Indeed, the centrality of the concept of prevention cannot be overemphasised when discussing pathways to successful disaster resilience. While prevention most certainly implies taking pre-event steps to avoid disasters and their impacts, it has a far broader application to disaster resilience policy than what is articulated in the NSDR. In particular, prevention in disaster resilience has much in common with the concept of prevention in the discipline of population health. This is a recurrent theme throughout this thesis that is explored further in Chapter 2, Sections 2.3.1 and 2.3.2 in the literature

review of resilience. These links are reinforced in Chapter 3 Section 3.2.2 where the theoretical resilience model of choice for the thesis is identified, partly because it takes a community well-being approach to disaster resilience. The significance of prevention becomes even clearer as the research findings are described in Chapters 5 in relation to the idea of Community Competence and a sense of agency that enables people to take responsibility for their own well-being, in Chapter 6, Section 6.2.3 regarding sustainable choices for future well-being; in Chapter 7 in terms the key aim of information and communication strategies being learning, and gaining confidence and motivation to act; and lastly, in Chapter 8 where it is concluded that population health approaches that employ pre-event or early intervention strategies in the context of the promotion of broader well-being goals should be incorporated into disaster resilience policy implementation.

The NSDR is a type of policy mechanism that has been described as a 'national strategic policy' or 'metapolicy' (Samnakay, 2017:107). This type of policy is common in areas where the aim is to encourage coordinated policy in a federal system. Some other examples of national strategic policy include the National Suicide Prevention Strategy (Australian Government Department of Health, 2016), the National Road Safety Strategy 2011-2020 (Australian Government Department of Infrastructure and Regional Development, 2018), and the National Plan to Reduce Violence against Women and their Children 2010-2022 (Australian Government, 2016a). While not unusual, the nature of this policy instrument impacts on the way it is implemented. The NSDR does not specify a definition of disaster resilience and because it consists of high-level principles and broad priorities the pathways for implementation may be hard to discern. This is discussed further in Chapter 2.

International interest in resilience as a guiding principle for disaster management policy occurred in response to the global rise in the incidence and costs of disasters, as well as in response to the overlap between human activity and natural systems, causing disasters to be reconceptualised as social problems requiring social policy approaches. As early as 1994, the Yokohama Strategy and Plan of Action for a Safer World brought together goals for sustainable development with natural disaster prevention, preparedness and mitigation (United Nations International Strategy for Disaster Reduction, 2005:2) but did not explicitly describe this as 'resilience'. In 2005 the Hyogo Framework for Action 2005-2015 was adopted by the United Nations International Strategy for Disaster Reduction. The Hyogo Framework articulated a resilience-based approach that sought to shift the disaster management culture to one where disaster prevention predominated over relief and recovery (United Nations International Strategy for Disaster Reduction, 2005). The Hyogo Framework was superseded by the Sendai Framework for Disaster Risk Reduction ('the Sendai Framework') which maintains an emphasis on resilience and the integration of development policy with disaster risk reduction (United Nations International Strategy for Disaster Reduction, 2015). The Australian federal government was, and continues to be a signatory to these international disaster policies and affords a high priority to Australia's participation in the Sendai Framework. This has been demonstrated in national public

statements on domestic disaster policy (Law, Crime and Community Safety Council, Communique, May 2017; October 2018) and its most recent focus on bringing Australia's disaster risk reduction policy into line with the Sendai Framework by the development of a National Disaster Risk Reduction Framework (NDRRF) (Commonwealth of Australia, 2018). The NDRRF sets out principles and practices for implementing disaster risk reduction to strengthen disaster resilience. It was agreed by all levels of government in 2019 (Ministerial Council for Police and Emergency Management, 2019a) and a national action plan has recently been finalised to implement the NDRRF (Australian Government, 2020). The action plan outlines pathways and priorities to build resilience to natural disasters and climate change through risk reduction. It supplements the broad principles-based National Strategy on Disaster Resilience (NSDR) which includes components of disaster risk reduction, disaster preparedness, disaster response and disaster recovery. The NDRRF and the First National Action Plan to Implement the National Disaster Risk Reduction Framework represent a significant step aimed at operationalising disaster resilience in a nationally strategic sense. However, this is a very recent development and it will be some time before it is possible to assess the contribution made by these policies to national disaster resilience. Meanwhile, the NSDR remains the overarching Australian natural disaster policy and resilience continues to be reiterated as the end goal of all Australian disaster policies. Resilience is, therefore, the subject that is investigated in this thesis.

1.4 The policy problem

Seven years since the adoption of the NSDR, the language of resilience has become more mainstream within the disaster management lexicon. The disaster resilience message of prevention, preparedness and risk mitigation has now reached all levels of the disaster management system within Australia. All of the states and territories and many local governments articulate disaster resilience goals in their policies and a number have adopted state-wide approaches to disaster resilience. For example, Victoria has a state disaster resilience strategy developed by the Victorian State Emergency Services (Victorian State Emergency Service, 2016) and Queensland's disaster resilience strategy was developed in 2014 and updated in 2017 to include climate change (Queensland Government Queensland Reconstruction Authority (QRA), 2017). South Australia is in the process of developing its disaster resilience strategy and in NSW, disaster resilience activities were packaged and funded within the National Partnership Agreement for Natural Disaster Resilience (NPA-DRP) up until June 2018. This agreement was replaced in 2020 by the National Partnership Agreement for Disaster Risk Reduction (Council on Federal Financial Arrangements, 2019; Commonwealth of Australia, 2017). As well as disaster resilience activities that are funded and implemented by federal and state governments, disaster resilience projects have been initiated by local government, business and the Not for Profit sectors, some of which are included as case studies in this thesis. These are the Marks Point and Belmont South Local Adaptation Plan for flooding and sea level rise (LAP) developed by the

Lake Macquarie City Council (2016c; Lake Macquarie City Council); the Rivers and Ranges Community Leadership Program that identifies, trains and supports local leaders to build community disaster resilience (2019) and the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) (2019), a group of corporate chief executives led by the insurance industry who advocate for increased investment in disaster resilience (Deloitte Access Economics, 2013; Deloitte Access Economics, 2014; Deloitte Access Economics, 2016a; Deloitte Access Economics, 2016b; Deloitte Access Economics, 2017).

In addition, the National Strategy for Disaster Resilience Companion Booklet and National Strategy for Disaster Resilience Implementation Review: Progress to date report on the progress of the NSDR and provide additional examples, primarily of state government disaster resilience activities: The companion booklet provides a number of case studies of disaster resilience projects and re-states some of the original goals and priorities of the NSDR in broad terms (Commonwealth of Australia, 2012c), and the implementation review follows a similar format (Commonwealth of Australia, 2015e). While it is encouraging to see many activities conducted under the banner of disaster resilience, without national evaluation information, it is difficult to assess how far the NSDR has advanced toward its long term aim of creating a more disaster resilient nation.

A lack of consensus in the first few years of the NSDR on an appropriate definition of disaster resilience has been a barrier to its evaluation, insofar as it constrained the development of disaster resilience indicators that would enable progress to be measured. In the last decade, research into suitable definitions for disaster resilience and instruments for measuring resilience has progressed (Arbon, 2014; Aslam, 2018; Parsons, 2016). The increasing availability of robust techniques to measure disaster resilience among population groups may facilitate future evaluation efforts and help us to understand and attribute changes in disaster resilience over time. The recent development by the federal government of a framework to monitor and evaluate the performance of recovery assistance programs (Verlin, 2018) may indicate the beginning of a broader culture of disaster resilience evaluation.

Even in the absence of a means for evaluating the NSDR there are opportunities to make a difference in the shorter term. An area of research that has been given little attention is disaster resilience policy implementation (Cork, 2010; Paton, email communication, 26 June 2014). This can produce evidence-based information that can be applied at the front-end of disaster resilience intervention planning and design to influence policy outcomes for the better. Accordingly, in this thesis, I research approaches which will guide good practice in the implementation of disaster resilience policy, in Australia, with reference to the NSDR. The federal system provides the context for disaster resilience policy implementation and is significant in terms of the way it has the capacity to shape the implementation of the NSDR.

As mentioned earlier, the NSDR is an example of a national strategic policy (Samnakay, 2017 p.107) and, like similar policy mechanisms, the way it plays out reflects the issues and

characteristics associated with a federal system of governance. In particular, the power-sharing arrangements between the federal government and the state and territory governments, from where much of the responsibility for disaster management is devolved, present challenges, including but not limited to, the need for effective coordination (Parkin, 2003; Walsh, 2008). While the sharing of information and effective communication channels are key to coordination of effort by government, there are other factors that contribute to a style of governance that works best for disaster resilience. These factors, including the significance of subsidiarity defined as:

'Powers and responsibilities should be left with the lowest level of government practicable. Such a devolved system means there is greater local input into decision-making and states/territories can customise policies and services to suit local preferences' (Council for the Australian Federation, p.44), are considered throughout this thesis, particularly in

relation to the development of a provisional disaster resilience policy implementation framework (Provisional framework) in Section 3.2. Coordination is also discussed in Chapter 7 as part of evaluating good practice in disaster resilience information and communication for the Provisional framework.

The NSDR is a significant example of resilience policy that is an obvious and critical point of reference for this research. However, at the outset it is important to remember that this thesis is not about the implementation of the NSDR per se. It is concerned with the implementation of disaster resilience policy more broadly which was identified as a gap in the research, as raised in the previous paragraph and in Section 2.3.2.

The proposition for this thesis is that to effectively build disaster resilience across Australia, policy implementation should build in approaches that operationalise the determinants of disaster resilience, and consider the context of Australia's multi-level governance system.

The research questions arising from this:

Does the implementation of disaster resilience policy, in Australia, reflect good practice? and how is this shaped by the characteristics of the federal (multi-level) system of governance?

1.5 Research Approach

The approach taken in this research is a method described as 'applied policy analysis'. It is located within the discipline of public policy which is a 'course of action by government designed to attain specific results,' or 'a statement of government intent and its implementation through the use of policy instruments' (Bridgman and Davis, 2004 p 5). Qualitative methods are employed and an inductive process is used to look for 'patterns and associations derived from observations of the world' (Ritchie, 2003 p.14, p.23). This is distinct from deduction which is concerned with the development of new theory.

Policy analysis lends itself to research that aims to systematically analyse a complex problem in order to identify policy solutions (Bridgman and Davis, 2004; Hill and Varone, 2014). This is

consistent with the need to gather more evidence on what constitutes good practice in the area of implementation of disaster resilience policy. Public policy is multi-disciplinary and draws on theory and skills from fields as wide-ranging as economics, law, sociology, political science, environmental science, and international relations (Handmer and Dovers, 2013 p.43). It is frequently subject to a pluralistic policy process; a process underpinned by the interactions, inputs and interests of diverse stakeholders (Hill and Varone, 2014) including politicians. Thus, it is shaped by the need to manage many variables while developing pragmatic solutions. It is, perhaps, because of this that a goal of applied policy research is that it be translated into practice. This aligns with the research goals and expertise of the author, the Australian National University Fenner School of Environment and Society, and the Bushfire and Natural Hazards Co-operative Research Centre, both project sponsors (Australian National University, 2019; Bushfire and Natural Hazards Cooperative Research Centre, 2019).

In accordance with the pluralism that characterises public policy, the NSDR is multi-faceted, and operates on numerous levels drawing on a number of disciplines. For this reason, the literature covering a number of different subjects and fields is surveyed in this thesis. These literature reviews are multiple and broad ranging, rather than in-depth and they appear in relevant places throughout the thesis, rather than as a single chapter.

Chapter 2 provides the thesis with context and rationale in terms of natural disasters within international and Australian settings. Climate change, and related predictions for rising sea levels and more extreme temperatures and meteorological events overlay Australian and international disaster risk profiles. The policy challenges that natural disasters pose for most, if not all nations across the world, are described briefly with the reasons for the emergence of resilience as the guiding principle that many have chosen to address these challenges. These decisions are largely being driven by the increase in the incidence and associated costs of natural disaster events and a realisation that, while all disaster risk cannot be eliminated, smarter disaster management in the form of disaster resilience, is the way of the future.

A wide-ranging literature review in Chapter 2 provides the broad architecture for the methodology that is used. The subjects of resilience, disaster resilience, policy implementation and Australian federalism are scoped to understand their origins and the theory underlying these terms. The uptake of resilience into many disciplines is acknowledged and it is found that there is a shortage of up-to-date evidence about good practice in policy implementation, including as it relates to disaster resilience. Similarly, while there is much in the international literature that reflects on the principles and spirit of federal forms of governance, information about the normative values and principles of contemporary Australian federalism is not conspicuous. Instead, the policy discourse focuses more on individual arguments, for or against federalism, based on the strengths and weaknesses of its policy mechanisms. The concept of subsidiarity added another dimension to the overall understanding of the meaning of federalism and revealed principles and policy objectives that are equally relevant to federalism.

The main research method involved the development of a framework, based on the initial literature review of resilience, titled the Provisional disaster resilience policy implementation framework (the Provisional framework). This is the subject of Chapter 3. The Provisional framework was used to identify and assess the application of good practice implementation techniques in the Australian disaster management system. It consists of four policy domains: social capital, community competence, economic development, and information and communication. These are derived from a model of disaster resilience developed by Norris el al. (2008). The Norris study is significant in terms of how it relates to the theoretical basis for this thesis, why it was chosen as the model from which the Provisional framework was derived and how it was adapted. This is outlined in several places throughout the thesis. It is discussed in the review of the concept of resilience in Chapter 1, Section 1.6, followed by an account in the literature review that defined the key concepts of the research question in Chapter 2, Section 2.3. Chapter 3, Section 3.2.2 is dedicated to discussing the Norris model in detail and why it was chosen, particularly how it aligns with the purpose and the approach taken in this research. The Norris model is again referred to extensively in the theoretical background of the four policy domains of the Provisional Framework, being social capital, community competence, economic development and information and communication in Chapters, 4, 5, 6 and 7.

Each of the policy domains in the Provisional Framework has a set of policy objectives associated with actions that translate into disaster resilience, and hence are considered good practice. The utility of the Provisional framework is tested in Chapters 4, 5, 6 and 7 through a two-step process: Firstly, through exploration in the literature of links between its elements and disaster resilience; and secondly, through its application to a number of case studies. After this, it was revised according to the research findings and in its final form is referred to as the Disaster Resilience Policy Implementation (DRPI) Framework. The DRPI Framework is a product of the thesis and, is indeed, its main finding.

Chapters 4, 5, 6 and 7 provide the body of the thesis. The implementation of disaster resilience activities at different levels within the Australian disaster management system are presented as five case studies. The Provisional framework was applied to the case studies to examine how disaster resilience was being operationalised, if at all. This allowed characteristics of the various implementation approaches to be identified and inferences made about the extent to which they represented good practice.

Data for the five case studies was obtained from a mix of primary and secondary sources. The primary data came from interviews with experts in organisations at different levels of the federal system where an Australian disaster resilience measure is, or was, being implemented. Secondary sourced information came from administrative documents directly related to the project, from disaster/emergency management and public administration, academic journals and books, and from the 'grey literature'. Grey literature, which was used extensively in this thesis comes from published or unpublished information in non-commercial form and is often the best

source of up-to-date research on certain topics and can include government reports, policy statements and issues papers, research reports, facts sheets (University of New England, 2019).

The case studies are: the National Flood Risk Information Project, the NSW National Partnership Agreement – Disaster Resilience Program (which includes the Community Resilience Innovation Program), the Lake Macquarie City Council Marks Point and Belmont South Local Adaptation Plan for Flooding and Sea Level Rise (LAP), the Australian Business Roundtable for Disaster Resilience and Safer Communities, and the Rivers and Ranges Community Leadership Program (Hazelwood, 2016; Lake Macquarie City Council, 2017; Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019; NSW Government Department of Justice and Emergency Management, 2019; Rivers and Ranges Community Leadership Program, 2019). These case studies are explained in more detail in Chapter 3.

The Provisional framework did not include any variables directly related to governance because these did not exist in the theoretical model on which it was originally based. To address this, a mechanism was needed to answer that part of the research question that relates to the influence of the federal system on implementation of disaster resilience policy. Thus, federalism, from multi-level governance theory, was reviewed. It was found that the term 'subsidiarity' was often used synonymously with federalism. The meaning of 'subsidiarity' centres around the division of powers, responsibilities and functions within a system. It is defined as 'any particular task should be decentralised to the lowest level of governance with the capacity to conduct it satisfactorily' (Marshall, 2008 p. 80). Another interpretation is that 'Powers and responsibilities should be left with the lowest level of government practicable. Such a devolved system means there is greater local input into decision-making and states/territories can customise policies and services to suit local preferences' (Council for the Australian Federation, p.44). The following action-based concepts associated with subsidiarity were identified: negotiated roles and responsibilities, devolution accompanied by authority, capacity building, open access to information, system coordination, stakeholder engagement (Council for the Australian Federation; Head, 2007a; Marshall, 2008; Zurita, 2015). The relevance of subsidiarity to disaster resilience policy implementation, for each of the policy domains in the Provisional framework, is explored in Chapters 4, 5, 6, and 7. Ultimately, it was incorporated into the final version of the Provisional framework and became a key thesis finding.

1.6 Scope and terminology

Disaster resilience, as it applies to natural disasters, has been chosen as the focus for this thesis because of the potential for resilience-based approaches to reduce the costs associated with natural disasters. Many of the theoretical bases of resilience are relevant to natural disaster management, including socio-ecological resilience, psychological and sociological resilience, business and organisational resilience. Natural disaster resilience even has relevance, through the built environment, to the original concepts of resilience from engineering and the material

sciences (Alexander, 2013). This is not to understate the role of resilience in policy approaches to other types of disasters. For example, in Australia, resilience principles are also applied to national security and critical infrastructure protection policy (Commonwealth of Australia, 2015b).

The disaster management and disaster resilience fields carry with them a substantial array of terminology. A glossary is provided at the beginning of the thesis to add clarity for the reader. Definitions and terminology included in the thesis has regularly been sourced from the Australian Institute of Disaster Resilience (AIDR) website. The AIDR Glossary or Terminology webpage informs and provides a degree of definitional uniformity to its substantial collection of disaster management resources, including its Handbook Series (

It is necessary to give specific mention here to the terms 'disaster management' and 'emergency management' because they are often used interchangeably in the literature. The former is favoured in this thesis. It is consistent with the terminology used in major national and international policy documents, including the NSDR and the Sendai Framework (United Nations International Strategy for Disaster Reduction, 2015) and aligns with a disaster resilience model that encompasses the Prevention, Preparedness, Response and Recovery (PPRR) framework of disaster management activity (Australian Institute for Disaster Resilience, 2019). The use of the term 'emergency' is also avoided because it implies government and quasi government emergency services agencies and rapid onset events. The term 'disaster' is considered more generic than 'emergency'. It conveys a sense of the temporal nature of disasters with impacts that may reach across the whole community. 'Disaster' also implies a level of scale. For example, a house fire is an 'emergency' but is not of sufficient scale or impact to be categorised as a 'disaster'. It is noted that use of the term 'natural hazard event' is preferred by many over 'natural disaster' due to the positive focus of the former on the potential to prevent a disaster by the management of natural hazards. Nonetheless the term 'natural disaster' is used in this thesis because it is still regularly used interchangeably with 'natural hazard event' and is well understood amongst the general population (Parsons, 2016).

A number of Australian national disaster policies supplement the NSDR. For example, the National Disaster Risk Reduction (NDRR) Framework (Australian Government, 2018) and its implementation plan (Australian Government, 2020). There are times when the focus of the thesis may shift from disaster resilience more broadly toward the more specific elements of disaster management as articulated in these related policies. This has been done to acknowledge their significance and to identify the various components of disaster management where resilience can and must be applied. It is also because disaster resilience data either does not exist, or is inadequate in many areas, making it necessary to use available alternatives. For example, methods for accurately calculating the intangible or social costs of disasters are underdeveloped (Young *et al*., 2016; Young and Jones, 2018) and there is no international data base for measuring and comparing resilience. The first Australian National Disaster Resilience Index (ADRI) was

released in 2020 and it is too soon to see how it will be used, including whether it will enable longitudinal studies of disaster resilience in Australia retrospectively or in future. Furthermore, government programs are tending to pivot toward risk reduction which may overlook other measures for achieving resilience. I do not discount the benefits of disaster risk reduction, and acknowledge that disaster risk reduction is an appropriate priority for government policy, not least because it is an area that lends itself to the role of government and the resources available to government. However, I would emphasise that disaster risk reduction is an element of a broader resilience-based approach. The gaps that persist in disaster resilience data reflect the fact that resilience, particularly social resilience is difficult to measure and more difficult to translate into concrete and demonstrable outcomes. Nonetheless, this makes it no less important and is the reason it was chosen as the subject of this thesis.

The term 'vulnerability' is used frequently in the disaster resilience field and has become relatively more prominent in Australian strategic policy since the adoption of the National Disaster Risk Reduction Framework (NDRRF) in 2018 (Commonwealth of Australia, 2018). The Australian Vulnerability Index and a number of associated documents were developed to support the implementation of the NDRRF, culminating in the release of a national NDRRF implementation action plan (Australian Government, 2020). In this context, the issue of vulnerability is interpreted broadly and is the principle means of identifying and assessing systemic disaster risk (Commonwealth of Australia, 2018, Commonwealth of Australia, 2020, Australian Government, 2020), A recognition of the interconnectedness of systems and how this increases vulnerabilities which, in turn, potentiates disaster risk to create 'cascading risk" is seen to have been lacking in previous government approaches to implementing the National Strategy for Disaster Resilience. The Australian government's recent focus on systemic vulnerability combines disaster risk reduction, sustainable development and climate adaptation in accordance with the Sendai Framework for Risk Reduction (United Nations International Strategy for Disaster Reduction, 2015). This conceptualisation of vulnerability differs from previous policy narratives around disaster risk reduction that have been judged by policy makers as being too operationally focused. For example, they tended to refer to specific disaster risk mitigation activities. While this shift may deliver positive outcomes in the future, I chose not to include vulnerability as a determinant of disaster resilience in the Provisional Disaster Resilience Policy Implementation Framework for a number of reasons.

The nature of the relationship between vulnerability and resilience has not been settled. The academic discussion calls into question the premise underlying the latest Australian Government policy that one is the antonym of the other or that the two are inversely proportional (Brooks, 2003; Maguire and Cartwright, 2008, Obrist, 2010, Cutter, 2016, Fekete, 2014).

Similar to my position on the relevance to this thesis of the National Disaster Risk Reduction Framework, the recent policy pivot toward vulnerability has not been in place long enough to allow it to be meaningfully evaluated for inclusion in this thesis. I also stress that the purpose of

this thesis remains, not to evaluate the implementation of the National Strategy for Disaster Resilience per se, but to explore practical good practice pathways to improving disaster resilience through policy implementation at all levels of government and the community. This thesis explores disaster management policy through a resilience lens. In this sense, the need to prevent or address systemic vulnerability is implicit because resilience is, in and of itself is a systemic quality. Thus, an in-depth focus on vulnerability alone, was considered somewhat redundant. More detail about how approaches aimed at reducing vulnerability differ from those for enhancing resilience is provided in Chapter 2.

1.7 Findings

The thesis findings are largely derived in Chapters 4 to 7. It is not intended that these be used as a basis for judging the effectiveness of specific disaster resilience projects or the ability of a particular level of government or sector to implement disaster resilience policy. The main purpose is to raise awareness, among disaster resilience stakeholders, of the need to consider the determinants of successful disaster resilience programs and to increase their understanding of how these can be incorporated into the design of implementation approaches.

1.7.1 The Disaster Resilience Policy Implementation Framework

The main product of the thesis is the Disaster Resilience Policy Implementation (DRPI) Framework. The DRPI Framework is the end result of the application, evaluation and review of the Provisional framework.

The process of the application of the Provisional framework saw a number of key messages emerge that are considered the secondary findings of this thesis. These provide broad principles for good practice for disaster resilience policy implementation in the Australian setting. They include the notion that policy implementation should consider the systemic nature of the context for implementation with its interdependencies and feedback loops. These issues were highlighted within the theory and practice of subsidiarity. Hence the Provisional framework was adjusted to include subsidiarity, giving the final DRPI Framework, as described in Chapter 8.

Subsidiarity as a concept reaches far wider than federalism and the conventional view that it is solely concerned with formalised systems of governance. In this thesis it is not confined to federal versus state issues but pertains to matters relating to broader social, political and economic systems. As a principle subsidiarity applies to the allocation of government functions, but it can also be applied at a sociological level (Grewal, 2014). That subsidiarity provides principles to guide social organisation was found to be instructive when considering how to implement government policy that needs to reach deeply into the social arena to achieve its desired outcomes. National disaster resilience policy is such a policy.

1.7.2 The application of the Provisional framework

Findings from the application of the Provisional framework suggest that no single level of government or sector has a monopoly over the ability to operationalise disaster resilience. Instead, different sectors and levels of government have demonstrated varying capacities to generate disaster resilience across the different disaster resilience policy domains. These observations, when considered as a whole, pointed to the operation of different elements in a system, each having different capacities to contribute to disaster resilience, some of which may, or may not, be fully realised.

In Chapter 4, I explore the Policy domain of social capital, describe how it is directly linked to disaster resilience (Aldrich 2010; 2012; Aldrich and Meyer 2015) and identify policy objectives that align with social capital. The establishment and maintenance of effective networks, including between levels of government and their officials, and the initiatives that prioritise stakeholder and community engagement and reward citizen empowerment are all policy objectives that achieve social capital. Implementation approaches such as these warrant further attention by government and for this reason, they are included in the Provisional framework. While these processes are not without their difficulties, and are not likely to reduce costs, they ultimately have more chance of delivering a higher quality outcome (Lindquist, 2013a) because, to work effectively, they require trust to be built between the various parties. Trust is a 'close proxy for the level of social capital within a community' (Productivity Commission 2003, p.7) and, in turn, levels of trust will have a bearing on disaster resilience. Indeed, the Lake Macquarie City Council (LMCC) case study in Chapter 5, Section 5.3.3 shows that a significant allocation of additional resources is not necessary to undertake the sorts of activities that will build social capital and engender community trust. The implementation by the LMCC of its Local Adaptation Plan for Flooding including due to Sea Level Rise (LAP) provides a good example of the implementation of the policy objectives related to social capital. Notable is LMCC's support for community engagement, its organisational resilience, and determination to develop and implement the LAP via a hard-won participatory process. This achievement has been recognised at both state and national levels (Lake Macquarie City Council, 2016a).

In Chapter 5, community competence is described as the 'networked equivalent of human agency' (Norris *et al*., 2008 p.141). Community competence is connected, among other things, to a culture where it is 'acceptable to challenge authority' (Norris *et al*., 2008 p.142). From this perspective it can be seen how implementation of disaster resilience policy, in accordance with the Provisional framework, while theoretically sound, could present practical challenges. For example, non-traditional emergency volunteers, who tend to adopt a more decentralised leadership and organisational style, will play a greater role in the disaster management workforce in the future (McLennan *et al.*, 2016). This will need to be balanced alongside the more customary 'command and control' model that is commonly employed by emergency services organisations (Drabek and McEntire, 2003; Whittaker *et al.*, 2015).

In Chapter 6, I draw out the connections between economic development and disaster resilience. In particular I discuss the contribution of business to disaster resilience and identify areas where partnerships with government could enhance this activity. The National Flood Risk Information Project (NFRIP) highlights how effective networks, thorough community and stakeholder engagement, and open access to flood information can facilitate action on flood risk reduction and mitigation opportunities. Unfortunately, the agreement of the Council of Australian Governments (COAG), the highest level federal intergovernmental body, to share information did not translate into a willingness by data custodians to provide the information (Hazelwood, 2016b) (Interview, GA42, GA44, 2 May 2016).

In Chapter 7, I apply the Provisional framework to the case studies and examine the idea that information and communication can influence behaviour change, a key capability for enhancing disaster resilience (Commonwealth of Australia, 2011a; Commonwealth of Australia, 2012c). Desired behaviour change can mean more disaster risk awareness and pre-planning rather than solely depending on the emergency services. It may mean property owners make it a higher financial priority to have adequate insurance or state and local governments work with developers to prevent construction in hazard prone areas etc. Importantly, there is little evidence that the provision of information alone will translate into behavioural change (Paton, 2003; Australian Institute for Disaster Resilience, 2010). Instead, educative approaches are needed that are supported by research about how to successfully achieve behaviour change. It is known that progress toward change occurs in psychological stages and education programs should incorporate strategies to address each stage. For example, a 'preparedness conversion' (Dufty, 2008:18) requires the initial harnessing of anxiety to encourage preparation. This is followed up with strategies tailored to the response, relief and recovery phases. Later, mitigation behaviour is promoted, then adaptive capability and finally post-disaster learnings. The issue of trust is also revisited in Chapter 7, Section 7.3.2, where I discuss the current low levels of trust in government (Bean, 2005; Evans, 2016) with particular attention to the role of the media (Blood and Lee, 2016).

1.7.3 Evaluation of the Provisional framework

The basis for the Provisional framework is the Norris model. It is geared to acute disaster management (relief and recovery) rather than across the whole disaster resilience spectrum. Efforts were made to remediate this in the Provisional framework by including the universal themes of trust, self-efficacy, sustainability and behaviour change. The literature reviews and discussions that linked the policy domains to the policy objectives in Chapters 4, 5, 6 and 7 also sought to ensure each element of the Provisional framework was relevant to disaster resilience more broadly. Limitations associated with the use of a two-dimensional framework in a multi-level system of governance like the Australian federation were noted. For example, in practice, social capital and community competence are more visible at local levels of activity. This may

make it more difficult to build awareness of how they translate at higher levels of the system. Nonetheless, this is both possible and desirable and could be considered for future research. The interconnection between the four policy domains is a feature of the Provisional framework that is particularly evident for social capital and community competence. They are retained as separate categories in the final framework due to the distinction between building capacity for action by enhancing social capital and translating it into action by promoting community competence. The interconnectivity of the framework is reflective of the synergies between the various determinants of resilience and the levels of governance within the system in which it operates. Thus it is again emphasised that the elements of the Provisional framework are not mutually exclusive. Nor is disaster resilience good practice in a single activity reliant on implementation of all the policy domains and objectives.

1.8 Conclusion

This thesis contributes to knowledge of disaster resilience theory and strengthens the evidence base for disaster resilience policy implementation and practice. The DRPI Framework is a vehicle which can be used to raise the awareness of stakeholders about the need to consider the determinants of successful disaster resilience programs and how these can be incorporated into implementation approaches at every level of government and civil society. It provides a foundation for future research to develop, test and validate indicators for disaster resilience good practice in federal and other multi-level systems. Furthermore, it could encourage the formation of partnerships between government and researchers who can then evaluate the National Strategy for Disaster Resilience.

I conclude that this thesis expands on the work of Norris *et al* (2008) to deliver new knowledge in the form of the Disaster Resilience Policy Implementation (DRPI) framework. In particular, I focus on the finding that subsidiarity is the fifth, cross-cutting policy domain incorporated into the (DRPI) framework. Subsidiarity expands our understanding of the outcomes, positive and negative, of disaster resilience policy implementation in relation to actions that produce social capital, community competence, economic development, and information and communication. It plays a role in the performance of each and can potentially alleviate good practice gaps that were found in the application of the Provisional framework. This finding is then considered in terms of the need for future research, and how subsidiarity can be applied to the planning and design of disaster resilience policy in Australia. Policy objectives that are articulated in terms of the goals of subsidiarity may be more readily translatable, or at the very least, relatable to government policy makers than those that are expressed in terms of the existing four theoretical policy domains in the framework. This may be useful in situations where there is no requirement, or limited opportunities, for policy makers to work directly with local and community-based organisations to implement disaster resilience policies.

The authentic application of subsidiarity principles and objectives in the planning, design and review phases of policy implementation reminds policy makers of the need for a whole-of-system approach to disaster resilience. This should include governance arrangements that are compatible with the realisation of disaster resilience goals. Policy implementation that is informed by this evidence will encourage decision makers and practitioners to apply disaster resilience policy objectives. By drawing attention to the practices associated with subsidiarity, this thesis asserts the place that disaster resilience thinking has in the development of governance and policy implementation by government. This will then contribute to, and become part of, the overall quantum of effort to reduce loss and damage from disasters.

This chapter introduced the issues surrounding natural disasters and highlighted the shortage of information, in this field, relating to good practice in policy implementation. It posed two questions which this thesis endeavours to answer:

Does the implementation of national disaster resilience policy in Australia reflect good practice and how is this shaped by the characteristics of the federal (multi-level) system of governance?

This was followed by a brief overview of the thesis structure, methodology and a summary of the main findings. In Chapter 2, I provide background and context to the problem dealt with in this thesis. This includes the theoretical underpinnings of the research question which are used to guide development of the methodology and the Provisional framework. I then describe Australian policy settings relevant to the implementation of disaster resilience policy.

Chapter 2: BACKGROUND

1.9 Introduction

Chapter 1 provided introductory information about the problems caused by natural disasters in Australia. In it I proposed the research questions, outlined the thesis structure, and summarised the research approach, the main outcomes and findings. These outcomes and findings included the development, testing and application of a good-practice disaster resilience policy implementation framework (the Provisional framework); the evaluation and review of the Provisional framework, including the concept of subsidiarity to take account of Australia's federal (multi-level governance) system; and the Disaster Resilience Policy Implementation (DRPI) Framework.

Chapter 2 emphasises the need for a thorough understanding of a problem and its context in order to devise solutions to that problem. Thus, it provides the thesis policy context and the theoretical basis for the research question. This includes a detailed picture (Section 2.2) of the causes, incidence, trends, scale and costs of natural disasters in Australia, in relation to other parts of the world. This highlights the severity of the problem and the importance of measures to alleviate the problem. The hazardous overlay of climate change on natural disasters receives special mention (Section 2.2.2). Section 2.3 explores the theory relevant to Australian natural disaster policy and to the research question:

> *Does the implementation of national disaster resilience policy in Australia reflect good practice and how is it shaped by the characteristics of the federal (multi-level) system of governance?*

The review of the theoretical literature in Section 2.3 scopes the main elements of the research question. Notably, it has been shown that enhanced social resilience and more effective disaster resilience policy implementation has the potential to alleviate loss and damage from natural disasters. I will also argue that there is a shortage of contemporary research on the practice of policy implementation. In Section 2.3.3 the context provided by Australia's federal system of governance for Australian disaster resilience policy implementation highlights the centrality of subsidiarity

> Any particular task should be decentralised to the lowest level of governance with the capacity to conduct it satisfactorily. (Marshall, 2008:80);

> or

> Powers and responsibilities should be left with the lowest level of government practicable. Such a devolved system means there is greater local input into decision-making and states/territories can customise policies and services to suit local preferences. (Council for the Australian Federation, 2017);

<p style="text-align: center">or</p>

> Power should be devolved to the lowest level of government where there
> is shared community interest (Head, 2007:136).

The authors of each of these definitions have observed that subsidiarity, as an organising principle of federalism, directly translates into practical approaches that are designed to facilitate citizen and local participation in decision-making and the development of resources that are tailored at the local level to support community resilience.

In Section 2.4, I describe and discuss the relevant public policy settings to give context to the interventions used to reduce the toll of disasters in Australia. In Australia the most readily identifiable element is the National Strategy for Disaster Resilience, but policy implementation is also heavily reliant on a number of other policy settings: the legislative framework for disaster management; the governance, administration and operational arrangements for the delivery of disaster management services; and the mechanisms for the provision of government financial assistance for disasters. The international policy context is provided by the Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations International Strategy for Disaster Reduction, 2015) to which Australia, as a signatory, has made a commitment, in conjunction with the international community, to align implementation of its disaster policy (Merrin-Davies, 2018).

An appreciation of the policy environment requires an understanding of some key terms and concepts. Definitions that are introduced in the body of the thesis are listed in the glossary 'Disaster' was introduced in the previous chapter. Other terms introduced in this chapter include 'hazard', 'vulnerability', 'risk', 'disaster risk reduction' and 'mitigation'. Disaster management and disaster resilience policy is a complex field, made more complex because it lacks standard definitions. Frequently used terms, such as those above can be used for different purposes. For example, to describe highly technical matters, such as resilience in the built environment, as well as subjects that are more concerned with social and humanistic issues, such as the psychological and behavioural aspects of resilience. Indeed, the plethora of definitions in the disaster resilience field reflects the pluralist nature of public policy mentioned on page 7. Brooks (2003) highlighted ambiguity in the definition or risk, adaptive capacity, and vulnerability and the challenges this poses for integrating the social and biophysical aspects of these variables. Standardised definitions would provide more objectivity. Instead, definitions in disaster resilience research and policy development are generally chosen and adapted based on the purpose at hand, an approach that is not seen as problematic by Grant: 'Let us not let terminology stand in the way of our exploration of process' (2000, p.3). While this can be criticised for being somewhat imprecise it offers flexibility and acknowledges the need for different definitional approaches within different contexts (Brooks, 2003). This approach can be said to be applied in this thesis on occasions where more than one definition of the same term is used to emphasise different interpretations of a concept. A prominent example is 'disaster resilience' and its numerous definitions. Although the two definitions that are considered most relevant to this thesis were provided in Chapter 1, I refer

to alternative definitions in other parts of the thesis, when I want to emphasise that definitional variations can influence policy implementation. Readers may also find some variation in the general usage of certain terms throughout the thesis. Efforts have been made to keep this variation to a minimum and to clearly define key terms that have a bearing on the outcomes of this thesis. For example, in Chapter 3, Section 3.2 Development of the Provisional Disaster Resilience Policy Implementation Framework. However, it was not possible or desirable to remove all inexactitude, because of the intersection between the technical and social elements of disaster resilience. For example, resilience in the built environment and the human psychological and behavioural aspects of resilience. To adhere too slavishly to one definition or another could have shut down the discussion in one or more areas and thus compromised the holistic treatment of disaster resilience that this thesis strives to achieve. Grant thus argued for flexibility: 'Political scientists with a definition are like dogs with a bone. They will continue to gnaw at it while ignoring more nutritious alternatives' (2000, p.3).

1.10 Understanding the problem of natural disasters

Public policy is about solving problems (Bridgman and Davis, 2004; Colebatch, 2009). Finding solutions to a problem requires a detailed knowledge and understanding of that problem. Accordingly, in this section, I provide information about the causes, incidence, trends and costs of natural disasters both in Australia and other parts of the world. This conveys the scale, severity and complexity of the problem and highlights the importance of effective disaster policy. I also discuss the importance of having access to quality data to inform public policy and some of the limitations of the current disaster data, as well as the implications this has for implementing disaster resilience policy.

While the emphasis of this thesis is on resilience as an Australian disaster policy it is nonetheless important to be aware that hazards and disasters are not necessarily confined within the boundaries of nation states, for example, climate change, which is discussed in Section 2.2.2. Although the causes of natural disasters tend to be expressed in term of hazards, not all hazards cause a disaster. The following definitions of 'hazard' are provided by the Australian Institute for Disaster Resilience (AIDR):

> A source of potential harm or a situation with a potential to cause loss; A potential or existing condition that may cause harm to people or damage to property or the environment; and an intrinsic capacity associated with an agent or process capable of causing harm (Australian Institute for Disaster Resilience, 2019a).

Alternatively, a hazard is

> A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or

socionatural in origin (United Nations International Strategy for Disaster Reduction, 2019).

When exposure to a hazard occurs it creates a risk:

The chance of an event that will have an impact; The likelihood of harmful consequences arising from the interaction of sources of risks, communities and the environment (Australian Institute for Disaster Resilience, 2019).

If the risk is sufficiently high it may reach a tipping point and result in a disaster. The relationship of hazards and hazard exposure to risk can be quantified as,

Risk = Hazard × Vulnerability.

The definition of vulnerability:

The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (United Nations Office for Disaster Risk Reduction, 2020).

The concept of vulnerability is significant in terms of its relationship to resilience and is discussed in more detail in Section 2.3.1.

Perhaps conspicuous by its absence is the lack of available data both nationally and internationally about disaster resilience. Granted, disaster risk reduction is expressed in term of enhancing resilience, resilience is far more difficult to measure, particularly the social aspects of resilience, not to mention the fact that disaster resilience is a highly localised phenomenon. This is discussed in more detail in Section 2.3.1 but is raised here to explain why the assessment of disaster risk tends to be used more widely to plan, develop and implement disaster programs at national and international levels. Section 2.2 also presents data about disaster costs and losses rather than taking a more resilience based and holistic consequence measurement approach. Predicting and assessing consequences or consequence management includes consideration of social and other intangible costs. The ability to do this effectively remains limited although some progress is being made and this too is discussed in the following Sub-section The Causes and Costs of Natural Disasters.

Before describing the causes and costs of disasters, the importance of disaster data needs to be mentioned. Access to quality data is at the heart of understanding and devising effective solutions to disasters. During relief and recovery efforts, public funds are directed toward the replacement and repair of assets and are used to remediate and compensate affected individuals. The prevention and mitigation of disasters is a key strategy to build disaster resilience (Comfort, 2012b; Comfort, 2012a; Comfort *et al.*, 2010). To do it effectively requires, among other things, quality data to help predict future disasters and their impacts. Good data allows us to demonstrate the benefits of prevention by enabling calculation of costs avoided (Dobes, 2008; Hallegatte and Przyluski, 2010). The more accurate and reliable this information, the better our understanding of

the problem. Knowledge of the impacts and an ability to count the costs, both monetary and non-monetary, provides us with a strong case for action and the allocation of public funds for this purpose (Commonwealth of Australia, 2001a). Quantitative and qualitative information includes number and frequency of disasters, causal hazards, and deaths, injuries and damage to the built and natural environments.

A number of issues can affect the quality of disaster data and may compromise its ability to inform effective policy implementation. Disaster facts and figures are characterised by high degrees of variation between individual years (Commonwealth of Australia, 2001a). Smaller, more frequent disasters result in lower average costs than fewer highly destructive disasters. Between 1967 and 2013 there were 367 disasters (events with an estimated cost of over $10 million AUD each) and, of these, ten severe events were responsible for one-third of the total cost (Handmer *et al.*, 2018). Data concerning disasters from overseas may not be available or may not be collected in some areas. In addition, discrepancy can occur when data is aggregated for unrelated variables and from different sources, across multiple countries. For example, disaster information on a global scale is obtained from news reports and other informal accounts, as well as from data bases maintained by insurers on both insured and uninsured damages. These may contain estimates of disaster damage in terms of event, but not by nation state or geographical area. In addition, natural disaster reporting is not complete or uniform for all countries across all hazards. This limits the ability for policy makers and researchers to make comparisons between different countries and even between different areas within the same country (World Bank, 2010).

There are difficulties in deriving the cost of disasters largely because there are numerous dimensions to disaster loss and damage and, again, data may not be collected or available for all of these. To compound this, estimates of the costs depend on what is being counted and how it is being counted. This, in turn, relates to the purpose of the loss assessment and the availability and utility of the financial or accounting tools that are used. 'It is impossible to define the cost of a disaster, as the relevant cost depends largely on the purpose of the assessment' (Hallegatte and Przyluski, 2010:21), which may include making an insurance claim, calculating payments of assistance from government, or conducting cost-benefit analyses to assess whether future benefits will exceed total costs. Cost-benefit analysis is an important tool for implementing disaster resilience policy, particularly when making decisions about whether to invest the large amounts so often required to build disaster resilient infrastructure. The costs of disasters, however, are not solely financial and the social costs must also be counted. Calculating the intangible aspects of disaster losses can prove challenging but, nonetheless, need to be included in cost-benefits analyses to quantify the true benefits of disaster mitigation. Some of the issues associated with cost-benefit analyses are raised in Chapter 6, Economic Development, Section 6.3.2.

As tends to occur in other countries, Australia has difficulty in counting the full costs of disaster because data is not always available for some indicators. Some data is only held by states and territories and is not aggregated at the national level; or there are overall gaps for different

sectors or industries where data is not generally available as is the case for agriculture and fisheries. This was highlighted by a recent report on Australia's readiness to report on implementation of the Sendai Framework which cited capacity issues and federal governance arrangements as a barrier to the provision of some national level data {United Nations Office for Disaster Risk Reduction, 2020).

1.10.1 The causes and costs of natural disasters

Causes

The overwhelming contribution that natural disasters make to total loss and damage from all disasters is highlighted when the numbers are compared with the costs of disasters caused from 'technological hazards' which includes industrial and transport accidents. In 2015 the estimated total damage from technological causes was US$15 million with 9,826 deaths. During 2006–2015 the total number of people killed from technological disasters was 73,834 compared with 698,077 from natural disasters, (International Federation of Red Cross and Red Crescent Societies, 2016 pp.225-226).

The physical forces that create hazards with potential to result in natural disasters are classed by the Emergency Events Database (EM-DAT) (Centre for Research on the Epidemiology of Disasters, 2019): geophysical, (For example, earthquakes and volcanoes), climatological (drought), hydrological (floods), meteorological (For example, storms and heatwaves) and biological or extra-terrestrial (International Federation of Red Cross and Red Crescent Societies, 2016 pp.227-228). In this thesis biological causes are excluded from the definition of 'natural' disasters, as is drought. This is because in Australia, drought is not treated as a natural disaster event for Australian national policy purposes (Australian Government, 2018a p.7).

In 2018, the International Federation of the Red Cross and Red Crescent Society (IFRC) recorded that for the ten years 2008-2017 there were 3,271 disasters of which 84 percent were weather related. Floods and storms accounted for nearly two-thirds of these (2018 p.168) although over the decade to 2015, the number of floods had dropped well below average and the number of storms had risen above the average (2016 p.224).

'Natural disasters result from the interaction of human activities with the natural environment.' (Handmer and Dovers, 2013 p.101). For example, land use for industries like mining, forestry, and manufacturing can destabilise the landscape or cause environmental pollution. Human sociological and economic factors contribute to a greater chance of damage and loss from natural disasters by creating vulnerabilities that interact with weather. These factors include: an increasing global population; pressures on space and livelihoods leading to settlement in hitherto uninhabited areas; urban development in the form of suburban sprawl around major cities; migration of people along coastal strips and low lying river estuaries; increased distances to commute for employment; mobility of the population such that people often settle far from their existing family and traditional support networks; and reliance on critical infrastructure

systems including transport, electricity, gas, fuel, telecommunications, and 'just in time' supply chains (Australian Government, 2018bp.21) that have very little in-built excess capacity or redundancy (Dilley, 2005; Handmer and Dovers, 2013; Keating *et al.*, 2017; Templeman and Bergin, 2008).

The multiplying effect of interactions between hazards not only increases the chance that a disaster will occur, but compounds the methodological challenges involved in assessing disaster exposure and risk. In turn, this complicates efforts to predict the potential impacts and costs of natural disasters (Zaidi, 2018). The World Bank mapped global geophysical hazards (earthquakes and volcanoes) and those related to hydro-meteorological processes (floods, cyclones and landslides) in 2005. They discovered that around 19% of the world's land area, and more than half the world's population, are relatively highly exposed to at least one hazard. Moreover, 790 million people are exposed to at least two hazards and 105 million people are exposed to three or more hazards (Dilley, 2005 p.2).

As mentioned above, during 2006–2015 there were 698,077 people killed by natural disasters, (International Federation of Red Cross and Red Crescent Societies, 2016 p.225-226). However, when looking at the years 1988–2002, worldwide, the number of deaths and injuries varied depending on which global databases were consulted. According to the World Bank, 3.3 million people died as a result of natural disasters, during the period 1970 to 2010, which represents 82,500 deaths in an average year (World Bank, 2010 p.26). Another source reported a lower annual average of nearly 60,000 deaths due to natural disasters in the 20 years to 2000. (Dilley, 2005 p.26) Meanwhile there were 22,724 deaths in 2015, which is 67% below this figure. Notwithstanding this, caution needs to be observed about apparent overall improvement because a decrease in mortality for some hazards was offset by an increase in overall disaster losses due to increased exposure to hazards (United Nations International Strategy for Disaster Reduction, 2015 p.4).

Another measure that is reported is the number of people impacted or affected by natural disasters. Between 1998 and 2002 EM-DAT reported that 756 million people were affected; whereas, other disaster databases differed in their estimates. NatCat reported 277 million and Sigma 19 million (World Bank, 2010 p.26). This represents a decrease from 343 million in 2010 and 264 million in 2011 to 108 million in 2015. Nearly half of those people were affected by drought, followed by floods and storms (International Federation of Red Cross and Red Crescent Societies, 2016 p.225).

A recent study of Australian disasters compiled from a new data base AUS-DIS (Handmer *et al.*, 2018) updated the last comprehensive report on the impacts of disasters prepared in 2001 by the Bureau of Transport Economics (Commonwealth of Australia, 2001a). Handmer reported that deaths from natural disasters have remained generally stable, after factoring in population increase, and a spike in 2009 due the Victorian bushfires (2018 p. 42). The study found that there has not been a statistically significant increase in the frequency of natural disasters in the period

1967–2013, with the exception of a small increase in the frequency of heatwaves over the past decade. Storms, floods, cyclones and bushfires account for 93% of a total of 310 disasters occurring in the same period. This snapshot of disasters highlights the variation, apparent discrepancies and lack of comparability amongst the data available, but does not change the underlying message: natural disasters occur persistently in many parts of the world, including Australia, and in so doing, continue to wreak devastation and inflict significant loss on society year after year.

Costs

Knowledge of the costs of disasters adds a critical dimension to our overall understanding of disasters and feeds in to the development of public policy to manage them. To accurately assess, monitor and communicate the problem of natural disasters, it is important to consider not only the cost of material losses from disaster impacts but also the costs in terms of human experience and suffering.

Internationally, the total estimated cost of damage from natural disasters in 2015 was US$70.3 billion (International Federation of Red Cross and Red Crescent Societies, 2016 p.226). Droughts were most costly and far exceeded storms as the next most costly (2016 p.225). Australia was ranked 10th in the world for the cost of disasters between 2008 and 2017 (Wade, 2018) and, storms overtook floods in 2015 as most costly at AU$49.6 billion, which was 32% of total losses. Floods caused 28% of total losses, followed by cyclones at 19% and bushfires at 17%. It is interesting to note that bushfire losses, as a proportion of total disaster losses, have more than doubled in the period (Handmer *et al.*, 2018 p.43-45). An estimate of annual insured losses of $1 billion, in 2006, as a result of natural disasters (Crompton and McAneney, 2008) is consistent with a later report developed for the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) which noted a trend toward rising costs in Australia over the longer term. This was even after large variations between years had been taken into account (Deloitte Access Economics, 2013). The average annual cost of insured losses from natural disasters in Australia was given at $1.2 billion per year, between 2000 and 2012 (Deloitte Access Economics, 2013 p.19).

The figures detailed in the previous paragraph are all examples of 'tangible' costs which have monetary value. For example, direct tangible costs include damage to buildings, infrastructure, and crops and livestock and indirect tangible costs include emergency response costs, household costs, commercial costs and loss of production (Deloitte Access Economics, 2013 p.75). The tangible costs of a disaster alone are not an accurate representation of its seriousness (Deloitte Access Economics, 2016b; Hallegatte and Przyluski, 2010). A more accurate estimation of the total economic cost of disasters needs to include both tangible and intangible costs. Intangible costs are generally non-monetised and include the social impacts of disasters, such as death and injury, negative effects on health and well-being and community connectedness (Deloitte Access Economics, 2016b p.18). Indeed, it has been proposed that costs

that do not take the social impacts of disasters into account are underestimated by at least 50% (Deloitte Access Economics, 2016b).

In 2010 'indirect' (or intangible) costs were identified as the most difficult but also the most important to measure (Hallegatte and Przyluski, 2010 p.21). The gap in the availability of data and instruments to quantify intangible costs has come to the attention of researchers in recent years (Young *et al.*, 2016; Australian Business Roundtable for Disaster Resilience and Safer Communities, 2016; Handmer *et al.*, 2018). To develop and implement public policy solutions to build resilience to natural disasters, the full range of disaster impacts and their systemic nature need to be taken into account. Furthermore, when this is done, the potential for savings from disasters prevented or mitigated can be more accurately calculated and used to inform public policy. In spite of the release of reports, in recent years, that emphasise the need to calculate both tangible and intangible costs of natural disasters, the problem of a lack of robust economic instruments to do this persists (Young, 2018; Young *et al.*, 2016). The tendency remains in official cost estimates to either omit intangible costs or to only partially include them. As a result, the full economic costs of disasters are likely to continue to be underestimated. Not only does this downplay the severity of disasters in a general sense, it also skews the ratio of costs versus benefits and may disincentivise investment in mitigation. More research to develop and refine robust methods to quantify intangible costs will help to alleviate this situation.

In Australia, the disparity between the cost of losses with an assigned monetary value and those without, was raised by the Bureau of Transport Economics over a decade ago. At that time, it estimated average annual total economic costs of natural disasters in Australia at $1.14 billion and stated that the total economic costs for most natural disasters was two to five times greater than the insured costs alone (Commonwealth of Australia, 2001b). It was calculated that for a total of 265 natural disasters, occurring in the 32 years from 1967 to 1999, the total cost to the Australian community was $37.8 billion of which $1.4 billion was from deaths and injuries. The report did not include any other categories of intangible loss (Commonwealth of Australia, 2001a). It is noted that three of the most expensive natural disasters to have affected Australia, up to 1999, (Cyclone Tracy in 1974, the Newcastle earthquake in 1989, and the Sydney hailstorm in 1999) are included in this figure. More recently the total cost, including death and injury for the 46 years between 1967 and 2013 was calculated as AU$171.5 billion, with an average annual cost of $3.65 billion (Handmer *et al.*, 2018 1113 p. 42). Again, this study was not able to include all intangible costs such as those that arise from impacts to general health and well-being and losses from heatwave.

A factsheet produced by the Australian Business Roundtable for Disaster Resilience (2016), calculated that when intangible costs were incorporated with tangible costs, the figure for 2015 alone was at least $9 billion. This was far higher than the $1.2 billion per year, based on the years 2000 to 2012, as previously estimated by the Australian Business Roundtable for Disaster Resilience (Deloitte Access Economics, 2013 p.19). The Australian Business Roundtable for

Disaster Resilience went on to predict that these would rise to an average total annual cost of $33 billion by 2050 (2016 p.1). Both of these estimates differ from the annual average estimated loss of $3.65 billion, provided by Handmer in 2018, (Handmer *et al.*, 2018 p.42).

Econometrics, using mathematical modelling and statistical analysis, is another method of measuring the cost of disasters. Rose, in particular, has contributed to this field. He questions, however, whether econometrics can be used to validly measure the holistic quality of resilience. His position is that recovery is the only aspect of disaster resilience that lends itself to the application of econometrics with the indicator being the speed of recovery following a shock, be it a financial or a natural disaster (Rose, 2004, 2006, 2007).

Despite the inconsistencies in the data, there is little doubt that natural disasters result in significant mortality and morbidity, economic and social hardship, both overseas and in Australia. Indeed, based on the data limitations that have been outlined above it is more likely that the impacts of disasters are underestimated rather than overestimated. Furthermore, the trends documented in the latest reports from 2015 and 2016 point to the likelihood that these costs will rise. Nonetheless, if human activity can create or increase disaster risk, it stands to reason that human actions have the potential to prevent or reduce disaster risks. Disaster resilience policy and its effective implementation is a way of doing this.

1.10.2   Climate change and disasters

The changing climate interacts with the weather, other aspects of the natural environment, and human activity to create new and amplified hazards. It is predicted, with a very high level of confidence, that the climate is warming and that this is due in part, to anthropogenic or man-made causes (Intergovernmental Panel on Climate Change, 2014). Human-induced climate change, coupled with naturally occurring variation, contributes to the incidence and severity of some weather events, including storms, cyclones, and fires (Commonwealth Scientific and Industrial Research Organisation, 2016). Public policy solutions to natural disasters should ideally seek to mitigate climate change where possible as well as factor in the additional disaster hazard it causes. While research has not yet comprehensively linked climate change to an all-hazards view of natural disasters, the field is advancing rapidly. Individual extreme weather events have been attributed to climate change (Hassol *et al.*, 2016; Otto, 2017; Lewis, 2013; King *et al.*, 2015).

Unfortunately, the ability to incorporate climate change into calculations of disaster risk and an assessment of their full costs to society remains a work in progress (Brekke and Johansson-Stenman, 2008; Dobes, 2008; Kousky, 2014). Having said this, we are reminded of the definition of disaster mitigation: 'Measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and the environment' (Deloitte Access Economics, 2013 p.7). This differs from the definition used in climate change terminology: 'Actions to address the cause of climate change. This generally involves actions to reduce anthropogenic emissions of greenhouse gases that may contribute to the warming of the atmosphere' (Deloitte Access Economics, 2013 p.7).

Weather that is characterised by more extremes is predicted for the 21st century across many regions of the world, including in Australia (Commonwealth of Australia, 2015b). For example, there is 90-100% probability that heat waves will increase in length, frequency and/or intensity; and 66-100% probability that heavy rain will increase throughout the 21st century. It is very likely (90 -100% probability) that average sea levels will rise which will contribute to episodes of coastal flooding and inundation. While scientists have concluded that climate change is not expected to have a direct impact on the incidence of cyclones, cyclonic strength is likely to increase, and this, coupled with rising ocean levels will result in more severe coastal storms and the potential for coastal flooding and inundation (Intergovernmental Panel on Climate Change, 2014). There is also evidence supporting a predicted increase in severity of drought in many areas (Commonwealth Scientific and Industrial Research Organisation, 2016).

While variation has always been a feature of Australia's climate, it is predicted that the degree of variability will increase so that Australia will experience more extreme temperatures and weather events. Regional variation limits the extent to which generalisations can be made about the frequency and intensity of natural disasters in a global and even an Australian sense. However, the overall prediction is for hotter dryer temperatures in South Eastern Australia, and for wetter conditions in Far North Queensland, the North West and the Top End (Commonwealth Scientific and Industrial Research Organisation, 2016).

Ideally policy solutions to disasters need to factor in climate change to ensure they have regard for the full range of disaster hazards. There is a high level of scientific confidence in the potentiating effect of climate change on extreme weather events. However, the precise nature, magnitude, time-frames and localised detail of the changes that can be expected are unknown (Intergovernmental Panel on Climate Change, 2014). This creates additional complexity and heightens uncertainty in an already uncertain policy environment (Parsons, 2016). An environment of uncertainty makes it more difficult to operationalise policy (Handmer and Dovers, 1996). The issue of uncertainty and how it impacts on disaster resilience policy implementation is discussed further in 2.4.1.

1.11 Research question: literature review

The purpose of the literature review in Section 2.3 is to develop the research parameters. This is done by scoping each of the main issues included in the thesis research question. These are resilience, policy implementation and Australian federalism:

> *Does the implementation of national disaster resilience policy in Australia reflect good practice and how is this shaped by the characteristics of the Australian federal (multi-level) governance system?*

1.11.1   Resilience and related concepts

This account briefly traces the etymology of resilience then examines resilience theory, including definitions and conceptual models, one of which was identified as the basis for the thesis methodology which is developed in Chapter 3. It starts with a broad view of resilience that is aligned with a socio-ecological and organisational systems perspective and narrows to a focus on social resilience, then to disaster resilience.

Early developments

The use of the term resilience can be traced back to ancient Rome where it is has origins in the Latin words *resilio* and *resilire* meaning 'bounce'. Resilience was referred to in engineering and the material sciences during the late 18th and throughout the 19th centuries (Alexander, 2013). It remained in the material sciences (McAslan, 2010; Norris *et al.*, 2008) and attracted more widespread attention during the 20th and 21st centuries. This culminated with it being adopted into the theory of many different disciplines including, but not limited to, ecology, psychology, systems and organisational theory, sociology and community development, economics, climate change adaptation, and disaster management (Alexander, 2013; Longstaff, 2015; McAslan, 2010) although there are claims that the term resilience was used in 1854 by American observers to describe the post disaster recovery of a Japanese city after an earthquake (Alexander, 2013).

From natural to social ecology

It was not until the 1970s that the term resilience became prominent in the ecological systems literature. The behaviour of natural systems was observed as dynamic and adaptive to external conditions and was characterised as either stable or resilient (Holling, 1973; Holling, 2001). A stable system has the 'ability to return to an equilibrium state after a temporary disturbance;' whereas, a resilient system has the ability to absorb the effects of the disturbance and remain unchanged (Holling, 1973 p.14). The idea of resilience as a quality that operates within a system is not only relevant to its application in social ecology but it is also a feature of its use in the mainstream humanities, for example in population health, where, through psychology and sociology, individual and group behaviour comes into play (Turnock B.J., 2004). How these theoretical elements come together to inform disaster resilience is outlined further in the following paragraphs.

Resilience migrated from natural ecology to human ecology early this century with a study that demonstrated how the social resilience of a coastal community in Vietnam was connected to the resilience of its local ecology (Adger, 1999, Adger, 2000). This reinforced the role resilience had in linking natural systems with social systems and expanded its scope into economic policy and development policy through natural resource management. Gunderson and his colleagues described 'adaptive capacities' as properties of landscapes that are resilient because they are able to undergo significant change and survive, that is, they undergo transformation. (Gunderson et al., 2002). Around the same time, the concept of panarchy was introduced into social ecology.

Panarchy refers to a 'self organising system' and the 'cross-scale and dynamic character of interactions between human and natural systems' (Gunderson, 2002, cited in Walker and Salt, 2012, pp.17-18). Panarchy offers guidance to implement resilience policy for environmental policy settings that draws on notions of social and organisational resilience, and political and governance systems (Allen *et al.*, 2014; Walker and Salt, 2012).

Some claimed that the process to shift resilience from the physical and ecological sciences into the social sciences was flawed because the methods used were not adequately scientific or robust (Davidson, 2010). Unlike Gunderson (2000), Davidson claimed that adaptation and transformation are separate and distinct to resilience because they relate to ecological functions that are not under conscious control: 'Agency is missing from ecological theories of resilience' (Davidson, 2010:1143).

As mentioned in 2.2.3 climate change impacts need to be incorporated into disaster resilience policy. However, at times questions have been raised regarding the suitability of the term 'adaptation' for application to disaster resilience: Adaptation, in a general sense, entails a response to an existing or unavoidable situation which excludes the concept of prevention. This is consistent with the understanding of adaptation in the field of climate change: prevention is understood separately within the category of 'mitigation', and refers to 'actions to address the causes of climate change' (Deloitte Access Economics, 2013:7). This contrasts with disaster resilience, where adaptation and mitigation have a strong preventive focus. Thus, the prevailing view of adaptation within climate change science could have rendered it an unsuitable concept to use with disaster resilience. However, other research counters this and enables it to be included. The case for the inclusion of adaptation within the suite of disaster resilience measures is supported by their shared association with uncertainty. In practice, the acceptance of adaptation into disaster resilience policy is borne out by its inclusion in key Australian and international disaster policies (Commonwealth of Australia, 2011a, 2015c; United Nations International Strategy for Disaster Reduction, 2015).

Klein *et al*. (2003) chose the concept of adaptive capacity instead of resilience to manage the apparent inconsistency between adaptation and resilience. Adaptive capacity is defined as: 'The ability of a system to modify or change its characteristics or behaviour to cope with actual or anticipated stresses' (Folke *et al.*, 2003 cited in Parsons *et al*., 2016a:7). The reasons given by Klein for this view were that adaptive capacity could be readily combined with climate change as an 'umbrella concept'. Furthermore, it was not well understood how to operationalise resilience (Klein *et al*., 2003) Later, a direct link was made between adaptive capacity and community resilience (Maguire and Cartwright, 2008). Thus, adaptation and adaptive capacity both suggest an ability to adjust to changing and uncertain circumstances and both describe policy approaches to natural disasters. This aligns with the definition of resilience that I have adopted in this thesis, 'resilience involves an ability to integrate capacities to withstand disturbance with the ability to

recover to the previous level of function *as well as to adapt and improve. …*', '…positive trajectory of functioning and adaptation after a disturbance' (Norris *et al*., 2008:130).

In ecology, the tendency for a natural system to adapt to challenges up to a threshold, beyond which it becomes permanently changed or transformed, is the concept that underpins sustainability (Holling, 1973), a theme that I develop further in other chapters. Studies of sustainability bridge natural ecology and the humanities, and resilience has come to be regarded as integrated with sustainability (Achour *et al.*, 2015). An understanding of resilience, within a natural system, has significance for how it is viewed within other systems. In systems of governance, it is connected through public policy to sustainable development and defined as: 'Meeting the needs and aspirations of the present generation without compromising the ability of future generations to meet their needs*'* (Brundtland, 1987:292).

These connections warrant the inclusion of sustainability in the exploration of the implementation of disaster resilience policy. In Chapter 3, I incorporate sustainability into the Provisional framework as the universal theme for the policy domain of economic development. It is also discussed in more detail in Chapter 6 when the Provisional framework is applied through the lens of economic development.

Resilience in individuals and communities

The concept of resilience entered the field of psychology from anthropology in the late 1950s although it was not until the 1980s that it was taken up among developmental psychologists (Alexander, 2013). It was proposed as an explanation for why some children who had experienced difficult or traumatic experiences during their upbringing are able to overcome adverse conditions and prosper contrary to expectations (Garmezy *et al.*, 1984; Rutter and Garmezy, 1983). The developmental psychologist Masten, proposed that resilience is a process following adversity where, after experiencing an initial decline in well-being, a person can move to a higher level of functioning described as 'posttraumatic growth' (Calhoun and Tedeschi, 2006, cited in Masten, 2016:300). She raised the problem of how to operationalise or promote resilience in individuals (Masten, 2007). There is evidence in this work of an emerging focus on the multi-level dynamics of resilience in socio-cultural systems, (including a mention of disaster resilience) (Masten, 2007: 927). The application of resilience to disasters was singled out for its potential to translate theory into practice to deliver more interconnected and effective assistance at scale to individuals, families, communities, economies, and natural and built systems (Masten, 2015). Masten developed the systems perspective on resilience still further by using an ecological framework that was generalisable across a range of disciplines and levels (Masten, 2016). This foreshadowed the emergence of collective or community resilience that is central to the aim of Australian disaster resilience policy.

The transition of resilience as a quality that could be enhanced in individuals to one that could be applied similarly to groups or communities (Adger, 2000,2003; Brown and Kulig, 1996;

Kulig *et al.*, 2013; Norris *et al*., 2008), was a key development in resilience research. A collective understanding of resilience was adopted in the United States to build disaster resilience in national health security policy as early as 2009 (US Department of Health and Human Services, 2009) and this was applied and tested in local communities in subsequent research (Chandra *et al.*, 2013). These developments brought the long-standing ecological and socio-ecological systems views of resilience together with the idea of social resilience systems. The conceptualisation of disaster resilience policy implementation, within a complex social system, is integral to the case that is made in this thesis for good practice in disaster resilience policy implementation. In this thesis community resilience is assumed to be identical to social resilience which: 'takes into account the economic, institutional and social dimensions of a community. It extends the ecological perspective of resilience to recognise the ability of people to organise themselves' (Maguire and Cartwright, 2008:4).

One study was able to shift resilience from an individual quality to that of groups affected by natural disasters (Norris *et al*., 2008) and as such, is particularly important to this thesis. Norris and her colleagues modelled the various factors that enable community resilience to disasters using 'four networked adaptive capacities with dynamic attributes' (Norris *et al.*, 2008:135). These adaptive capacities are social capital, community competence, economic development, and information and communication. Resilience is portrayed as a process with dynamic and connected qualities, which upon contact with a shock or disturbance, cause adaptation and ultimately result in an improved condition. The interpretation of community applied by Norris was at multiple scales from 'grass roots groups and neighbourhoods to complex amalgams of formal institutions and sectors in larger geo-political units*'* (Norris *et al.,* 2008:136). This study adopted a social systems approach that treated resilience and disaster resilience as attributes to support the health and well-being of groups or communities. Community health and well-being is closely associated with the discipline of population health. Population health or public health takes a positive definition of health. Rather than health being an absence of disease, it emphasises wellness. Good health can be achieved by the promotion of factors that support wellness as well as minimising factors that are known to increase the chances of ill health. For example, policies and programs that encourage people to exercise regularly, quit smoking, reduce obesity etc. Modifying these factors can achieve measurable and significant changes in health status across populations that may not be discernible in individuals (Kindig and Stoddart, 2003; Kindig, 2007; Turnock B.J., 2004). The constitution of the World Health Organisation provided the following definition of health to the 1986 Ottawa Charter for Health Promotion: 'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (Potvin and Jones, 2011 p.244).

This edict was reaffirmed by the Bangkok Charter in 2008 although it acknowledged that changes to population health had occurred since then due to increased inequality and globalisation (Potvin and Jones, 2011). Similarly, a wellness, rather than an illness-based perspective, was

espoused by Norris (2008). This aligns with a view of resilience that emphasises the identification, maintenance and enhancement of existing strengths, in contrast with an approach that focuses on vulnerabilities (Richardson, 2014).

Different disciplinary approaches to resilience or those concerned with individuals or groups at various scales within the system are not mutually exclusive. This was demonstrated by Paton and Johnston who assembled an integrated multi-disciplinary examination of resilience (Paton and Johnston, 2006). This volume includes, but is not limited to: resilience thinking in economics and the development of methodology for measuring economic resilience for disasters (Rose, 2006, cited in Paton and Johnston, 2006, pp.226-245); guidance for assessing community disaster resilience and the relationship of vulnerability to resilience (Buckle, 2006, cited in Paton and Johnston, 2006, pp.88-103); the idea that disasters are a social phenomenon and there is a need to focus on changing the behaviour of communities to enhance protection and reduce disaster risk (Smith, 2006, cited in Paton and Johnston, 2006, pp.143-160); the urban planning view on the importance of hazard mitigation to create sustainable communities (Schneider, 2006, cited in Paton and Johnston, 2006, pp.66-86) and the complex role of planners in hazard mitigation (King, 2006, cited in Paton and Johnston, 2006, pp.288-304).

Defining disaster resilience: what's in a name?

Many of the resilience-related studies combine the development of discipline-specific definitions of resilience with models, methods or tools to measure resilience. Resilience definitions are too numerous to fully document in this thesis. Instead, an international and an Australian definition were provided in Chapter 1 and additional definitions, referred to in other parts of the thesis, are included in the Glossary. Although most definitions of resilience have commonalities, the variations between them may be significant. This is because apparently minor differences can translate into quite different approaches to disaster resilience policy implementation. The variations in definitions of resilience roughly correspond to the main developments in resilience theory that have been discussed above.

These are summarised as: the material sciences version of resilience based on maximising resistance or survivability to forces; socio-ecological definitions that emphasise adaptability and change in response to shocks to a system with the aim of returning to original levels of function within certain thresholds (bounce back) (Wildavsky, 1988); and the psycho-social view of resilience that may incorporate both of the above goals with the addition of the goal 'to achieve 'a positive trajectory of functioning' (Norris *et al*., 2008:130) or to 'bounce forward' (Manyena, 2006, Manyena *et al.*, 2011; Paton and Johnston, 2006).

The definitions of resilience favoured for this thesis were given in Chapter 1 and are most consistent with the third category:

> A process linking a set of adaptive capacities to a positive trajectory of
> functioning and adaptation after a disturbance (Norris *et al*., 2008, p. 130), and

> The ability of a system, community or society exposed to hazards to
> resist, absorb, accommodate, adapt to, transform and recover from the effects
> of a hazard in a timely and efficient manner, including through the preservation
> and restoration of its essential basic structures and functions through risk
> management. (United Nations International Strategy for Disaster Reduction,
> 2019).

In accordance with the theoretical links that have been highlighted in Section 2.3 the definition developed by Norris and her colleagues was selected because of its focus on social resilience, its application to multiple scales within a system, and the incorporation of the concepts of adaptation and improvement articulated within the concept of a positive trajectory. This is discussed in Chapter 3, Section 3.2.2.

The United Nations International Strategy for Disaster Reduction (UNISDR) definition of disaster resilience was selected because, although not explicitly stated, it is consistent with the spirit of deliberative forms of policy development for disaster risk reduction. A deliberative approach is compatible with disaster resilience because it facilitates citizens' participation in public policy through the use of strong horizontal methods of consultation and decision making. In contrast, the more traditional hierarchical methods that are generally employed by most democratic systems tend to feature more limited citizen input (Hunold, 2001).

Choosing an appropriate definition or definitions of resilience raises questions about its relationship to *vulnerability, adaptive capacity* and *risk.* These terms produce different emphases depending on how they are used in, or indeed omitted from, the disaster resilience discourse. Differing definitions and understandings of resilience allow us to make distinctions between approaches that focus on identifying, assessing and reducing vulnerability with those that equate resilience more closely with building adaptive capacity. Risk, particularly in the context of risk reduction and risk mitigation, is prominent in disaster resilience policy and is a key focus of disaster resilience policy implementation. The following definition of disaster risk reduction captures the elements of disaster resilience and can be applied equally to individuals and groups:

> The ability to absorb and then recover from an abnormal event; being
> ready and prepared to face threats and events which are abnormal in terms of
> their scale, form or timing; an ability and willingness to adapt to a changing
> and sometimes threatening environment; a tenacity and commitment to
> survive; and a willingness of communities and organisations to rally round a
> common cause and a shared set of values. (McAslan, 2010).

The dominance of the idea of reducing and mitigating disaster risk, although not unsound, could signal a reductionist approach to disaster resilience to be regarded with a degree of caution. A preoccupation with risk could limit the transformative potential of disaster resilience. However, it is not within the scope of this thesis to debate this thoroughly. Suffice to say that an awareness

the application of the concept of risk in public policy for disasters and its limitations should be kept in mind when considering how to operationalise or implement resilience policy.

One of the distinguishing features of the definitions and models that were explored to develop this thesis was whether they emphasised the need to overcome existing vulnerability or whether the focus was on the identification and enhancement of strengths to resist, survive and adapt positively following a disaster.

Vulnerability versus strengths

Vulnerability is regarded by some as the antonym of resilience (Norris *et al*., 2008) and something that must be countered in order to build resilience: 'the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards' (United Nations International Strategy for Disaster Reduction, 2019). This can have a bearing on how a disaster resilience policy is implemented. From a sociological perspective, vulnerability is connected with belonging to a particular demographic group, such as the frail and aged, people with disabilities, people from culturally and linguistically diverse backgrounds, Indigenous Australians etc. Marsh developed a list of vulnerable groups and the idea has gained some acceptance in disaster planning and operational settings (Marsh *et al.*, 1999). One manifestation has been the development of local risk registers to support disaster prevention, planning, response and recovery. These generally provide detailed published information about local hazards, with risk assessment and risk treatment advice (see the WA Joondalup Risk Register (City of Joondalup, 2013). They may also include an audit of local assets and infrastructure and identification of specific vulnerabilities. Risk registers contrast with state and territory or national disaster plans that, in Australia, tend to provide broad guidance about jurisdiction-wide disaster risk priorities and emergency management agency roles and responsibilities. They may or may not be published (Australian Government Department of Home Affairs, 2019).

Buckle (2001, 2006) explored the relationship between resilience and vulnerability and characterised vulnerability as more dynamic and nuanced than what had hitherto been understood as the opposite of resilience. Resilience and vulnerability are context specific and are considered as linked but not opposite. Vulnerability depends on the interplay between a hazard or hazards with a range of social, economic, and environmental conditions that impact a person or a group's ability to 'work toward and attain certain basic goals' (2001 p.101) rather than it being a characteristic that exists independently to a hazard. Buckle differentiated between vulnerability and resilience saying 'it is critical that resilience be given priority. Achieving resilience is positive. Reducing vulnerability is reactive' (2001 p.6).

'Resilience is the capacity to withstand loss, the capacity to prevent a loss occurring in the first place and the capacity to recover from a loss if it occurs. Vulnerability, on the other hand is a measure of what losses may occur and how severe they may be' (Buckle, 2006 p.91).

Continuing the theme of vulnerability as a functional characteristic, Cutter's research located vulnerability within hazard management and disaster risk reduction. In an early study Cutter (1996) claimed that the literature was dominated by an explanation of vulnerability as either a potential exposure to a risk or a social response. She proposed a third, predominantly geographically-located model that combined elements of the two: the hazards of place model (1996). This model is referred to in Chapter 3 in relation to the inclusion in the Provisional framework of the policy objective, Local disaster risk awareness. In what might be seen as recognition that resilience is linked to vulnerability, Cutter later suggested that vulnerability could be managed by strategies that include capacity assessment and support (Cutter *et al.*, 2008b). Vulnerability was a predominant concept in disaster research during the 1970s (Cutter, 2016) after which it was somewhat overshadowed by disaster resilience as a social form of adaptation and transformation in response to adversity. This idea of resilience encompasses the idea of building a community's capacity to adapt and transform where the incidence and impacts are unknowable or uncertain**;** and is described as a strengths-based approach (Saint-Jacques *et al.*, 2009). This term was expounded by Obrist who recommended moving away from risk and vulnerability (2010) and replacing it with an approach that enhances social resilience as a form of disaster mitigation. (2010). Similarly, there is an argument that a vulnerability focus stigmatises certain groups (Hufschmidt, 2011). Fekete developed a model to measure vulnerability (2009) and later analysed the benefits and problems associated with the use of both terms from an international disaster management policy perspective. He notes that Miller *et al* see a 'difference between the implementation of the concepts of vulnerability and resilience' (2014, page 5). Fekete describes how vulnerability is a concrete tool or task and explains how its use helps to overcome the difficulties associated with operationalising the more strategic and goal orientated concept of resilience (ibid). This may explain the ascendency of vulnerability in Australian public policy (referred to in Chapter 2) as the Australian Government seeks to align itself within the international context provided by the Sendai Framework for Disaster Risk Reduction (UNSDR, 2015).

Risk and Vulnerability comprises just one of four components of resilience that are included in the Torrens Resilience Institute Scorecard. The others are Community Connectedness, Planning and Procedures, and Available Resources (NSDR Companion Booklet page 4). Groups who may be identified as vulnerable for the purposes of disaster management, have capacities that contribute toward their resilience. For example, people in groups that have been identified as vulnerable can also be resilient because they have strong social networks that provide assets in the form of social capital (Cutter, 2016). Having insurance is resilient (Buckle, 2006), older people may be resilient due to their life experience, Aboriginal people's resilience may come from centuries-old skills in land management, while people from migrant or non-English speaking backgrounds often have strong community networks (Richardson, 2014).

Climate change adaptation has lately provided a bridge between resilience and vulnerability. Vulnerability is the susceptibility to harm, while in climate change adaptation vulnerability encompasses susceptibility as well as the capacity to adapt (Cutter, 2016), a key characteristic of resilience. Adaptation to climate change and its connection to the idea of addressing systemic vulnerabilities to reduce disaster risk and thus improve resilience, is one of the key themes in recent Australian disaster policy (Australian Government, 2018, 2017; O'Connell *et al*, 2018a, 2018b). In this sense, resilience is relegated to the status of a biproduct of disaster risk reduction through measures to address vulnerability. Whether the long-term outcomes of this approach support this logic remains to be seen. In the meantime, it is important to understand how decisions based on a vulnerability paradigm may deliver different outcomes to those that are made from a resilience perspective.

Models and measurement

Arguments about whether resilience is a process or an outcome, or a combination of both, and efforts to define the term have been confounded by lack of distinction between the antecedents of resilience, the outcomes of resilience and descriptions about the actual resilient state of being (Kulig *et al.*, 2013). This has become more salient as resilience has been applied to public policy development where there may be a requirement to isolate, analyse and empirically measure inputs to aid decisions on where to allocate resources and target investment. This may also explain the proliferation of different definitions for resilience and disaster resilience and the development, in the past decade, of models and tools to assess and measure disaster resilience.

Significant work has been done overseas and in Australia to this end. Overseas, the Norris model shifted the description of resilience as an individual quality to one applied to groups affected by natural disasters. During the same period, Cutter developed the Disaster Resilience of Place (DROP) model (Cutter *et al.*, 2008b), followed by a methodology and indicators for measuring baseline disaster resilience (Cutter *et al.*, 2010). However, the validity of some of these tools may be limited to their use within the locality for which they have been developed and may not be transferable to other countries, regions and communities. A method to assess vulnerability was developed by Fekete (2009) followed by a social impact assessment tool in 2010 (Cottrell and King, 2010). Meanwhile, system dynamics was incorporated into the idea of community in a study that looked at community resilience from the perspective of Australia's Indigenous peoples. Although this work did not deal specifically with disaster resilience it reinforced the idea that resilience is about well-being, not the absence of illness (Kirmayer *et al.*, 2009; Kirmayer *et al.*, 2011; Kirmayer *et al.*, 2012). Longstaff *et al*., (2010) developed a preliminary conceptual framework for resilience in community systems comprising ecological, economic, physical infrastructure, civil society and governance subsystems. They noted the importance of assessing the effectiveness of governance in terms of how it operated within a system, not in isolation because 'competing governing entities can undermine the functions of the system' (Longstaff *et al*., 2010:13)

The Norris model was later used as a basis on which to develop indicators for social capital and economic development. This made use of locally available data and thus could be used at the smaller scale (Sherrieb *et al.*, 2010). This was followed up by Kulig *et al.*, (2013) who expanded on Norris' model by developing the Index of Perceived Community Resilience (IPCR). The IPCR was tested in two fire-affected communities in Canada using a methodology that triangulated quantitative and qualitative findings drawn from interviews, community profiles and a household survey. These findings corroborated Norris' model and, in addition Kulig proposed the sub-scales of leadership and empowerment, community engagement, and non-adverse geography. These sub scales aligned with two of the four community resilience adaptive capacities in the Norris model; social capital and community competence.

Resilience frameworks have more recently been developed for instrumental purposes, including for policy and program monitoring and evaluation of disaster resilience and risk reduction projects. For example, in the UK, a framework for implementation of community-based disaster risk reduction and climate change adaptation initiatives was developed to explain the relationship between disaster risk reduction and climate change adaptation. The central linking concept is 'community' and 'community disaster resilience' is the overarching goal. Progress towards this goal is done by monitoring the various elements of disaster resilience (Twigg, 2009).

In Australia, researchers have assessed the conditions necessary to achieve social resilience at the community level and proposed the following six elements: knowledge of hazards, shared community values, established social infrastructure, positive social and economic trends, partnerships, and resources and skills (Buckle, pp.97-98). A follow-up study in Australian communities found that disaster resilience could be created by empowerment of locals, that is local leadership, a local centre to provide a hub where representatives from various sectors can meet, as well as trust in government and the private sector, development and maintenance of networks that have linking characteristics, and open and inclusive communication to support stakeholder participation (Buckle *et al.*, 2003 p.15-16).

A social assessment framework for measuring community resilience was developed to determine local level priorities for government water management reform. It explored the relationships between the concepts of vulnerability, adaptive capacity and social resilience. This favoured an approach to build capacity to enable a community to adaptively respond to change instead of limiting the vision for change to the restoration of a pre-existing state (Maguire and Cartwright, 2008).

In Australia, the Torrens Resilience Institute produced a toolkit for communities to self-assess their resilience to all hazards by using community-based data that is either readily available or generated by community meetings (Arbon *et al.*, 2012). This produced a community resilience scorecard that was trialled in four communities. Feedback from the trials suggested that a resilience toolkit would be useful at household level (Arbon *et al.*, 2013). The Torrens Resilience Institute followed up with the development and evaluation of a Household Resilience Toolkit for

community organisations to work through with potentially vulnerable households. The process involved identifying support networks and services on the basis of local government areas (Arbon *et al.*, 2016). The evaluation found that those using the tool needed to better understand how disaster resilience focuses more on preparation rather than on response and recovery (2016). the Australian Red Cross RediPlan, while not explicitly about measuring disaster resilience, is a practical resource which households can use to check their level of emergency preparedness and to make improvements where needed. Uptake of this resource is supported by a community program where volunteers host forums to encourage local residents to use the material (Australian Red Cross, 2016).

An Australian index for measuring community resilience at regional and national levels has been developed by the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC) and further results are likely to be forthcoming when it has been applied. The Australian Natural Disaster Resilience Index (Parsons, 2016) draws on the Norris model and conceptualises disaster resilience as having adaptive and coping capacities. National level indicators have been developed to enable baseline resilience and changes in the level of resilience to be measured. Importantly only indicators for which data is readily available have been chosen for inclusion in the index. The researchers have acknowledged that one of the biggest challenges in its development, and potentially to its application, is the mix of top-down and bottom-up data sources used to measure resilience. It is possible that there may be limitations to combining these into a comparable measurement. This is the first disaster resilience index that incorporates organisational and institutional factors and could lay the groundwork for evaluation of national disaster resilience policy. A definition of resilience was developed for the Australian context:

> The capacity of communities to prepare for, absorb and recover from
> natural hazard events and to learn, adapt and transform in ways that enhance
> these capacities in the face of future events. (Parsons, 2016 p.6).

In New Zealand, a collaboration between various government and academic institutions, is supporting a comprehensive resilience research agenda. The Resilience Challenge New Zealand is developing frameworks and tools to model and measure resilience to directly inform best-practice resilience policy implementation across New Zealand in range of areas. For example, a National Report Card and National Infrastructure Resilience Rating that can be used by the general public; a rapid assessment method to report socio-economic impacts of disasters over time, in different settings and for multiple stakeholders; ways of harnessing citizen science to contribute to strategic resilience; a national framework for assessing risk and impact information for natural hazards, using scenario-based approaches; and a decision-making framework that matches the most appropriate form of governance to the problem and resilience solution (Resilience to Nature's Challenges, 2018).

The examples above demonstrate how research to develop methods to measure disaster resilience complements approaches to the implementation of disaster resilience policy. This is

because activities, programs and interventions or projects designed to build disaster resilience may be required to demonstrate effectiveness or to evaluate the extent to which stated aims and objectives have been achieved. In the next section, I outline policy implementation theory and give some disaster resilience practice examples.

1.11.2   Policy Implementation: theoretical and practical perspectives

The previous section outlined how the knowledge base on resilience has evolved to improve the ability to define and measure resilience. Meanwhile, other questions for resilience research remain. One pertains to how we should effectively operationalise or implement resilience and disaster resilience policy (Klein *et al.*, 2003; McAslan, 2010).   This section continues the process of developing the thesis parameters by exploring what is known and what is not known about effective disaster resilience policy implementation. Information is presented on major studies of policy implementation, models to explain policy implementation, and some factors that contribute to its success accompanied by a number of examples. This highlights a shortage of policy implementation studies in general that translates into a shortage of information about effective disaster resilience policy implementation. At the same time it identifies that the context for implementation can have a significant influence on policy outcomes. This indicates a need to better understand the policy context for disaster resilience including relevant models of governance and policy mechanisms. Different governance models, including federalism, are investigated to find how they operate and contribute to disaster resilience policy implementation. Next key issues and arrangements that define the Australian context for disaster resilience policy implementation are discussed in terms of how they affect policy outcomes. For example, the National Strategy for Disaster Resilience, which is the major policy mechanism being used to implement disaster resilience policy.

'Policy' has many purposes and many definitions including the following: 'A course of action by government designed to attain specific results' (Bridgman and Davis, 2004 p.5) or 'a statement of government intent and its implementation through the means of policy instruments' (2004 p.184). Policy instruments can be a selection of some or all of the following: advocacy, monetary means including taxation and spending, service delivery and laws (Bridgman and Davis, 2004 p.69). Public policy, or government policy, is typically multi-disciplinary and thus provides a suitable vehicle to enable disaster resilience, which by nature, is multi-faceted, and applicable across all levels of society. It draws on bodies of knowledge from political science, economics, psychology, sociology, anthropology, statistics and the physical and natural sciences etc (Fischer and Miller, 2006). It is also compatible with the systemic view of resilience that requires its implementation as a whole-of-community and whole-of-nation goal. Both government and non-government or private organisations can conduct activities aimed at furthering public policy

objectives although the non-government sector does not have direct access to public funds or the legislative instruments that are available to government (Bridgman and Davis, 2004).

Policy implementation is defined as 'a process of interaction between the setting of goals and the actions geared to achieving them' (Pressman and Wildavsky, 1984, p.xxi) or 'what develops between the establishment of an apparent intention on the part of government to do something, or stop doing something, and the ultimate impact in the world of action' {O'Toole, 2000, cited in Hill and Hupe, 2002:8).

Hupe (2014) reviewed the development of policy implementation research and observed that the book, 'Implementation' by American policy researchers Pressman and Wildavsky (1973), when first published, stimulated a period of interest and activity in implementation research that continued until approximately 1990 (Hupe, 2014). At this time, the dominant paradigm for policy implementation was one where government prescribed and initiated policy and specific consideration was not given to implementation. Hupe declared that the publication 'Implementation' presented a new and critical way of thinking about policy implementation. Hupe also claimed that the book stimulated a discussion of a number of case studies and identified a gap between policy aspirations and policy outcomes that led to government recommending more commitment to implementation. 'There is no point in having good ideas if they can't be carried out.' (Pressman and Wildavsky, 1973 p.143). The authors emphasised the criticality of implementation as an instrument of change and a dynamic and evolving process to support policy learning and improvement (Pressman and Wildavsky, 1984 pp.175-176). In terms of a methodology to measure success, implementation was judged in accordance with the compliance of outcomes with policy goals. The policy goals are used as the starting point or the ideal, and are compared with what has been achieved (Hupe, 2014:170).

A premise of this thesis is that, not only is policy implementation in and of itself, critical for policy success, the context for policy implementation also influences, if not determines, policy outcomes. This view was proposed and supported by early policy implementation scholars and continues to be valid today. Pressman and Wildavsky (1984) asserted that the context controls (or at least heavily conditions) the implementation' and 'context is everything' particularly when dealing with large scale social problems (Pressman and Wildavsky, 1984, p.164). The need for more attention to be given to implementation research and its context in the form of policy processes and institutions, was acknowledged by Hezri and Dovers who urged:

> 'Implementation should include a consideration of policy processes that can be more or less constrained or supported by institutions ie there is scope for redesigning the processes for achieving the desired change that are not well utilised' (Hezri and Dovers, 2009:310).

Policy development and implementation is complex

The policy development environment can be very complex due to the numerous actors and issues that must be managed. This was described by Goggin as 'too many variables' (Goggin, 1986:328). Very early scholars had identified the unstructured nature of policy implementation but did not necessarily see this as problematic. For example, Lindblom referred to it as 'the science of muddling through' (Lindblom, 1959). Others came to view a lack of methodological rigor in the field as a disadvantage amidst calls for future research to develop better methodology, including to better reflect its complexity (O'Toole, 2000). One study that aimed to simplify policy development and implementation variables, was the Ambiguity-Conflict model. It consists of administrative, political, experimental and symbolic categories of policy implementation (Matland, 1995). Another approach was to propose various stages of implementation (Anderson, 2014; Sabatier and Jenkins-Smith, 1993). The 'Policy Cycle' (Bridgman and Davis, 2003 p.100) depicted in the figure below, demonstrates that policy development, implementation and evaluation are iterative processes. This model was developed in Australia and is relevant to Australian public policy. Hence it is adopted as the most suitable model for this thesis.
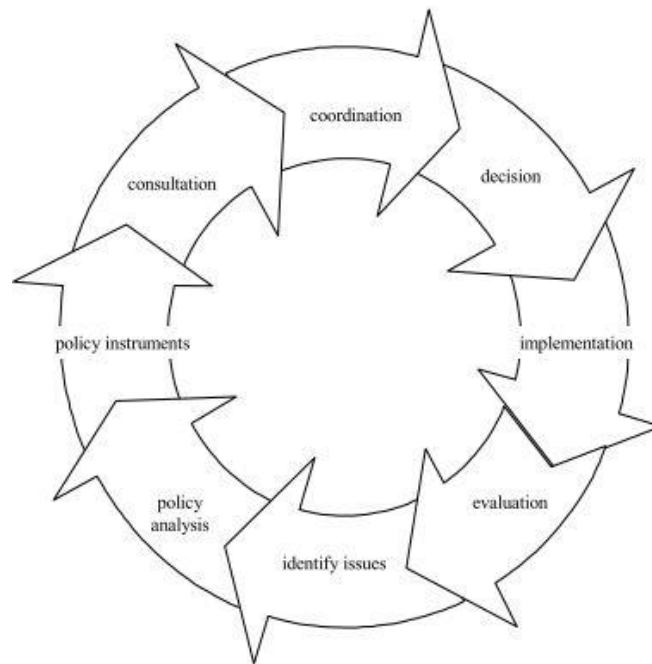
Figure 0-1 The Australian Policy Cycle
(Bridgman and Davis, 2003 p.100)

Bridgman and David also provided specific advice about how to ensure successful policy implementation. It should be based on a simple, robust theory that has been tested through experience; have minimal complexity with a small number of steps between policy formulation and implementation; be identifiable; limit the number of agencies responsible for coordination and have effective coordination arrangements; have a clear line of accountability; those who deliver the program, 'street level bureaucrats' should participate in its design; and it should be subject to continuous evaluation that facilitates the ongoing review and change of the policy

(Ingram, 1990, Davis and Weller, 1993, Sabatier, 1988, all cited in Bridgman and Davis, 2004, pp.120-121).

In another development in Australian policy research, Colebatch (2009) proposed three models of policy development consisting of authoritative choice that is focused on the policy decision. The outcome is seen to have been achieved when the high-level arrangements are completed, usually at the government leadership level; Structured interaction relates to 'doing policy' and resembles consultation. It operates at a lower level in the policy process and relies on the establishment of working relationships between stakeholder organisations; and social construction which is a lower level more comprehensive and dispersed form of consultation that is more likely than the other models to achieve a consensus for change among different groups.

By 2009, disaster resilience was established as national policy in Australia (Commonwealth of Australia, 2008) and this commitment was strengthened by the adoption of the National Strategy for Disaster Resilience (NSDR) in 2011(Commonwealth of Australia, 2011a). The NSDR remains in place today, but research on effective implementation of disaster resilience policy has not accompanied these developments. Klein argued in 2003 that not enough is known about how to operationalise resilience (2003). Further, Cork states that 'resilience is not yet being applied or researched widely in policy development in Australia (Cork, 2010) and in a personal communication on 2 July 2014, Paton stated that 'implementation studies on resilience are lacking'. One of the reasons for this that was highlighted in Section 2.3.1 and in Section 2.4 is that resilience theory is complex and this makes resilience policy equally, if not more complex. A complex policy is more challenging to implement than more one-dimensional policies.

Since its heyday in the 1980s and 90s, research on policy implementation has dwindled. What has been done since is fragmented and discipline-specific such that it is not readily identifiable (Hupe, 2014). Not surprisingly, disaster resilience policy implementation does not have a discrete evidence base. Thus, the following discussion on different modalities of policy implementation is instructive because it highlights those that have goals that are consistent with resilience and disaster resilience policy.

Top-down versus bottom-up implementation

The predominant approach of the early models for policy implementation, and a model that continues to be applied today, is described as 'top-down'. A top-down approach to implementation starts with a policy decision by government. This prescribes certain objectives and procedures that are assumed to translate into policy outputs and impacts relevant to the official government policy (Sabatier, 1986). Top-down policy implementation activity, is developed at the top with the aim of achieving change at the bottom. By comparison, 'bottom-up' approaches focus on understanding actor interaction and strategies for dealing with a policy problem in a specific policy sector, rather than the implementation or 'carrying out' of a policy per se (Sabatier, 1986:36). Along with the interest in policy implementation in the last two decades of the 20th

century came debate about top-down versus bottom-up approaches as ways of conceptualising different styles of implementation.

This culminated in the identification of advantages and drawbacks for each of these and proffered, instead, support for a synthesis of approaches (Goggin, 1990, cited in Hupe, 2014: 176) that combines the 'best of the bottom-up and the top-down approaches' (Sabatier, 1986:38). Sabatier developed a framework that brought together elements from both (Sabatier, 1986). This framework depicts a process of *policy change,* which Sabatier concludes to be more appropriate than the notion of policy implementation, where success is judged based on the direction of action. A 'Decentralised Policy Implementation' model (Whitford, 2007) combined top-down and bottom-up approaches. This study expanded on the work of Sabatier. It incorporated statistical analysis which was seen to add rigour to the policy implementation and evaluation process and enhance 'the capacity to design government to better understand the tension between national control and local flexibility' (Whitford, 2007:17). Others claim that flexibility is needed. This could mean that unidirectional approaches; either top-down or bottom-up, or synthesised approaches may be appropriate, depending on the circumstances (Goggin, 1986; Sabatier, 1986; Graham, 2011). This contradicts critiques of resilience who assert that all government or top-down resilience activity is inconsistent with resilience. This, it is said, occurs because, by the exercise of its powers, government undermines individual and social flexibility and freedoms. Government requests for citizens to develop a greater awareness of disaster risk can become an instrument of government control (Davidson, 2010; Gleeson, 2013; Zebrowski, 2009; Zebrowski, 2013). Another concern centres around resilience being used to support the dominance of neo-liberal economics under the guise of decentralised community centred disaster resilience (Tierney, 2015).

In Australia, Buckle conducted community research and advocated for local empowerment through partnerships using both top-down and bottom-up approaches (Buckle, 2006). He also argued for a combination of the two in order to implement disaster resilience policy (Buckle *et al.*, 2001). This was echoed by McGowan in 2012 when he criticised the overly top-down regulatory outcomes recommended by the Queensland Flood Commission of Enquiry (McGowan, 2012). Bun compared and contrasted various approaches to disaster recovery in the US and Australia and takes the position that better recovery is not necessarily faster recovery (Bun, 2012).

Sabatier also proposes that combined or synthesised models of policy implementation need longer time frames to accomplish their objectives and recommends that a program not be assessed for its effectiveness prior to ten years (1986 p.28; Sabatier, 1988 p.131). This has relevance to implementation time-frames and measures of success for national strategic policies, including the Australian National Strategy for Disaster Resilience (Commonwealth of Australia, 2011a).

Community engagement

One particular study which was concerned with the direct implementation of disaster resilience policy identified principles for effective and sustainable community engagement in disaster management. These include good governance, adequate resourcing, integrated development, self-sustaining, change mechanisms and effectiveness (Coles, 2004 p.12-13). The theme of community engagement in policy implementation was raised again in relation to emergency powers in Australia for preventing the spread of serious communicable diseases (Bennett *et al.*, 2012). Bennett emphasised that even though legal, regulatory and administrative arrangements are critical in federal and state governments, they are rendered impotent without a simultaneous process for ensuring community engagement and cooperation. In 2013 Adger stressed the importance of community engagement to support the implementation of climate change adaptation policy at very small scales so as to take cultural values and psychological well-being into account (Adger *et al.*, 2013).

Community development

The idea of community engagement as a form of policy implementation that can be employed to build disaster resilience goes hand in hand with the concept of community development. Community development was first defined as a 'process of developing the community field' when the field represents 'the capacity of local residents to work together for their own well-being' (Wilkinson, 1972, cited in Wilkinson, 1991, pp.87-88). Its value lies as much in the process as in the outcome. Community development will occur 'even if the external goal is not achieved' (Flora, 1998:493). Community development aims to produce positive change and transformation by fostering and harnessing community capacity. Community development relies on people's sense of attachment to their community which can be based on shared geography and physical location or cultural and social ties (See Glossary for a definition of community). The role that community development plays in facilitating action and change appears again in Chapter 3 in the discussion about social capital and community competence, whereas it transforms place-based qualities into place-based capability. Kretzmann and McKnight refer to this as 'asset-based community development' which is similar to a strengths-based approach for building community resilience previously mentioned in Section 2.3 (Kretzmann and McKnight, 1993:1-6). Furthermore, it is has been argued that effective community development will create social capital (McClenaghan, 2000).

The remainder of Section 2.3.2 is allocated to a discussion about governance because of the context and mechanisms that governance provides for policy implementation. Governance consists of: 'Regimes of laws, rules, judicial decisions, and administrative practices that constrain, prescribe, and enable the provision of publicly supported goods and services' (Lynn Jr *et al.*, 2001

p.7). According to Buckle, the principles of good governance that support community capacity and resilience are 'legal authority, transparency, accountability, inclusiveness, and agreed priorities' (Buckle, 2006, p.99). Disaster governance research as a discrete field is in its early stages of development. Much of what exists has been pioneered by Tierney who has found characteristics and challenges in common with environmental governance and collaborative governance; in particular the multi-scale nature of disasters and the difficulties that are inherent in organising effectively to deal with risk and uncertainty (Tierney, 2012).

Established in 2016 after the Christchurch, earthquake, Resilience to Nature's Challenges National Science Challenge, includes the Resilience Governance Research Programme (Resilience Challenge New Zealand, 2018) which is developing best practice governance models including a knowledge-base on the institutional elements needed for New Zealand to be resilient; evidence-based practice and innovations needed to support resilient decision-making; and research methods for investigating and addressing the institutional drivers of resilience (Ivory, 2017:1). The programme has funded a number of case studies that highlight the need for an enhanced focus on building communication and trust between disaster agencies (Ivory, 2017); White *et al* (2018) developed a heuristic to match the type of governance to the problem or resilience outcome being sought – 'fit-for-purpose governance' (White *et al.*, 2018). For example, a more challenging governance approach may be needed to ensure transformation, while situations of high stress or shock may require a mode of governance that supports stability versus change.

Certain theories of governance have features that are compatible with disaster resilience. One of these is adaptive governance which has been advocated in recent years as a suitable approach to the implementation of environmental policy (Folke *et al.*, 2005). Adaptive governance is defined as: *'A range of interactions between actors, networks, organisations, and institutions emerging in pursuit of a desired state for socio-ecological systems'*(Chaffin *et al.*, 2014 p.2) that involves, among other things, 'devolution of management rights and power-sharing that promotes participation' (Folke *et al.*, 2005 p. 449).

Adaptive governance

Adaptive governance is usually portrayed in the literature as a form of environmental governance and is an appropriate style of policy implementation in situations that are dynamic, complex and uncertain (Chaffin *et al.*, 2014). Thus, it can provide useful lessons for disaster resilience policy implementation. Adger's research on climate change adaptation requires particular mention. He described interactions between the different institutions of government and civil society and their collective contribution to climate change adaptation. Different styles of governance arising from these institutions were identified as providing the diverse context for resource management in the face of weather-related risk in a rural coastal community in Vietnam. He emphasised the importance of central and local reciprocity, cooperation and partnerships, as opposed to clear cut centralisation or decentralisation in managing climate change. Adger viewed

governance as the locus for climate change adaptation. Here, integrated approaches to reduce vulnerability and enhance resilience were made possible by using diverse policy mechanisms. He proposed multi-level governance systems to achieve this outcome (Adger, 1999; Adger, 2000; Adger, 2003; Adger, 2005; Adger, 2006; Adger *et al.*, 2011). Marshall investigated governance for environmental policies and recommended a decentralised but connected or 'nested' approach informed by the principle of subsidiarity (Marshall, 2008). This research is revisited in the discussion on subsidiarity in Section 2.3.3. Synergies between multi-level governance for implementing environmental policy and disaster resilience were demonstrated in a review of adaptive governance studies by Djanante (2011). He identified four features of multi-level governance that increase disaster resilience: 'polycentric and layered institutions, participation and collaboration, self-organisation and networks, and learning and innovation'(Djalante *et al.*, 2011:3).

Panarchy theory describes the different levels operating in socio ecological systems and the dynamic relationships between them (Gunderson and Holling, 2002). Panarchy explains how shocks or changes affecting the system lead to adaptation which increases the resilience of the system. Another key aspect of panarchy is the idea that a threshold can be reached after which adaptation is not possible. Instead of adaptation, transformation occurs and a totally different resource is created as a result (Walker and Salt, 2012, pp.1-25). Although panarchy is not a form of multi-level governance it deserves mention for a number of reasons: panarchy has been closely linked to the idea of linked, or nested, adaptive cycles that determine the behaviour of the system as a whole; in turn, the adaptive cycles concept underpins climate change adaptation and adaptive governance (Salt, 2014); panarchy is considered central to 'resilience thinking' because it explains a process where stresses or shocks within a system can bring about change and build system strength; and it has been proposed as the theoretical basis to integrate policies to enhance community resilience with policies that operate on a larger scale to encourage sustainability (Berkes and Ross, 2016). Panarchy, however, remains largely conceptual and the ability to test and predict outcomes by applying panarchy theory is not well developed (Allen *et al.*, 2014).

More recent styles of governance that have similarities to adaptive governance are experimentalist governance, collaborative governance and public private partnerships. Their relevance to disaster resilience is explained below. Joined-up or whole-of-government warrants a brief mention followed by an explanation of multi-level governance. Information about multi-level forms of governance provides background for the examination of Australian federalism that follows in Section 2.3.3.

Participatory governance is noted as a form of governance that has traditionally been found in development studies (Fung and Wright, 2001; Gaventa, 2004). It will not be elaborated upon in this thesis because its principles are aligned with those of collaborative governance and issues surrounding Australia's federal system. These are discussed in section 2.3.3 and in other chapters.

Experimentalist governance

Policy experimentalism has come to the fore in recent years in a body of work that has largely emanated from the experience of the European Union. It has similar characteristics to implementation carried out within an adaptive governance model. The experimentalist model proposes stakeholder collaboration as a means to agree broad perceptions of problems. Problems are solved within an iterative process and implementation is adjusted along the way, based on learning from the experience (Sabel and Zeitlin, 2008, 2012; Sabel and Simon, 2011; Fossum, 2012; Zeitlin, 2015). Global Experimentalist Governance employs the same principles but they are applied in a transnational context (de Búrca *et al.*, 2014). In terms of policy implementation, experimentalism is recognised as having been successful to determine an approach to environmental governance (de Búrca *et al.*, 2014).

A defining characteristic of experimentalist governance is the emphasis it places on evidence-based decision making (Mulgan, 2013). Experimentalism eschews a hierarchical command and control structure of regulation and encourages evaluation and learning. It also acknowledges that the context for implementation is a critical part of this process. This is salient in disaster resilience policy where information about the context is incomplete resulting in uncertainty surrounding the problem, the definition and the solution (Sabel and Zeitlin, 2008; Sabel and Simon, 2011; Sabel and Zeitlin, 2012). Researchers advocate for experimental styles of governance aimed at improving government services and underpinned by a commitment to continuous learning (Breckon, 2015; Sunstein, 2013). Implementation steps would include: designing strategies for new government initiatives that are based on best evidence; and testing them to see what works best and why (Mulgan, 2013).

Collaborative governance

Disaster resilience relies on cooperation and collaboration between all sectors of the community. The goals of collaborative governance include outcomes to support stakeholder participation and shared responsibility (Ansell and Gash, 2008). This reflects some of the key priorities for Australian disaster resilience policy (Commonwealth of Australia, 2011a, 2012, 2015). Thus to successfully implement disaster resilience measures policy makers could look to collaborative governance. This is defined as:

> A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets.(Ansell and Gash, 2008 p.544)

Public Private Partnerships (PPPs) are a key policy mechanism of collaborative governance. PPPs are commonly between government and business although they may include other non – government actors and organisations. In relation to disaster management policy, benefits accrue

from public-private partnerships in the areas of planning and response to large scale disasters and for disaster risk management (National Research Council Committee on Private-Public Sector Collaboration to Enhance Community Disaster Resilience, 2011; Pittman, 2011; Desai and Sarmiento, 2015). PPPs can be enacted via formal legal contracts and agreements or through looser arrangements. The blurring of traditional boundaries between the state and civil society of PPPs may work well in terms of achieving mutual benefits for the participating bodies but they may also involve pitfalls from a public policy perspective. For example, unclear ownership and accountability (Steele *et al.*, 2017) which may flow on to inadequate disaster risk management. Implementation practices that clearly define the roles and responsibilities of each party to the PPP can enhance their chances of success and mitigate some of their disaster risks (Eyerkaufer *et al.*, 2016).

US researchers from the Rand Corporation conducted a body of work about building community resilience using population health approaches (Chandra and RAND Corporation, 2011; Stern *et al.*, 2011; Acosta and Chandra, 2013; Chandra *et al.*, 2013; Plough *et al.*, 2013; Wells, 2013). Chandra and her colleagues wrote about implementing community resilience in the emergency health or health security field and expanded this to include disaster preparedness more generally. They take a community-centred approach and emphasise the role of non-government organisations (NGOs) and the importance of government and non-government partnerships to build resilience (Chandra *et al.*, 2009; Acosta *et al.*, 2011). In 2013, the same authors proposed a model for formalising the roles and responsibilities of NGOs in disaster response and recovery (Acosta and Chandra, 2013). Note also the work by Wells *et al*. (2013) who used community-partnered participatory research to develop community disaster resilience action plans.

Whole-of-government or Joined-up government

Whole-of-government or joined-up government, as the name suggests, relates to a particular set of arrangements within government (as distinct from a governance model), primarily for coordinating policy implementation. The National Strategy for Disaster Resilience (NSDR) is coordinated in the federal system by whole-of-government arrangements.

Whole-of-government or 'joined-up' government denotes:

> the aspiration to achieve horizontal and vertical coordination in order to eliminate situations in which different policies undermine each other, so as to make better use of scarce resources, to create synergies by bringing together different stakeholders in a particular policy area, and to offer citizens seamless rather than fragmented access to services (Christensen and Lægreid, 2007 p.1060)

Whole-of-government and joined-up government can operate in conjunction with collaborative governance models. The two can work in tandem to extend the vertical and horizontal reach of government policy into and across other sectors to deliver decentralised and

integrated national policy implementation. The Australian National Mental Health Strategy (NMHS) is an example: While the NMHS is essentially a 'top-down' government policy, the sheer range of actors at various levels, and the networks they forged enabled it to create a collaborative rather than a competitive policy implementation environment (Smullen, 2015). The NSDR is analogous to the NMHS. Both are coordinated via whole-of-government processes; both can be classified as a national strategic policy mechanism (Samnakay, 2017); and both aim to achieve national goals by encouraging community change through decentralised collaborative governance. The Australian federation shapes the way this type of policy is implemented. The nature of national strategic policy in relation to the NSDR is discussed further in 2.4.3.

Multi-level governance

Multi-level governance theory is included in this review because of its significance in the Australian context for policy implementation, particularly through its association with federalism. Multi-level governance is an umbrella concept that describes various systems and configurations of governance as opposed to a central government. Within political science it is often used in relation to analysis of decision-making mechanisms and arrangements in the European Union (EU) (Piattoni, 2010). The term was coined in 1992 by Marks when he commented on structural changes to the EU (Stein and Turkewitsch, 2008). Marks defined multi-level governance as 'the reallocation of authority upwards downwards and sidewards from central states' (Hooghe and Marks, 2003 p.5). Two different models of multi-level governance were described by Hooghe and Marks: the first where the different jurisdictions have discrete functions; and the second where functions are highly dispersed with a large degree of overlap between physical and functional properties (2003). Outside of the discipline of political science, the term is also used in socio-ecological and environmental science in a similar context to adaptive goverance (Dietz, 2003; Walker, 2004; Folke, 2005; Munene, 2018).

There is a lack of agreement about the relationship between federalism and multi-level governance and whether they are two distinct models or a form of multi-level governance or visa versa; or whether they are more loosely associated. Stein and Turkewitsch (2008) surveyed these different schools of thought and reviewed the similarities and differences of federalism and multi-level governance. They recounted a much longer history of federalism compared with multi-level governance and fewer examples of federalism that can be used for analysis and comparison. One major difference between the two appears to be one of formal authority. Federations are distinguished by having a written constitution with subsidiary legislation and policy instruments. Multi-level governance systems tend to include those that have developed more organically and are said to provide a more flexible response to the complexities of governance arising from our contemporary globalised order. However, the similarities and the differences are finely balanced. Indeed, Hooghe and Marks include multi-level governance as a descriptor of federalism in their categorisation of non-unitary concepts of governance (2003), and Stein and Turkewitsch conclude that the two closely interact with each other (2008). Thus, in this thesis I take the position that

federalism is a form of multi-level governance. With reference to the discussion in Section 2.3.1, a multi-level system of governance and its ability to reach across all sectors appears well suited to the delivery of resilience policy. In particular, localism, which is a form of policy implementation in a multilevel governance system, resonates with the principles of disaster resilience:

> Localism is an umbrella term which refers to the devolution of power and/or functions and/or resources away from central control and towards front-line managers, local democratic structures, local institutions and local communities, within an agreed framework of minimum standards. (Evans *et al.*, 2013 p.405).

The principles of localism go hand in hand with community participation and networked community governance (Porteous, 2011; Porteous, 2013; Porteous, 2015). Its relevance to disaster resilience is explored further in Chapters 3 and 5.

Strategic policy instruments

A policy mechanism or instrument is a tool used by government to implement public policy. There are many different types of policy instrument and they can operate at different scales, from local through to state, national and international. For example, laws and regulations, contracts, funding agreements, intergovernmental agreements, grants, treaties, guidelines, codes of practice, taxation, etc. This section describes a specific policy instrument: strategic policy (Samnakay, 2017) or framework policy (Hussey *et al.*, 2013). The strategic policy instrument is an overarching policy instrument that is intended to coordinate and guide an array of lower-order policy instruments. Its characteristics describe the way disaster resilience policy is implemented in Australia through the National Disaster Resilience Strategy (NSDR). In turn, the nature of the problem of natural disasters and its solutions influence the way the national strategic policy instruments, including the NSDR are applied.

In Australia, complex policy problems have tended to give rise to strategic policies particularly where the issue is considered to be one of national concern. It was demonstrated in 2.2 that natural disasters are a complex policy problem which adversely affects the whole of Australia. Thus, a national strategic policy instrument, the National Strategy for Disaster Resilience (NSDR) was developed to implement national disaster policy. Specific details about the NSDR are provided in Section 2.4.3.

National strategic policy approaches are not new in the Australian policy landscape: They are prevalent for managing complex or expensive social policy problems with multi-factorial causes where solutions and interventions need to be generated at multiple levels with the participation and engagement of diverse actors; and where the Commonwealth lacks authoritative power or does not hold policy levers to act. This description aligns with what is frequently referred to in the literature as a 'wicked' policy problem (Head, 2008; Rittel and Webber, 1973; Samnakay,

2017). National strategic policies aim to create national arrangements to support vertical and horizontal coordination and synergy between activities, break down silos, and directly or indirectly influence local level outcomes. Furthermore, they engender ownership of issues through a combined top-down and bottom-up, or synthesis approach (Goggin, 1986; Mazmanian, 1989; Sabatier, 1986). Other Australian examples include the former National Strategy on Energy Efficiency (Commonwealth of Australia, 2009), National Drug Strategy (Commonwealth of Australia, 2017), the National Strategy for Suicide Prevention (Australian Government Department of Health, 2016), and National Climate Resilience and Adaptation Strategy (formerly the 2007 Climate Change Adaptation Framework) (Commonwealth of Australia, 2015c). In a report prepared for the National Climate Change Adaptation Research Facility in 2013, national framework approaches were said to offer advantages for climate change adaptation public policy (Hussey *et al.*, 2013). These have characteristics that align with the vision for what is needed to advance disaster resilience on a national scale and include an overarching federal government policy agreed by all state and territory governments (and usually local government), which, supported by guiding principles, provides for a coordinated approach to implementation. Implementation and achievement of policy goals to solve wicked problems relies on multi-sectoral action and, to a greater or lesser extent, on non-government actors (Hussey *et al.*, 2013). These characteristics are relevant to disaster management in Australia where non-government organisations and the third sector provide much of the disaster management system capacity (see Australian Disaster Management Arrangements at Appendix 1).

National strategies and national framework policies seek behaviour change at individual, population, and institutional levels. For example, the National Suicide Prevention Strategy is guided by the Living Is For Everyone Framework (Commonwealth Department of Health and Ageing, and consists of matrices covering principles, actions and outcomes tailored for different groups, across all sectors, including government, business, schools, health professionals, not-for-profit and charitable organisations, communities, households and individuals. This is resonant with the NSDR message of community partnerships and shared responsibility; however, unlike the National Suicide Prevention Strategy, the NSDR does not have an operationalising framework to guide implementation.

One of the barriers to implementation of national strategic policy can be the localised nature of engagement and program development in local areas. These structures and arrangements may not always be compatible with regional, state and national approaches to policy development and implementation. National strategic policy development and implementation can have disadvantages that are not dissimilar to those encountered by whole-of-government approaches. These include including resourcing, attribution, and, accountability (Barrett, 2003; Ling, 2002; Podger, 2002; Wilkins, 2002). Another disadvantage that affects national strategic policies is their broad reach and the dispersed nature of implementation. This makes it difficult to determine implementation pathways and even harder to monitor, identify, report or analyse outcomes

(Samnakay, 2017). These, and other issues associated with operating in a federal system more broadly (Hussey *et al.*, 2013) are discussed in the review of federalism in Section 2.3.3. Section 2.3.3 further develops our understanding of the theoretical issues and context surrounding the thesis research question.

1.11.3 Federalism in Australia

Australia's national system of government is a federation. Federalism, located within governance theory, provides the theoretical basis to investigate the influence of the Australian federation on implementation of disaster resilience policy. This is in accordance with the thesis research question:

> *Does the implementation of national disaster resilience policy in Australia reflect good practice and how is this shaped by the characteristics of the Australian federal system?*

Comments on the principles (in a normative sense) of federalism and its underpinning policy objectives (in a descriptive sense) are investigated in this section with a view to the development, in Chapter 3, of a provisional framework for disaster resilience policy implementation.

A focus on subsidiarity is pursued because it has commonalities with federalism that may offer possibilities for optimising conditions to support the development of disaster resilience within a federal system. In Chapters 4, 5 , 6 and 7, I will consider federalism, particularly in terms of its policy mechanisms and the role of subsidiarity in case studies on the implementation of disaster resilience policy. Theories of governance are revisited and how they highlight barriers and opportunities for the development and implementation of national strategic policy within federal systems, and builds on the discussion in Section 2.3.2 which described strategic policy as a key federal policy mechanism.

The purpose of federation is to preserve political, economic and social diversity within a unified system of government. It does this by establishing power sharing arrangements between a central government body and regional or more locally-based government bodies or jurisdictions (Singleton, 2009b). 'Federalism is a desirable form of public sector for satisfying diverse preferences for government services within a national polity and for efficiency enhancing innovation and experimentation in governance.' (Grewal, 2014 p. 43). The distinguishing feature of federations is that they have a constitution that sets out in law how the governing powers are divided and shared between the members (McAllister, 2003). In spite of this difference, they acknowledge that in recent years, federalism has come to be viewed by many as a form of multi-level governance which is the position I take in this thesis.

Federations are often characterised as either 'cooperative' or 'coordinating'. The former is likened to 'game theory where a cooperative game occurs where coalitions of players coordinate their actions to secure binding agreements (Benson and Jordan, 2011). In more instrumental terms the distinction implies that in cooperative federalism the ability for the various levels to work

together is facilitated by their sameness. These shared characteristics or areas of concurrency enable them to work together to achieve a common outcome that, albeit may involve an element of compromise. In coordinated federalism the default is that member states maintain discrete policy domains and agree to work together to achieve a harmonious relationship. The United States has a coordinating form of federalism with 'separate and discrete spheres of jurisdiction' (Singleton, 2009a p.88). The European Union does not fit either category with some asserting that it is a cooperative form of federalism and others that claim it is 'far too loose an arrangement to be considered a federation at all' (Fenna and Hollander, 2013). Australia's federal system is usually considered to be cooperative described as based on 'mutual agreement and collaborative joint action' (Singleton, 2009a p.88).

A cooperative style of federalism is more achievable when the member states are relatively homogeneous (Saunders, 2002) and in Australia, this was true at the time of federation in 1901. At this time, the states already existed as sovereign powers and needed to be convinced as to the benefits of federating. Therefore, the areas where a central government needed jurisdiction were relatively well defined and tended to be expressed negatively in the Australian Constitution, that is it emphasised how the Commonwealth would not encroach on the other member states' autonomy.

Most experts on Australian federalism don't debate the fundamental principles of federalism and there tends to be general consensus that it is a beneficial and basically sound form of governance (Brumby and Galligan, 2015; Galligan, 2002; Painter, 2001; Twomey and Withers, 2007). Most of the discussion tends to revolve around the details of what constitutes the best or better models, and what and how much the federation needs reform to ensure its continued relevance. For example, competition, which is seen as one of the benefits of a federation can range from those who advocate for maximum competition to others who seek moderate competition between the member states (horizontal competition) or between the central authority and the member states (vertical competition). An important feature of Australian federalism is vertical fiscal imbalance (VFI) (McAllister, 2003). Since World War II, when changes were made to the Australian Constitution that restricted the right of the states and territories to levy income tax, the federal government has had a far greater capacity to generate income than the states and territories. This has created a wealth discrepancy between the federal government and the state and territory governments. This gap is exacerbated by the relatively larger costs facing the states and territories that are responsible for the majority of publicly funded services, programs and infrastructure within their respective jurisdictions. The federal government because of its more lucrative financial position provides funding the states and territories according to the principle of Horizontal Fiscal Equalisation (HFI). HFI occurs where the central government equalises state and territory wealth by providing proportionally adjusted funding to poorer states. This aims to ensure all Australians, regardless of the state in which they reside, have equitable access to government funded services and facilities (Singleton, 2009b).

Bound up in this is another major point of contention that has defined the character of Australian federalism since its inception in 1901: the ongoing tension between centralist and devolved approaches. The early vision for the Australian federation was a system of power-sharing that ensured the states and territories retained their autonomy, while the central or federal government would only have control over matters of national significance. These powers were expressed in Section 51 of the Australian Constitution and had the effect of leaving the vast majority of legislative power in the hands of the states and territories, including in concurrent areas where both states and territories and the federal government are able to make laws Even so, more and more powers have been gathered by the federal government over time. This has occurred because areas of the Australian Constitution are ambiguous and have been referred to the High Court for an official interpretation many times since Federation. These rulings have amounted to a clear trend toward centralism (Carling, 2008; Wanna *et al.*, 2009).

The creeping centralism that has characterised Australian federalism and manifests in vertical fiscal imbalance and issues associated with Horizontal Fiscal Equalisation forms the basis of assertions by some researchers that the federation in its current form has the effect of undermining state and territory sovereignty and has led to over dependence of the states and territories on federal funding. This has produced a culture of federal paternalism and disempowerment of the states and territories. The ever-changing nature of the federation and the maze of federal and state and territory functions and responsibilities can also result in inefficiencies due to inadequate coordination and duplication (Parkin, 2003; Walsh, 2008).

While the deficiencies of Australia's federation often dominate public and political discussion, the public policy literature does not bear this out. Instead, there tends to be agreement that Australia's federal system continues to provide the best, if flawed, model for achieving participatory and multi-level governance for reconciling the range of interests present in the Australian political, socio-cultural and economic landscape (Craven, 2012). Even so, while many scholars of federalism retain confidence in the Australian system, they also generally acknowledge that this does not discount the need to adjust the system to ensure its continued relevance (Galligan, 2002). Within the broader issue of the ongoing need for federal reform, national and international threats and opportunities are emerging. In a globalised world, these require national as well as regional and local action. This lends itself to centralised functions within the federation. The actions of nation states, within the international community, are increasingly being subject to international treaties (Fenna and Hollander, 2013) and Galligan (2002). For example, the Sendai Framework for Disaster Reduction (United Nations International Strategy for Disaster Reduction, 2015), while not having the legal status of a treaty, is an international agreement to which Australia is a party. The Sendai Framework, described in Section 2.4.5, maintains an emphasis on disaster resilience. Australia has adopted the Sendai priorities into the National Disaster Risk Reduction Framework (NDRRF) (Commonwealth of Australia, 2018), introduced in Section 1.3 and described in more detail in Appendix 1.

Coordinated by the federal government, the NDRRF was adopted by the Ministerial Council for Police and Emergency Management, and thus, all levels of the Australian government, in November 2018 as part of the ongoing implementation of the National Strategy for Disaster Resilience Strategy (Commonwealth of Australia, 2011). The Australia-New Zealand Emergency Management Committee has been tasked to plan and manage the national implementation of the NDRRF and the federal government will report on progress periodically to the United Nations (Merrin-Davies, 2018; United Nations International Strategy for Disaster Reduction, 2018). This is an example of how Australian federalism can support cooperative relationships between the jurisdictions and facilitate efforts to build national disaster resilience as well as Australia's contribution to international disaster policy.

The previous paragraphs have described federalism, with a particular focus on the broader issues and concerns that have arisen for Australian public policy. These can have a flow-on effect to disaster resilience policy implementation via the disaster management system. Australia's federation, provides the frame for the institutions and mechanisms that comprise the disaster management system. The arrangements that make up the Australian disaster management system are outlined briefly in Section 2.4.2 with more thorough information provided at Appendix 1. An overview of the National Strategy for Disaster Resilience (NSDR), the main national policy mechanism for disaster resilience, follows at Section 2.4.3. Aspects of the Australian Constitution that are relevant to Australia's disaster management system are mentioned in Section 2.4.4 noting that a detailed examination of constitutional matters in disaster management is not within the scope of this thesis.

The principle of subsidiarity was introduced in 2.3.2 when it was associated with devolved policy implementation in environmental governance (Marshall, 2008). The problems associated with federation often lead to discussions about the need for reform and ideas for reform often centre around the principle of subsidiarity (Aroney, 2016). This brings us to a more detailed discussion about subsidiarity and how it relates to federalism and disaster resilience policy implementation.

Subsidiarity

Subsidiarity determines that governance arrangements should be devolved wherever possible. It is a principle that is associated with federalism and aims to ensure unity while preserving diversity (Fenna and Hollander, 2013).

The Council for the Australian Federation defines subsidiarity as:

Powers and responsibilities should be left with the lowest level of government practicable. Such a devolved system means there is greater local input into decision-making and states and territories can customise policies and services to suit local preferences (Council for the Australian Federation, 2014).

Subsidiarity has numerous definitions which can make it difficult to agree on desired policy outcomes and how these can be achieved in practice. Different interpretations of subsidiarity are significant when considering its application to Australian federalism and disaster resilience implementation. The subsidiarity principle has its origins in the Roman Catholic Church (Constantinesco, 1991) and possibly even earlier in Ancient Greece (Carozza, 2003). Subsidiarity teaches the primacy of smaller social units including individuals, family and communities, over state or higher-level authorities within the social system. Inherent in the Catholic interpretation is the idea that the state should minimise intrusion into private matters as far as possible to avoid crowding out the natural tendency for people to be enterprising, self-reliant, and to support each other to solve their own problems. This is regarded as the substantive or 'pure' meaning of subsidiarity (Carozza, 2003). Aroney strikes a balance by suggesting that subsidiarity is applicable at a sociological level and as a governing or organisational principle at the level of the community and individuals (Aroney, 2011).

Selective adherence to subsidiarity is problematic and decision makers, planners and practitioners need to be careful to differentiate between authentic subsidiarity and non-authentic subsidiarity or quasi decentralisation. This presents as an outward appearance of the devolution of power and responsibility to lower levels but it does not have the necessary regard for capacity building, equal status and power in the relationship (Marshall, 2008). Vischer asserted that 'subsidiarity is a principle of governance beyond devolution' (Vischer, 2001 pp.103-142). He described how subsidiarity was appropriated by conservative politicians in the United States in the early 21st Century who used it justify a slavish commitment to small government and market economics (2001). Some researchers proposed that subsidiarity is either a principle of social and community governance, or relates to the balance of power in the constitution (von Borries and Houschild, 1998; Van Hecke, 2003). The latter is directly applicable to federal arrangements while the former has a broader social application. I propose that the two conceptualisations of subsidiarity are complementary and both have a place in Australian forms of governance to support the effective implementation of disaster resilience policy. In accordance with subsidiarity principles, roles and responsibilities will not always be devolved downwards, but may also be allocated or shifted to higher levels depending on the capacities and attributes and comparative advantage of one level over another; known as 'reverse subsidiarity' (Zurita, 2015 p.393). For example, the federal level of government is the most appropriate to manage international treaties and agreements, including the Sendai Framework for Disaster Risk Reduction (United Nations International Strategy for Disaster Reduction, 2015). Even those who acknowledge the duality of subsidiarity in terms of its relevance to a sociological order and a form of governance agree that 'lower-level decision making should only be advocated when it is shown to be optimal' (Zurita, 2015 p.387). However, to argue for reverse subsidiarity merely on the basis of the federal government having more financial resources could be considered an inauthentic application of subsidiarity because funding should ideally be provided at the level where it is needed.

Regardless, how roles and responsibilities (and resources) are allocated within and across the Australian system has an impact on policy outcomes. This indicates a need to agree and apply subsidiarity principles more assiduously to public policy decision-making.

Generally, an authentic application of subsidiarity will reflect a combination of top-down and bottom-up approaches. Subsidiarity can also be three dimensional rather than being confined to a vertical decentralisation or centralisation interpretation. A more circular pathway, consisting of 'nesting' roles and responsibilities, or polycentric structures of governance (Marshall, 2008) has similarities to the idea of a structure of governance that is both devolved and centralised referred to by Davidson (2016) and evident in the National Mental Health Strategy in Australia (Smullen, 2015). In terms of roles and responsibilities, the enaction of subsidiarity would see a central authority retain a leadership role. Ideally, its functions would take the form of ensuring quality data collection, high standards and benchmarking, as well as sharing and coordinating resources to assist other levels of administration to execute their responsibilities efficiently and effectively. At the same time, it would see local and regional authorities granted more autonomy, resources and authority for decision making and management of locally impacting policies (Head, 2007a). This interpretation extends its relevance beyond the machinery of government to one that can inform an ethos for policy implementation in a multi-layered system.

In terms of a more comprehensive interpretation of subsidiarity, trust is the quality that bridges the predominant government-centric positions that emphasise decentralisation, with those that take a moral and philosophical approach by focusing on systems of governance to advance human dignity and the common good in a plural society (Drew and Grant 2017; Golemboski, 2015). The inherent value of trust can be harnessed in pursuit of resilience through actions associated with the application of subsidiarity. For example, open and transparent processes where information is shared between the various actors to ensure effective coordination, horizontally and vertically, a tolerance of options to employ both top-down and bottom-up approaches as the situation requires, a collaborative culture, support for capacity-building including the provision of adequate resources appropriately targeted, and negotiated roles and responsibilities. In this way, and similar to the notion of social capital as a product in economic theory, trust becomes a commodity that is central to the successful sharing and distribution of power, authority and responsibility and the transactions that must occur as part of the process of implementing strategic policies across multiple levels of governance and social systems. Parallels can be drawn between joined-up-government approaches and measures that enact the principle of subsidiarity. For example, the emphasis on collaboration and coordination. Delany-Crowe *et al* (2018) describe the role of trust in joined-up government activities, and cite trust as a prerequisite within the system. The issue of trust is picked up again in Chapter 4 Social Capital, which is defined as 'the information, trust and norms of reciprocity inherent in one's social networks' (Woolcock 1998.p. 153).

When we look to examples of the implementation of subsidiarity, the European Union (EU) is the only federal-type system that has sought to explicitly operationalise subsidiarity using specific guidelines (Van Hecke, 2003). There are conflicting verdicts on the success of this exercise. It was proclaimed that 'subsidiarity is a principle of organisation as well as efficiency because it allows for better implementation due to proximity, competence and autonomy' (Bevir, 2007 p.2). An impediment to successful implementation was seen as the reluctance of the judiciary to establish the roles and responsibilities of the various institutions (Vischer, 2001). Vischer responded to criticisms of subsidiarity by asserting that problems usually stem from it being poorly defined and not operationalised in accordance with its substantive meaning. For example, some of the functions in the EU were implemented horizontally between institutions and not vertically to regional and local authorities. These reveal polarisation toward a narrow interpretation and what some see as a reductive approach that has resulted in it becoming merely an administrative process, largely aimed at militating against overregulation (Van Hecke, 2003). The EU example is instructive for other federations that may seek to implement the subsidiarity principle. It highlights the need for implementation to be anchored firmly in a holistic systems-based approach and the need for government to actively conduct activities to support the development of competencies at other levels.

In Australia, subsidiarity was the guiding principle when the Australian Constitution was enacted in 1901. There is a view that many of the current problems experienced by the Australian federation are due in part to a drift away from subsidiarity (Kasper, 2008). The growing concentration of power in the central government is a symptom of this underlying trend which was summed up by French in 2008 when he spoke of Australia becoming a 'singular state' and 'the federation you have when you do not have a federation' (French, 2009, cited in Grewal, 2014, p.51). One of the ways that central power is manifested is through Vertical Fiscal Imbalance (VFI) which was raised earlier in Section 2.3.3. VFI may limit the practice of subsidiarity because without sufficient financial resources lower levels of governance are unlikely to have the capacity to manage implementation effectively. Indeed, Australia has a VFI that is the 'most extreme of any federation in the industrial world' (Twomey and Withers, 2007:37). To rectify this situation Eccleston called for the application of 'financial subsidiarity' (Eccleston, 2008:45).

In New Zealand, although subsidiarity is not mentioned explicitly, researchers identified a tension between centralised and devolved approaches to disaster recovery following the Canterbury earthquakes in 2010 and 2011. They found that the choice of centralised models of governance over decentralised bottom-up approaches provided more effective horizontal integration. This was a sound response at the time because local capacity had been significantly exceeded. However, the disadvantage was that resilience was compromised (Johnson and Mamula-Seadon, 2014; Mamula-Seadon and McLean, 2015). This raises questions about how subsidiarity should be applied in catastrophic disasters.

In Australia a small number of researchers have made a direct connection between subsidiarity and effective disaster management. Those that have, also relate the idea of subsidiarity to disaster resilience. Following the Victorian bushfires in 2009, a report prepared by non-government and charitable organisations stressed the need to enlist subsidiarity as the guiding principle to ensure future disaster recovery interventions promote disaster resilience (Taylor and Goodman, 2015). Zurita and her colleagues developed a tool for assessing the level at which roles and responsibilities should be allocated in Australia's disaster management system in accordance with the subsidiarity principle and disaster resilience (Zurita *et al*., 2015). Menzies emphasised that disaster management governance, will benefit by the application of subsidiarity because it is a shared or concurrent responsibility of federal and state levels of government and it is necessary to ensure that experience and skills from all levels is fed into its management (Menzies, 2014).

Planning to implement national policy, including national disaster resilience policy, must take account of the machinery of implementation and consider the level at which implementation is to occur within the federal system and its sub-systems; and the allocation of roles and responsibilities therein. In terms of a principle for successful policy implementation, subsidiarity is key and 'a potentially powerful concept around which a debate about the optimal assignment of tasks across different administrative levels should be constructed' (Jordan, 1999). While subsidiarity has been proposed as a factor in successful disaster resilience policy implementation, with the exception of those researchers already mentioned, little work has been done to strengthen this argument and how subsidiarity might be applied to disaster management governance in Australia. Constructing an approach to the implementation of disaster resilience policy based on authentic subsidiarity may provide a pathway to solve the problem identified by Tierney of the predominance of neoliberal economics under the guise of decentralised community centred disaster resilience raised in 2.3.2 (Tierney, 2015). At the same time, it provides a useful entry point into the underdeveloped field of research in disaster governance (Tierney, 2012, 2013). In the next five chapters: I develop and apply a framework to incorporate the determinants of resilience into policy implementation; and in doing so I consider the connection between disaster resilience and the principle of subsidiarity. The results add weight to my claim in Chapter 8 that subsidiarity is the fifth domain for successful disaster resilience policy implementation.

An examination of the origins of resilience, the developments that have occurred over the past two decades to translate resilience into disaster policy, and information about implementation research and practice was provided in 2.3.1 and 2.3.2. This revealed some information about good practice and where there are gaps in our knowledge about how to successfully implement or operationalise resilience. Furthermore, it highlighted the influence on policy implementation of governance and policy mechanisms. The focus on the Australian setting brought federalism, and the associated concept of subsidiarity, into sharp relief in terms of governance for disaster resilience policy implementation. Based on all of the above, there are parallels between subsidiarity as envisioned by the EU, the goals of Australian federalism and the National Strategy

for Disaster Resilience. These lessons can potentially be applied to develop disaster management governance in Australia to provide optimal conditions to enhance disaster resilience.

1.12 Australian public policy settings for disaster management

As well as the causes, incidence and costs of disasters, described in Section 2.2, and in light of the theoretical basis that was established in Section 2.3, practical contextual factors for resilience policy implementation must also be taken into account. This section does this by discussing Australia's apparatus for disaster resilience policy implementation. This is made up of key public policy settings, and the institutions and mechanisms that deliver government policy responses to disasters. The issue of uncertainty is included first in this section because it is a defining feature of natural disasters. It is widely believed that the uncertainty associated with disasters can be managed by improving the resilience of people and their environment. This accounts in part for the ubiquity of resilience in public policy. However, uncertainty brings with it some special challenges for policy practitioners that are reflected in Australia's disaster resilience policy settings and must be included in our understanding of the context for implementation.

1.12.1   Disaster policy and the challenge of uncertainty

Natural disasters, by their very nature are unpredictable, if not in terms of their absolute likelihood, at least in terms of their timing, scale and impact. To manage natural disasters requires an ability to acknowledge and work within this uncertainty. Indeed, an ability to deal with uncertainty and risk, in a general sense, is a key attribute of disaster resilience (Cork, 2010; Folke *et al.*, 2010; Ronan, 2014; Berke and Lyles, 2013; Dovers and Handmer, 1992). It underlies the Norris model, 'plan for not having a plan' (Norris, *et al*., 2008:143, p145) and is a theme throughout this thesis.

Circumstances that lend themselves to resilience policy solutions are related to certain features of contemporary society and the uncertainty that comes with living with new threats and unknown risks.   These include the effects of globalisation and complex interactions and interdependencies of economies, the creation and spread of new technology, terrorism and climate change (Boin *et al.*). A lack of, or poor quality disaster data, alluded to earlier, will work against alleviating the inherent uncertainty of disasters.

The physical characteristics of disasters create uncertainty. Uncertainty makes it harder to devise public policy approaches because unknown contingencies and costs make it difficult to plan. An environment of uncertainty makes it more difficult to operationalise policy (Handmer and Dovers, 1992, 2007, 2013). With uncertainty a key feature of natural disasters, not all aspects of disasters can be known. Where there is uncertainty, disaster risk cannot be accurately assessed or calculated (Dobes *et al.,* 2016) and therefore, it cannot be reduced or mitigated. Note that this concept differs

from that of residual risk, which is the risk that remains after all mitigation measures have been undertaken (Australian Institute for Disaster Resilience, 2019). Because natural disasters occur regularly and are often severe, public policy responses are necessary to manage disaster risk to the best extent possible. Disaster mitigation is an important policy response that can be done in advance of a disaster or following a disaster to prevent or reduce future loss and damage. Furthermore, cost-benefit analyses, particularly methods that factor in the value of disaster resilience, have shown that mitigation is cost effective (Deloitte Access Economics, 2016a; Gissing, 2017a, 2017b). So much so, that a 2019 report in the United States found, that for every dollar invested in disaster mitigation, six dollars is saved in future costs (The US National Institute of Building Sciences, 2019, cited in Barnes *et al.,* 2019). Unfortunately, out of a total of 12 guidelines on cost-benefit analyses for asset funding in Australia, only three of these include natural disaster resilience (Deloitte Access Economics, 2016a:25).

The settings for disaster management in Australia describe, at a practical rather than a theoretical level, how a disaster resilience approach is manifested in public policy. This includes the main programs and types of activities that underscore a resilience-based approach and the mechanisms that are employed for their implementation. While post-event disaster relief and recovery is critical and will certainly remain a highly visible public policy approach to natural disasters, resilience-based approaches emphasise the need to reduce the likelihood of a disaster occurring and to minimise their impacts if, and when, they do occur. The most recognisable and well-established practices included under the broader umbrella of disaster resilience centre around the identification, prevention, and reduction of disaster risks preferably before a disaster occurs or equally, as part of a resilient recovery process that seeks to prevent or reduce the impacts of a future disaster. In line with this, Australian disaster resilience policy both in principle and practice has a strong focus on disaster mitigation (Commonwealth of Australia, 2011a, 2012, 2015). The term 'disaster mitigation' is similar to 'disaster risk reduction' which tends to appear more often in international disaster policy and suggests the integration of sustainable development goals. In contrast, 'risk mitigation' more often describes specific activities undertaken by nation states. Disaster mitigation involves: 'Measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and the environment' (Australian Institute for Disaster Resilience, 2019), and 'Mitigation measures include engineering techniques and hazard-resistant construction, as well as improved environmental and social policies and public awareness (Australian Institute for Disaster Resilience, 2019).

Disaster risk reduction involves:

Preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are

defined in disaster risk reduction strategies and plans. (Australian Institute for Disaster Resilience, 2019),

To predict, prevent or reduce the impacts of natural disasters, risk is identified and assessed and appropriate action taken to reduce that risk. In turn, this relies on an ability to identify a hazard and the extent that people and assets are exposed to the hazard. It is important to note that disaster risk cannot be totally eliminated and thus, not all disasters are preventable.

The purpose of public policy is to solve specific problems. Thus, national disaster management policy is primarily directed toward the avoidance and reduction of loss and damage from disasters, and rightly so. As a result, disaster resilience public policy tends to emphasise risk. This is seen in the call to action which is the National Strategy for Disaster Resilience (NSDR) (Commonwealth of Australia, 2011a; Commonwealth of Australia, 2012c; Commonwealth of Australia, 2015) where risk management, risk mitigation and risk reduction are central themes. It should be noted that these are complex concepts and a detailed exploration of the concept of risk and risk reduction, mitigation, preparedness and the interplay between them in relation to disaster resilience is not within the scope of this thesis. As mentioned in Section 2.3.1, a strengths-based understanding of disaster resilience underpins this thesis in a normative sense. At the same time, I seek to strike a balance between advocating approaches that prioritise disaster risk management and those that enable disaster resilience, noting that these two emphases may be complementary. The importance of understanding and managing risk as a significant focus of disaster resilience policy is acknowledged, but there are other policy objectives that can and do contribute to whole-of-nation and whole-of-community disaster resilience policy. These are not mutually exclusive and may be complementary to risk-based approaches and are discussed in relation to the development of the Provisional Framework in Chapter 3.

1.12.2   Australian disaster management arrangements

Detailed information about Australia's disaster management arrangements can be found at Appendix 1.

Each level of government has its own arrangements to govern their responsibilities and actions during a natural disaster. While these vary across jurisdictions, the emergency service organisations all have state and regional disaster and emergency coordination functions and facilities. The emergency services are largely state-run entities with some functions devolved to local government. Their workforces are made up largely of volunteers and a smaller number of professional employees, such as firefighters, ambulance and police. They have historically focused on acute disaster response and the more immediate relief and recovery activities. Their role has become more varied over time and now extends to hazard monitoring, predicting the impacts of extreme weather events, and communicating hazard information and warnings to the community. They also manage and participate in a range of hazard risk reduction activities.

Non-government organisations, such as the Australian Red Cross, work alongside governments and the emergency services to provide welfare services and support during and in the aftermath of a natural disaster. These organisations often provide medium to longer-term recovery assistance in the affected area, usually in partnership with state, local government and existing non-government welfare agencies and service providers. The Australian Red Cross is also involved extensively in disaster preparedness. The RediPlan (Australian Red Cross, 2009), which adheres closely to disaster resilience principles, supports communities and households to develop personalised emergency preparedness plans.

Non-traditional or informal forms of volunteering are an emergent area of capability in the Australian disaster management system. A growing trend in recent years indicates that fewer people, especially in younger age-groups, want to commit to an established volunteer organisation (Australia, 2016; Barraket *et al.*, 2013; Whittaker *et al.*, 2015) and prefer to volunteer in specific circumstances or events. This came to the fore in the aftermath of the 2009 Victorian bushfires and the 2010-11 Queensland floods when Volunteering Queensland received around 100,000 offers of help from community members. Hundreds of citizens mobilised to perform community-led activities such as BlazeAid in Victoria and to join the 'mud army' which formed to assist in the Queensland clean-up (George, 2013; Barraket *et al.*, 2013).

A major area of interest and some concern, within the Australian federation, in terms of implementation of the National Strategy for Disaster Resilience (NSDR) is local government. Local Government is not included in the Australian Constitution and is essentially an instrument of state and territory governments. It is the level of government that is closest to the community and therefore might be expected to play a major role in the implementation of disaster resilience policy. The extent to which this occurs in practice varies across the different jurisdictions. It has responsibilities to implement land use planning and building regulations in accordance with predominantly state government laws. In some states, including NSW, local government is responsible for flood management from a range of hazards including sea level rise due to climate change. In recent years local government has become involved in hazard management a greater number of more diverse areas. For example, in Victoria local government is in charge of local disaster recovery coordination including that of informal emergency volunteers. This is in the process of being implemented in other states (Australian Institute for Disaster Resilience, 2017). Funding pressures are a perennial issue for local government which has an historically low revenue base. Revenue is obtained from residential rates, Grants of Assistance from state and territory government and matched funding from the Federal government for disaster mitigation has formerly been provided through the National Partnership Agreement Natural Disaster Resilience (Commonwealth of Australia, 2017-18). This funding program has recently been suspended and a replacement has not yet been established (See Appendix 1). Local Government's financial woes are highlighted by comparing the 6% share of public revenue allocated to local government in Australia, with that of 26% in Canada and 17% in the USA (Brown, 2007). The

relatively disadvantaged position of local government in Australia is discussed in a comparative piece, compiled by Podger (Podger *et al.*, 2013), which contrasts aspects of the Australian federal system with that in China. It is observed that local government in China is far more robust than in Australia. The domain of local government in Australia does not naturally lend itself to flexible, innovative and experimental approaches.

1.12.3   The National Strategy for Disaster Resilience

Earlier in this thesis it has been explained how the impacts of disasters span environmental, physical, social, organisational, economic and political spheres. Accordingly, measures to alleviate disasters must be developed and managed across a similarly diverse range of areas. It has also been made clear that the complex interaction of multiple hazards can make disasters hard to predict which contributes to a climate of uncertainty. All of these factors constitute a 'wicked' policy problem (Rittel and Webber, 1973; Head, 2008). Resilience was proposed as a desirable quality to operationalise in policy solutions using a national strategic policy mechanism as described in 2.3.2. This section explains the antecedents to the formal adoption of the National Strategy for Disaster Resilience in 2011 and touches on some of its policy settings.

A lack of strategic vision has been a feature of disaster management policy in Australia (Handmer and Dovers, 2013). Previous government policy reviews and developments have been undertaken that have recommended system reforms. However, change has usually occurred incrementally within the established program structures rather than as comprehensive or strategic reform.

One of the earliest signs of change was a Council of Australian Governments (COAG) report (prepared in 2002, published in 2004) which noted the sharp rise recorded in government expenditure on disaster relief and recovery in the previous decade. The report recommended a shift beyond 'relief and reaction' toward more 'cost effective evidence-based disaster mitigation' (Council of Australian Governments, 2002 p.iv). Six of its twelve recommendations for reform involved comprehensive nation-wide measures to strengthen natural disaster risk management and mitigation. This included recognition of the role of infrastructure betterment (referred to in the report as infrastructure resilience) and the long-term savings this would provide to all levels of government for preventing future damage and costs: 'Additional investment in natural disaster mitigation by all three levels of government is conservatively estimated to result in a rate of return of 15% of that investment' (Council of Australian Governments, p.vi-viii). While this ambitious vision for reform was not fully realised, it did result the establishment of a Disaster Mitigation Program in 2004 which provided funding annually for activities including bushfire and flood risk mitigation and emergency volunteer training. This was provided through a National Partnership Agreement (NPA) that had been developed as part of reforms to the Federal Financial Arrangements in the same year. NPA's are agreements between the federal government and the state and territory governments and are signed by the Prime Minister and the state and territory

government First Ministers. NPAs provided federal funds matched by the states and territories and were developed in the spirit of enhancing the states and territories autonomy in decisions about the allocation of federal funds. They were accompanied by a number of high-level performance indicators that states and territories would report against to the federal government.

In 2008 the government again turned its attention to national disaster policy. The Council of Australian Governments (COAG), acknowledging the part that social resilience could play to reduce the adverse impacts of disasters adopted the National Disaster Resilience Framework (Commonwealth of Australia, 2008). This was accompanied by a commitment to develop a National Disaster Resilience Strategy (Commonwealth of Australia, 2008). The existing NPA for disaster mitigation was renamed the National Partnership Agreement – Natural Disaster Resilience (NPA-NDR). The total level of funding (approximately $26 million) and its purpose remained largely unchanged.

After an unprecedented level of disaster loss and damage during the summer of 2010-11 the National Strategy for Disaster Resilience (NSDR) was adopted by all levels of government (Commonwealth of Australia, 2011a). This was the first time that a coordinated and strategic approach to disaster management was implemented in Australia. The NSDR altered the focus of disaster management policy away from relief and recovery to a whole-of-nation emphasis on disaster prevention, preparedness and risk mitigation. Instead relying on government and the emergency services for assistance after a disaster, all members of the community would learn to share responsibility to prevent, prepare and respond to disasters. This would require the development of a better understanding and awareness of disaster risks and what needs to be done to mitigate these risks. The NSDR acknowledged that this shift would need to be driven by behaviour change over the long term. The benefits of a resilience-based approach were promoted as an increased ability to withstand and recover from disasters and to reduce associated public and private expenditure.

While it did not bring additional funding to the Australian disaster management system, the NSDR was backed by a federal government commitment to implement a number of significant initiatives across priority areas, guided by resilience principles with disaster risk awareness, identification, communication and mitigation as its central operating tenets. The NPA-NDR remained the only national funding program directed toward natural disaster mitigation activities. (Commonwealth of Australia, 2017-18). The total amount allocated to prevention and risk mitigation was estimated at $50 million per year (Deloitte Access Economics, 2013).

In contrast, the level of funding provided for post disaster recovery (mainly under the Natural Disaster Relief and Recovery Arrangements (NDRRA) was estimated at $560 million per year (Deloitte Access Economics). This discrepancy indicates that, in spite of the official uptake of resilience into disaster management across Australia (See Appendix 1), in reality, a major shift toward resilience has not yet occurred.

Perverse incentives can be the unintended consequences of policy design and implementation and can undermine shared responsibility, a principle of disaster resilience. This is demonstrated by Biggs (Biggs, 2012) when comparing Australia's Natural Disaster Relief and Recovery Arrangements in the context of recovery from the 2010-11 Queensland floods with the US National Flood Insurance Program. Biggs observes that while the US system appears to be more in keeping with the principles of resilience, it creates perverse incentives for building in flood prone areas and is proving financially unsustainable for the US Government. This effect, also referred to as moral hazard, is discussed by Paton and Lo (Paton *et al.*, 2006) (Lo, 2013) who observe that government assistance payments may act as a barrier to shared responsibility by inadvertently encouraging people not to insure their properties.

Having said this, changes toward resilience-based approaches are discernible in some areas. The NDRRA was amended in 2012 to require the states and territories to insure their public assets. A significant change occurred in 2018 when the NDRRA was replaced by the Disaster Recovery Funding Arrangements (Australian Government, 2018). The new arrangements allowed for up-front assessment of disaster reconstruction costs for major public assets. This incentivises investment in mitigation by allowing the states and territories to reinvest the difference between the estimated and actual costs of reconstruction into mitigation, while ensuring rebuilding occurs at an agreed quality and standard. All levels of government have also recently adopted a National Disaster Risk Reduction (NDRR) Framework (Commonwealth of Australia, 2018) that incorporates a number of the priorities of the Sendai Framework for Disaster Reduction 2015-2030 (United Nations International Strategy for Disaster Reduction, 2015). Later, the National Partnership on Natural Disaster Resilience (Commonwealth of Australia, 2016) was replaced by the National Partnership (NPA) on Disaster Risk Reduction (Commonwealth of Australia, 2020). This was done to bring what historically has been the major mechanism for providing federal funds to the states and territories for disaster resilience activities (See Appendix 1 Australia's Disaster Management Arrangements for a description of the former National Partnership Agreement on Disaster Resilience) into line with the National Disaster Risk Reduction Framework (NDRRF) (Commonwealth of Australia, 2018). The NPA on Disaster Risk Reduction has a stronger emphasis on monitoring and evaluation than its predecessor. If more and better information is collected, it may offer a way of evaluating the risk reduction aspects of national disaster resilience policy. However, this is a very recent reform and it may take several years before information on the impacts and outcomes of the program become available.

At another level, changes are observed in the role of the emergency services. The emergency services have traditionally focused on relief and recovery although in recent years they have become more involved in hazard monitoring, predicting the impacts of extreme weather events, and communicating hazard information and warnings to the community. The emergency services also manage and participate in a range of hazard risk reduction activities. Without denying that the NSDR may have been a driver in this process, the NSDR could equally be considered a

product of the growing acceptance of the importance of prevention, preparedness and risk mitigation. Nonetheless, there is scope for improvement in the pace and nature of change to that includes but is not limited to correcting the persistent disparity between investment in disaster resilience and relief and recovery.

Another way to ensure the changes foreshadowed by the NSDR are occurring is to allow open and transparent review of the outcomes at regular intervals. It will be ten years in early 2021 since the NSDR was adopted and it has not been evaluated. The implementation of the NSDR was reviewed in 2015 by the federal government, although it did not discuss the effectiveness of the NSDR (Commonwealth of Australia, 2015e). Recent advances in resilience research, over the past few years, have provided the capability to conduct an evaluation of the NSDR. However, this does not guarantee that an evaluation will be done. The NSDR is included within the category of national strategic or national framework policy as described above. Implementation arrangements for the NSDR to an extent, align with the characteristics of other national strategic policies. To substitute for the present lack of evaluative information about disaster resilience policy, reports, reviews and evaluations of other national strategic policies, can provide useful information that could inform approaches to good practice in national disaster resilience policy.

The benefits and disadvantages of a national strategic policy are precariously balanced. As discussed in Section 2.3.2 their broad principles support flexibility and allow responsibility and functions to be devolved. They are considered suitable mechanisms for implementing policy solutions to wicked problems and can support both top-down and bottom-up implementation. Uptake into all sectors and bottom-up action, can be supported by national resources that articulate principles, actions and outcomes tailored for different levels. This can encourage local solutions to local problems and if well- coordinated these can create synergies between the various activities that can increase efficiency. However, where coordination is inadequate the opposite, fragmentation, can be experienced. The NSDR has priority areas for action but it can be difficult to discern the multitude of pathways for implementation in the community and, as mentioned in 2.3.2 the NSDR does not have a framework to guide implementation. This gap may be filled to some extent by relatively recent efforts whereby the states and territories have issued various disaster resilience policies The Australian Institute for Disaster Resilience, has also become well-established as a national source of resources and training on disaster resilience.

Implementation of disaster resilience policy requires a recalibration of the Australian system so that it enacts, and not just espouses the principles of disaster resilience. Contemporary policy aspirations to shift disaster management systems toward prevention and risk mitigation/risk reduction have common goals of self-reliance and shared responsibility and the creation of pathways to positive change. For these reasons public policy is a suitable vehicle to deliver resilience outcomes so long as its implementation has due regard for good practice. These pathways emanate at the highest level from the Australian Constitution. It has been described previously how the federal government has, overall, become a centralising force and it is

somewhat of a contradiction that its capacity to drive transformative change in disaster resilience policy is hindered by a lack of policy levers with reach into local communities.

1.12.4   The Australian Constitution

Section 51 of the Australian Constitution outlines the enumerated legislative powers of the Commonwealth Parliament. A number of issues or conditions that are counted in the Australian public policy environment impact the implementation of Australian disaster resilience policy and bear mention in this section. These are seen to have links to Australian federal arrangements and can be traced to the Australian Constitution. They have flow-on effects throughout the system. A tendency toward centralisation of government power is at odds with the relative weakness of the policy levers that are available to the federal government. Other aspects of centralisation have resulted in the situation where the federal government lacks strong policy implementation muscle, but is able to raise revenue. Thus the source of funds does not necessarily align with the target for expenditure of those funds. This is documented as part of the broader problem of Vertical Fiscal Imbalance, referred to in Section 2.3.3 as fiscal federalism. Some of this, it is argued, can be attributed to the uncertainty of the power sharing arrangements as they are expressed in the Constitution. When it comes to determining the respective legal domains of the Commonwealth and the states, the High Court is needed to provide interpretation of these matters. Even so it is argued that this uncertainty is more a matter of convention, and technically the federal government does have the legal power to take a strong leadership role in implementation of disaster policy. Nonetheless this does not change the likelihood that the federal government may be hesitant to assert this authority. An overt display of centralism could be seen to unnecessarily undermine the states' sovereignty except perhaps where it can be justified by the magnitude of the disaster, for example, in catastrophic events.

1.12.5   International disaster policy

During the first two decades of the 21st century, resilience has emerged as a principle underpinning the development and implementation of disaster management policy in a number of different nations, including the United Kingdom (United Kingdom Cabinet Office, 2014; UK Cabinet Office, 2011)and the United States (US Homeland Security Advisory Council, 2011; United States Department of Homeland Security, 2010).

On a global scale, disaster resilience has become mainstream due its integration with international development policy. The World Bank demonstrated that from a global perspective, the costs of natural disasters are closely linked to the broader issue of development. (World Bank, 2010). Successful disaster resilience programs can be found in developing countries. Good practice examples could potentially be translated into policy implementation approaches in more developed nations, like Australia (Moore *et al.*, 2012). Australia is a signatory to the Sendai Framework for Disaster Risk Reduction 2015–2030. As part of this commitment, it reports to the

UN on implementation in Australia (United Nations International Strategy for Disaster Reduction, 2018). The Sendai Framework builds on an international trend to move disaster management away from response and recovery toward disaster prevention, preparedness and risk reduction[1]. This shift began when The Yokohama Strategy was adopted by the delegates of the 1994 United Nations World Conference on Natural Disaster Reduction and was strengthened when participating nations adopted the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters (United Nations International Strategy for Disaster Reduction, 2005)

The Sendai Framework has a strong emphasis on the integration of disaster risk reduction with sustainable development and climate change adaptation. Actions that need to be taken by nation states to achieve the Sendai Framework's outcomes focus on more effective outreach at local and community level and establishing the economic case for greater investment in disaster risk reduction. Issues affecting disaster data quality, reliability and availability were highlighted in Section 2.2.1 and signatories to the Sendai Framework, including Australia, are required to report on its data collection activities and systems, particularly in relation to disaster impacts (United Nations International Strategy for Disaster Reduction, 2018). One of the priorities expressed in the Sendai Framework is to build global capability for disaster reduction and, perhaps, not coincidentally, the United Nations International Strategy for Disaster Reduction was renamed the United Nations Office for Disaster Risk Reduction in May 2019. As mentioned in Sections 1.3, 2.3.3 and 2.4.3, Australia's commitment to the domestic implementation of the Sendai Framework has seen the development and adoption of the National Framework for Disaster Risk Reduction which presently appears to be a major driver of national disaster policy. This reinforces the importance of disaster risk reduction as an important component of disaster resilience, especially in light of its potential to integrate sustainability. While I acknowledge this, the broader subject of disaster resilience policy and its implementation is the dominant focus of my thesis, not disaster risk reduction per se. I made this decision because disaster resilience provides a more holistic paradigm within which the full range of social, environmental, and economic factors can be accommodated to potentially deliver the most effective policy outcomes for the community. I also note that the National Strategy for Disaster Resilience remains the overarching Australian disaster management policy.

A number of other comparable liberal democratic countries have adopted disaster management policies that incorporate resilience goals, For example, Canada's national policy focuses heavily on disaster mitigation, and resilience is hardly mentioned (reference). In contrast, the UK's explicit emphasis on resilience is reflected in its placement of a Resilience unit in the

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[1] The term 'risk reduction' has a similar meaning to 'risk mitigation' and is more commonly used in the international context [probably because the idea of 'reduction' is broader and encompasses risks that arise from developmental issues whereas 'mitigation' indicates more specific pre and post disaster preventive activities (United Nations International Strategy for Disaster Reduction, 2019).

Cabinet office, as well as the creation of highly localised Local Resilience bodies. The UK public policy on disaster resilience, however, is almost exclusively dedicated to disaster response and recovery. The US, on the other hand, first incorporated resilience principles into its public health policy. This was followed by national security and then into natural disasters after Cyclone Katrina, by presidential executive order (The White House, 2007). These variations demonstrate that resilience-based approaches are not always labelled as such. Indeed, a resilience-based approach may be signalled by the types of activities that are conducted: emphasis on prevention, preparedness and risk management, shared responsibility, community-centred, consideration of the links between disasters and climate change etc . An example of this is provided by the Sendai Framework where resilience is a theme that is generally expressed in terms of a quality or approach that underpins actions to prevent, prepare for and mitigate the risks of disasters. This shows that disaster resilience can be an implicit policy goal, as well as one that is directly stated. This reminds us of the need to look more closely at resilience policy implementation and its elements to ensure the best chance of success because 'The devil is in the detail' (Marshall, 2008 p.94).

1.13 Discussion

This chapter provided the context for this thesis and described the complex set of conditions that form the backdrop for the implementation of Australian disaster resilience policy. I explained how Australia has come to adopt and implement a national disaster management policy centred around resilience and how it fits with the global shift toward prevention and disaster risk reduction rather than waiting until disasters happen to take action.

The research question was articulated in Section 2.3 and its scope was described in terms of three elements: disaster resilience, policy implementation and the Australian Federation. Literature reviews for each of these were provided in Sub-sections 2.3.1-2.3.3. to confirm and inform the research question and the development of the thesis methodology in Chapter 3. In particular, the discussion in Section 2.3.1 enabled an existing model of disaster resilience (Norris *et al*, 2008) to be identified that is used as the basis for a framework, referred to as the Provisional framework, which is used to investigate the research question in Chapters 4, 5, 6 and 7. In Section 2.3.2, I explored aspects of policy implementation theory and confirmed that there is a general shortage of contemporary research in this field, and therefore, and even greater shortage of research specific to disaster resilience policy implementation. In Section 2.3.2 I highlighted the need to consider the context of disaster resilience policy implementation as an important factor in policy outcomes. This context is not only informed by an understanding of theory but also by the policy mechanisms that operate in public administration settings. This led me to examine different forms of governance that provide the structure and organising arrangements for policy implementation. Australian federalism, as a specific form of multi-level governance, was singled out for discussion in Section 2.3.3 because it provides the context for national strategic policy

implementation and is the third element of the research question. Within this section, subsidiarity was introduced as an organising principle of federalism because of its apparent compatibility with the theory and practice of resilience and effective policy implementation as highlighted in Sub-sections 2.3.1 and 2.3.2.

In Chapter 3, I propose and develop a thesis methodology to answer the research question that involves four parallel, linked avenues of inquiry:

1. Proposal of a Provisional Disaster Resilience Policy Implementation Framework (Provisional Framework).

2. Application of the Provisional framework using case studies of implementation in different settings.

3. Evaluation and review of the Provisional framework to produce the Disaster Resilience Policy Implementation (DRPI) Framework.

4. Identification of objectives and practices that draw on the principle of subsidiarity to be incorporated into the DRPI framework for application within the Australian federal system to enhance national disaster resilience.

Chapter 3: METHODOLOGY

1.14 Introduction

Chapter 2 provided the rationale and the theoretical and policy context for the thesis. Information was provided on disaster incidence, causes and the human and economic costs imposed by disasters in Australia and internationally. This highlighted the scale and prevalence of losses resulting from disasters, and it raised some of the complexities that need to be considered in the development of policy solutions.

In Section 2.3 the origins of resilience and disaster resilience were explored including various definitions, models and frameworks that assist in understanding resilience. This was followed by a broad overview of the theory and practice of policy implementation. This highlighted a scarcity of studies in disaster resilience policy implementation how the context for policy implementation has a critical influence on policy outcomes. Next, Australian federalism was reviewed because it provides the context for the implementation of national disaster resilience policy. The principle of 'subsidiarity' was identified and proposed as a model to better understand how governance could be organised in Australia to ensure it is compatible with the goals of successful resilience policy implementation. Lastly, in Section 2.4, I described relevant policy settings and mechanisms that operate within the federal system. In particular, the National Strategy for Disaster Resilience was identified as the strategic disaster management policy-of-choice in Australia. The shortage of information about the practice of disaster resilience implementation is a central issue that underlies the thesis methodology. It is proposed that different approaches to policy implementation and the extent to which these support the determinants of disaster resilience can allow assumptions to be made about 'good' practice.

Now, in Chapter 3, I describe the thesis methodology. This sets out the thinking underlying the research methods and the process to develop the methods that were used to analyse disaster resilience policy implementation. The methodology, is the rationale for the choice of method, which is a research tool. 'Method is the ingredients of research while methodology provides the reasons for using a particular research recipe' (Clough and Nutbrown, 2012, p.25). Research methodology provides the scientific basis for claims or new knowledge to allow it to be incorporated into the body of knowledge of a relevant field. Documentation of the methodology facilitates scrutiny by peer researchers allowing them to assess the validity of its findings, to replicate the studies or apply the findings to other research. It is also important for researchers to be transparent and able to demonstrate that methods have been developed and applied to acceptable standards, and that ethical practice has and will be followed (Australian National University, 2015a, 2015b). Applied policy research, or policy analysis is the collective term for the research methods that were chosen for this project. Policy analysis is commonly used in public policy research and practice. For example, it can be performed by government to build logic and

structure into the policy development process and it can be used in academic research to investigate and evaluate different policy options and solutions

While policy analysis is considered a research method in its own right, in keeping with the multi-disciplinary nature of public policy, it may draw from a menu of quantitative and qualitative research tools that may be used separately, or in combination, depending on the issues to be examined. For example, econometrics, statistics, cost-benefit analyses, thematic and grounded analysis, social marketing and focus groups are all examples of methods that can be used to analyse public policy (Fischer and Miller, 2006). This thesis uses qualitative methods although, where relevant, it may refer to quantitative data from secondary sources. The qualitative methods included a mix of desk-top or literature based, and empirical research.

1.15 Development of the Provisional Disaster Resilience Policy Implementation Framework

As discussed in Section 2.4 successful implementation of complex public policy like national disaster resilience policy, requires a strategic approach that operates across multiple levels of society, including government and civil society. If all levels of government and the community are to assume their share of responsibility for disaster resilience, more detailed guidance on how to implement disaster resilience policy is needed. This guidance must take into account the range of stakeholders and the policy mechanisms used in the implementation process. The literature-based research conducted in Section 2.3 allowed a working version of a policy analysis framework to be developed. In Section 3.4, I describe and discuss the process to develop a working framework which is hereafter referred to as the 'Provisional framework'. The Provisional framework was developed to be relevant at all levels of the federal system and is applied to a series of case studies in Chapters 4, 5, 6 and 7 to generate information about how disaster resilience activities align with the known determinants of disaster resilience. The process of development and application of the Provisional framework enabled it be evaluated to produce a final version, the Disaster Resilience Policy Implementation (DRPI) Framework that is presented in Chapter 8.

1.15.1   The use of a framework method

This section explains the meaning and purpose of a framework and why it was chosen as a research method to examine how disaster resilience activities are guided by the theoretical determinants of disaster resilience. Policy research can be made more difficult when it explores a complex and wide-ranging issue, within which there may be multiple related topics each served by large amounts of information: referred to in Chapter 2 as the problem of 'too many variables' (Goggin, 1986). One way to manage this is to develop a framework to define the scope and structure of the research. A framework can help with the categorisation of variables and, in so doing, provide units of analysis. It can be used to select, design, conduct and analyse information

obtained, via a range of qualitative data collection methods, including documentary, case studies, observation, interviews, focus groups (Ritchie and Lewis, 2003; McNabb, 2013).

A framework, as in this thesis, can serve the dual purpose of being both a research method and a research outcome. It can present information about an issue to highlight similarities and differences, which, when interpreted, can generate new information and ways of understanding the issue. The process of applying a framework can also test the framework's utility. A framework, when developed and applied may not only identify its own strengths and weaknesses, after which it can be reviewed, updated and improved, but it may also demonstrate inconsistencies in the existing research. This can open up approaches to problem solving that may not hitherto have been identified (Bryman and Burgess, 1994; Ritchie and Lewis, 2003; Baxter and Jack, 2008; Srivastava and Thomson, 2009; McNabb, 2013).

Section 3.2.2 describes the Norris model of community disaster resilience and the reasons why it was chosen as the basis for the Provisional framework.

1.15.2   Disaster resilience: A model of networked dynamic adaptive capacities

A survey of resilience theory was conducted in Section 2.3.1 to understand resilience and disaster resilience and its theoretical and practical determinants. A model of community disaster resilience with four networked capacities and dynamic attributes (Norris *et al*., 2008) describes disaster resilience as: 'A process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance' (Norris *et al*., 2008, p. 130).

Figure 1 depicts the 'adaptive capacities': economic development, social capital, community competence, and information and communication as described by Norris *et al*., (2008). In this context the term adaptive capacities is used to convey qualities or attributes that are connected to each other and have the ability to adjust and change in response to a shock or a disturbance. Thus, instead of resilience being a static quality, it is conceptualised as a dynamic process that generates an ability to not only survive a shock or disturbance, but to adapt so that an improved condition is created as an outcome of the experience of adversity.

Figure 0-1 Norris model of community disaster resilience
(Norris *et al.*, 2008)

The Norris model captures an understanding of resilience that is broadly appropriate for this thesis because it has properties that render it relevant to the implementation of government policy. For example, as with government policy it is aimed at groups and populations. Indeed, Norris' theory was one of the first to translate theories of resilience from an individual frame of reference to a collective or community context (McAslan, 2010). Collective or community resilience, with population wellness as its ultimate goal, is more relevant to the idea of national policy approaches. It more closely reflects the conditions for effective policy resilience within a system, rather than other models that focus on individual resilience alone. Norris and her colleagues emphasise action at the local and community level while recognising the role of actions at other levels of the system. 'Political, economic and natural forces operating at larger ecological levels undoubtedly influence these capacities that operate at the community level.' (Norris *et al*., 2008:144). The Norris model is differentiated from other models because it accommodates, and indeed facilitates, transformative change in situations of complexity and uncertainty. 'Its transformation characteristics are what distinguish "community resilience' from other ways of characterising community strengths (Norris et al., 2008:135)'. It does this by bringing dynamic characteristics together with adaptive capacities, that were identified earlier in ecological systems and may play a role in transformation (Folke *et al*., 2002, 2003). Moreover, as well as being dynamic, the factors or 'resources' in the Norris model are networked (Norris *et al*., 2008:35-36).

The Norris definition and conceptual model of dynamic adaptive capacities also links generalised community resilience, understood by the authors in population health terms, directly to disaster resilience and disaster readiness. This is done via qualities of robustness (strength),

rapidity (timeliness) and redundancy (substitutability) that are inherent in each of the four adaptive capacities (Norris *et al*., 2008:134-135)

The properties of the Norris model capture the spirit of the National Strategy for Disaster Resilience (NSDR), even though the NSDR is not explicitly based on an identified theoretical model, and does not define disaster resilience. Firstly, being a national policy, the NSDR applies to the whole Australian population which aligns with the Norris model. Furthermore, the Norris model emphasises social resilience, the application of resilience at multiple scales within a system, and the idea that community resilience is associated with action to build capacity and to effect change. In addition, it emphasises the importance of managing risk and uncertainty, which is aptly summed up in the statement 'Plan for not having a plan' (Norris *et al*., 2008:143). These ideas are consistent with the NSDR and, like the NSDR, it incorporates the concepts of adaptation and improvement (Commonwealth of Australia, 2011a). This is in keeping with the idea that resilience is about 'bouncing back' (Manyena, 2006:433; 435;437;438; and 445: Manyena *et al*., 2011) 'bouncing back better' (Commonwealth of Australia, 2011a, p.20) or 'bouncing forward' (Manyena *et al*., 2011:417) which offers sustained benefits compared with the similar, but more reactive notion of 'bouncing back' (Aldunce *et al.*, 2014).

The Norris model was also considered practically suitable as the basis for the development of a framework. Each of the four networked capacities serve as high level determinants of disaster resilience and each has resources or sub-sets that act at a lower scale to support the development of resilience. These factors or resources are associated with the successful implementation of disaster resilience policy. Figure 2 (Norris *et al*.,2008:p 136) depicts, at the highest level, the network of the four adaptive capacities of social capital, community competence, economic development and information and communication, and their resources that act at an operational level to enable disaster resilience.
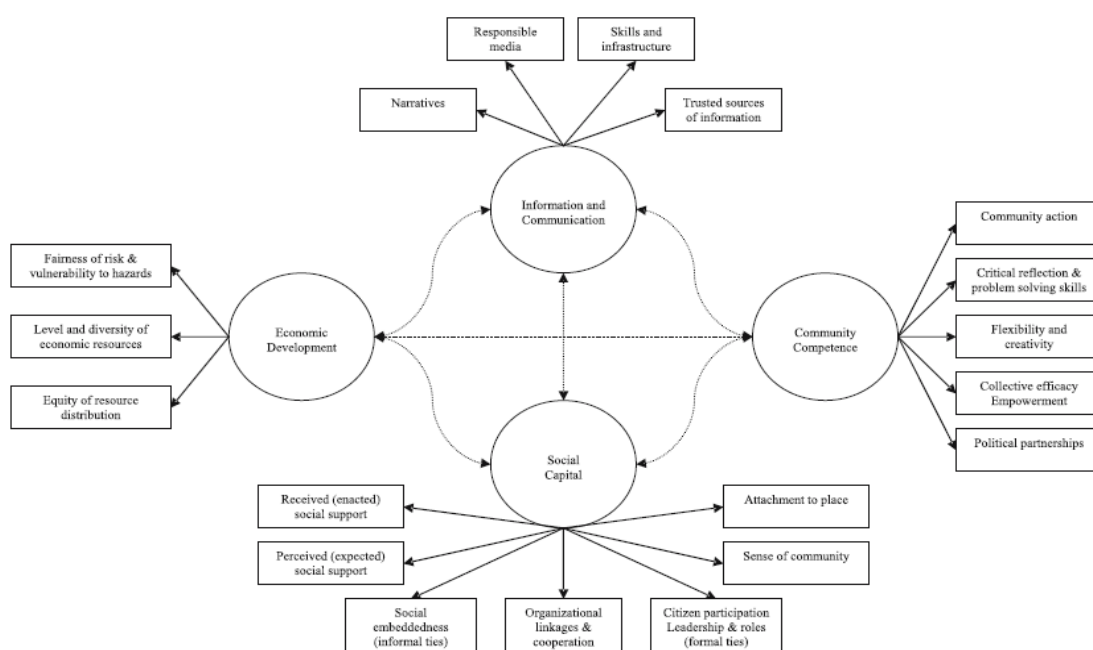
Figure 0-2 Community resilience as a set of networked adaptive capacities
(Norris *et al.*, 2008 p.136)

The Norris study incorporates a wide- ranging review of disaster resilience theory which is in accordance with the multi-disciplinary nature of public policy. Furthermore, this work is highly regarded by other researchers and, at 27 May 2019, had been cited 2837 times in Google Scholar.. For example,

> Norris, Stevens, Pfefferbaum, Wyche, and Pfefferbaum (2008) have written what is perhaps the most influential paper on community resilience in recent years. This article provides a thorough examination and discussion of the concept of community resilience based upon an extensive body of literature from various disciplines. (Kulig *et al.*, 2013:762)

It is not only the frequency of citation but the high standing given to this work by organisations that have used the Norris study in a number of authoritative policy documents that attests to its quality and suitability for use in this thesis. For example, the Norris definition of resilience was adopted by the United States National Research Council Committee on Private-Public Sector Collaboration (National Research Council Committee on Private-Public Sector Collaboration to Enhance Community Disaster Resilience, 2011, p.14), by the Australian Red Cross to advocate for household disaster preparedness (Richardson, 2014), and in advice to the Victorian state government following the 2009 fires:

> The critical components in building effective resilience communities must reduce risk and resource inequities, engage local people in mitigation, create organisational linkages, boost and protect social supports and plan for not having a plan, which requires flexibility, decision making skills, and trusted sources of information that function in the face of unknowns. (Norris *et al*., 2008, cited in Taylor and Goodman, 2015:175).

The Norris model is considered sufficiently robust because it has been tested, validated and expanded upon in later research. One study measured and tested economic development and social capital to build on Norris' earlier work. It produced a combined set of economic development and social capital indicators that can be used to 'predict a community's ability to "bounce back" from disasters, and reduce post-trauma health and mental health problems' (Sherrieb *et al.*, 2010:227). Social capital and economic development were both seen as structural indicators of disaster resilience that could be measured because of the availability of community level data (Sherrieb *et al*., 2010). In 2013 the Index of Perceived Community Resilience (IPCR) (Kulig *et al.*, 2013) incorporated elements of the Norris model. The IPCR was developed and tested in two fire-affected communities in Canada using interviews, community profiles and a household survey. The findings proposed additional characteristics of leadership and empowerment, community engagement, and non-adverse geography. These did not replace but were aligned with the Norris model, being labelled 'sub-scales' of social capital and community

competence. This added value to the Norris study and was incorporated into the development of the Provisional framework in Section 3.2.4.

The 'networked adaptive capacities' for community resilience (Norris *et al*., 2008; Kulig *et al*., 2013) of social capital, community competence, economic development and information and communication are reconceptualised in this thesis as 'policy domains' to signal their relevance to policy implementation. However, they remain fundamentally unchanged and are placed at the top level of the Provisional framework. Each provided a different lens through which disaster management activities are examined in Chapters 4, 5, 6, and 7.

1.15.3   A disaster resilience policy implementation concept

This section provides a structural concept for good practice disaster resilience policy implementation in the Australian federal system. It depicts the disaster resilience policy implementation system at the macro level and was done to visualise how the adaptive capacities proposed in the Norris model occur within the broader policy implementation system in Australia. As a heuristic, it assists us to understand the thinking underlying the process to develop the Provisional framework. It does not form part of the Provisional framework or the thesis hypothesis, and it should be borne in mind that the reality of policy implementation is far more complex.

Figure 3 consists of broad horizontal and vertical elements. The vertical dimension is comprised of social capital, community competence, economic development, and information and communication. These are viewed as the pillars of disaster resilience policy implementation. The horizontal dimension provides the platforms for policy implementation which represent the different levels within the Australian federation, and the local level incorporates local government and sectors within civil society including business, third sector organisations, and households. Policy settings and mechanisms are located on the platforms. This provides the apparatus of policy implementation and may include laws, governance arrangements, institutions and organisations, strategic policies and associated sub-policies or 'nested policies' (Samnakay, 2017:111) and related programs. In theory, the implementation of policy aims to bring about change and it uses policy mechanisms to achieve this. Normatively this results in actions which, if successful, produce the desired outcomes, in this case disaster resilience. The four adaptive capacities (or policy domains in the Provisional framework), are shown to intersect each of the platforms via policy mechanisms. This implies that as part of decision-making to guide implementation design and practice, the goal is to create social capital, community competence, economic development, and information and communication in all directions. It also demonstrates that consideration should be given to the role of policy mechanisms to enable disaster resilience determinants in every direction. The policy settings and policy mechanisms relevant to disaster resilience policy implementation were identified in Chapter 1. Note that there are overlaps and interconnections between most, if not all, of the elements of this concept.
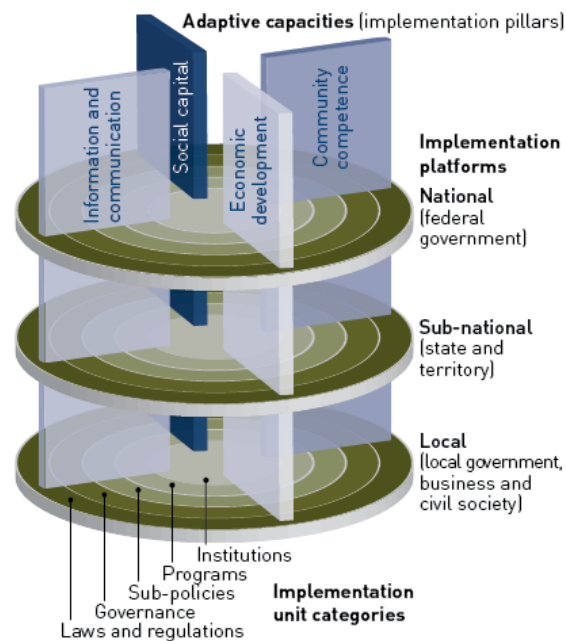
Figure 0-3 Conceptual structure for national disaster resilience policy implementation

1.15.4 Policy Objectives and Universal Themes

This section describes the policy objectives that were identified for each of the four Policy Domains, the four unifying themes or Policy Goals that emerged from this process and the reasons for their inclusion in the Provisional framework. Policy Objectives were included in the Provisional framework to bridge the gap between theory and practice. They inform implementation by translating the more theoretical Policy Domains of Social capital, Community Competence, Economic Development and Information and Communication into practical objectives.

The Norris model provided the basic architecture for the Provisional framework (Figure 3-4), and was the starting point from which to identify appropriate policy objectives. While the Norris model's value is linked, among other things, to its reach into the community grass roots, the Provisional framework differentiates itself by its emphasis on governance in disaster resilience policy implementation. This is a developing area of research (Tierney, 2012). The Norris model (2008) focuses on preparing to respond to disasters. Thus, one reason for its adaptation was to expand the practice of disaster resilience toward the prevention and risk mitigation end of the disaster management spectrum. With this in mind, the existence of other factors in disaster resilience policy settings, possibly not included in the Norris model, needed to be considered in order to make the Provisional framework more robust. To do this, the elements of the Norris model were cross-checked against relevant parts of Section 2.3, particularly policy

implementation theory and practice in Section 2.3.2. In addition, a number of reports and policy documents were consulted for information about outcome-focused approaches to disaster prevention, preparedness, planning and risk mitigation. Some of the resources or factors in the Norris model were condensed or omitted and some new ones were added. This was to guard against a problem that the use of a framework is intended to prevent: that of having too many elements or variables.

Provisional Disaster Resilience Policy Implementation Framework				
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change
Policy Objectives	1. Networks	1. Political partnerships	1. Security	1. Resilience narratives
	2. Place-based attachment	2. Stakeholder engagement	2. Economic diversity	2. Trusted information
	3. Community engagement	3. External Leadership	3. Equitable resource distribution	3. Skills and infrastructure
	4. Internal leadership	4. Local disaster risk awareness	4. Shared (equitable) risk allocation	4. Multi-directional information flow
		5. Community participation		

Figure 0-4. Provisional Disaster Resilience Policy Implementation Framework

The Provisional framework in Figure 3.4 consists of four high level policy domains that were derived directly from the Norris model shown earlier in Figures 1 and 2 (Norris et al., 2008:136), and a set of policy objectives for each of the four policy domains and themes.

Working definitions for each of the policy domains are:

Social capital: 'The social ties or membership of particular communities that make resources, advantages and opportunities available to individuals and groups' or 'features of social organisation, such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit (Putnam, 1995:67)

Community competence: 'the capacity of a community to assess and generate the conditions required to demand or execute change… a process by which groups, communities and aggregates work together to identify problems and needs of the community that includes agreeing on goals and priorities and implementing specific strategies to meet the identified problems and needs (Cottrell, 1976, cited in Brown et al., 1996:33); 'the capacity of a community to assess and generate the conditions required to demand or execute change' (Eng and Parker, 1994, cited in Brown et al.,1996:34).

Economic development: 'The growth of national income per capita of developing countries. Such countries need sufficient savings and investment in order to diversify their economies' (Bannock *et al*., 1998 p.117).

Information and communication: Information *is:* 'What is conveyed or represented or presented by a particular arrangement or sequence of things' (Oxford University Press, 2002 p.727), and 'the primary resource in technical and organisational systems that enables adaptive performance' (Comfort, 2005, cited in Norris *et al*., 2008: 140). Communication is: 'The creation of common meanings and understandings and the provision of opportunities for members to articulate needs, views and attitudes.' (Norris *et al*., 2008:140) .

The process whereby each of the policy objectives was selected or formulated for inclusion in the Provisional framework, is described in the following sections. A deep review of the theory underlying the adaptations to the Norris model that are proposed as policy objectives was not done at this phase of the thesis. The Provisional framework, particularly its policy objectives, is formative. The methodology allows it to be reviewed and refined in response to new information, including information that is derived in Chapters 4, 5, 6 and 7. The development of a plan to apply the Provisional framework in Chapters 4 to 7 is set out below.

Incidental to this process was the identification of the themes of trust, collective-efficacy, sustainability and behaviour change. These are unifying concepts that underpin social capital, community competence, economic development, and information and communication. The terms are incorporated into the Provisional framework because they are useful to navigate multiple project variables and provide a check on their internal consistency and that of the Provisional

framework as a whole.

Table 3.1 Development of the Policy objectives for Social capital

Norris Model of networked dynamic adaptive capacities	Provisional framework for disaster resilience policy implementation
SOCIAL CAPITAL	SOCIAL CAPITAL *(Trust)*
Resources	Policy Objectives
1. Social support 2. Social embeddedness 3. Organisational linkages and co-operation, 4. Citizen participation, leadership and roles (formal ties) 5. Sense of community 6. Attachment to place.	1. Networks 2. Community engagement 3. Leadership (internally focused) 4. Attachment to place

The development of social capital policy theme and policy objectives in the Provisional framework. The resources proposed by Norris to deliver social capital are in the left-hand column. The theme and policy objectives for social capital in the Provisional framework, are in the right-hand column.

It was found that networks and network creation are a focus of much of the research on social capital as it applies to policy implementation. For example, the Productivity Commission (2003) reviewed the potential for the application of social capital to policy. The report included a comprehensive review of the academic literature and consideration of the application of social capital to government policy development and implementation. It was reported that social capital is enabled by implementing policies that build informal relationships, networks and stakeholder trust; by providing information to people which is relevant to their own roles and values; and by giving people the skills to socially engage and to deal with conflict and diversity (Productivity Commission, 2003:65). These activities are very similar to numbers 1 to 3 in the Norris model in Table 3.1and, in accordance with the analysis that was done by the Productivity Commission, are encapsulated within the term 'networks' or 'networking', which in turn is central to the creation of social capital (Buckle *et al.*, 2003). The significance of network theory to policy implementation was borne out by the development of social capital indicators by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2004). This made a strong case to choose 'networks' as a policy objective in the Provisional framework. The decision was made to absorb the resources of social support, social embeddedness and organisational linkages and cooperation under the single policy objective of networks. In a study that built directly on the Norris model,

the sub-scales of community engagement, leadership and empowerment and non-adverse geography were identified. These were related directly to social capital and community competence (Kulig *et al.*, 2013).

Community engagement and leadership (internal style) have been included as policy objectives for social capital. Leadership (external style) and non-adverse geography have been included as policy objectives for community competence for reasons that will be explained later in this section. An association between community engagement and the development of social capital was confirmed in the Community Engagement Framework which was developed by the federal government to support implementation of the National Strategy for Disaster Resilience (Australian Institute for Disaster Resilience, 2013:3;8). Other examples of community engagement strategies and guidance that refer directly and indirectly to community engagement activities aimed at building social capital for disaster resilience have been produced by the federal and state governments (Australian Institute for Disaster Resilience, 2010; Government of Western Australia, 2016; Webber et al., 2017), and the national peak body for fire and emergency services (Australasian Fire and Emergency Services Authorities Council, 2016). Outside Australia, the International Association for Public Participation (IAP) (2020) produced a standard for community engagement, that was used by a number of Australian disaster resilience projects to develop and evaluate tools to measure disaster resilience by looking at community engagement, along with other indicators (Arbon *et al.*, 2012; Arbon *et al.*, 2016; Lake Macquarie City Council, 2016b, 2016b). The Lake Macquarie City Council (LMCC) Local Adaptation Plan for Flooding, including due to Sea Level Rise (LAP) (2016a,2016b) is the subject of Case Study 3 in this thesis. The LMCC community engagement strategy for the LAP has been recognised as an example of good practice in disaster resilience policy implementation by the National Climate Change Adaptation Research Facility (National Climate Change Adaptation Research Facility, (year of publication not known). At the state government level, Western Australia released a community engagement framework in 2016 targeted at its emergency services personnel which emphasises building on and strengthening community networks to enhance disaster resilience. It cites a need to 'build relationships based on trust and shared responsibility' (WA, Department of Fire and Emergency Services, 2016:7) to build social or community capacity. Community engagement is seen as an indicator of resilience when it occurs in disaster recovery (Coles and Buckle, 2004). The same authors identified principles for effective and sustainable community engagement in disaster management that are intended to guide disaster resilience policy implementation. These include good governance, adequate resourcing, integrated development, able to be self-sustaining, change mechanisms and effectiveness (Coles and Buckle, 2004:12-13). Actions to enhance social or community capacity in disaster management are closely associated with the broader concept of social capital (Buckle *et al.*, 2003). The same report asserts that networks and trust are prerequisites for disaster resilience (Buckle *et al.*, 2003:6).

The Norris resources of 'Citizen participation, leadership and roles (formal ties)' has, for the purpose of this thesis, been condensed into the policy objective of 'internal leadership'. Internal leadership is generated within a community with the aim of building internal capacity for positive action within that community. This is in contrast to external leadership, a policy objective for community competence, which seeks to mobilise community agency to exert influence and power beyond the community (Krishna and Shrader, 1999; Tansley and Newell, 2007). An internal style of leadership tends to develop bonding forms of social capital, which strengthens relations within a particular group, while external leadership tends to employ bridging social capital which works across groups (Productivity Commission, 2003:18). 'Citizen participation' was not incorporated here but it was renamed 'community participation' and is included as a Policy objective for Community competence. The rationale for this is discussed later in Section 3.3.

Norris and her colleagues treat 'Attachment to Place' and a 'Sense of community' as two separate resources, with one related to physical geography and the other a function of the social environment (Kulig *et al.*, 2013:766). 'Sense of community' was incorporated into community engagement. This was possible because of the development of the Index of Perceived Community Resilience where indicators of a 'sense of community' were classified as elements of a 'community engagement sub-scale' (Kulig *et al.*, 2013:766). This left 'attachment to place,' which is forged from a sense of family ties and the economic value afforded to a location where livelihoods are centred. Attachment to place was shown to encourage flood preparation: people who are connected to their physical location are more alert to flood risks and have more fear of the consequences of disasters (Mishra *et al.*, 2010:194). The authors of that study, nonetheless, recognise that knowledge and awareness of disaster risk does not necessarily lead to risk mitigating behaviour. This premise is taken up later in this thesis in relation to the operation of information and communication in the Provisional framework.

Trust is frequently raised in reports and articles about social capital (Coleman, 1988; Lin, 1999; Cox, 2000; Lin et al, 2001; Ahn and Ostrom, 2002; Buckle *et al*, 2003; Aldrich, 2010, 2012; Aldrich and Meyer, 2015; Engbers and Rubin, 2018). Indeed, the Productivity Commission literature review mentions it more than 200 times and states that trust is a 'close proxy for social capital' (Productivity Commission, 2003:10).

Trust is defined as:

> Confidence in the reliability of a person or a system. It is based on the expectation that people and organisations will act in ways that are expected or promised, and will take into account the interests of others (Australian Bureau of Statistics, 2004:26). 'Trust tends to be cumulative or self-reinforcing' (Putnam, 1993, cited in Australian Bureau of Statistics, 2004:26).

As well as having social significance, trust can also be viewed within an economic framework 'like other forms of capital, trust is productive and makes possible the achievement of

certain ends that would not be attainable in its absence (Coleman, 1988:S98). Thus, like social capital, trust can be traded to achieve certain goals and while this may not always result in positive outcomes, in its normative sense trust is a desirable commodity that can be harnessed by government for public policies that deliver a public good. Of relevance to disaster resilience is the view that trust is particularly important for decision-making in situations of uncertainty insofar as it bridges the gap between the known and unknown' (Giddens, 1991a., cited in Delany-Crowe *et al*., 2019:3). Another implication for policy implementation is that mistrust is not dichotomous with trust. Rather, trust is a phenomenon that is dynamic and in a constant state of monitoring, assessment and review by the individuals, and within the institutions and systems in which it operates (Giddens, 1994.

Therefore trust, was incorporated into the Provisional framework as the universal theme for social capital.

Table 3.2 Development of the Policy objectives for Community competence

Norris Model of networked dynamic adaptive capacities	Provisional framework for disaster resilience policy implementation
COMMUNITY COMPETENCE	COMMUNITY COMPETENCE (Collective efficacy)
Resources	Policy Objectives
1. Community action 2. Collective efficacy and empowerment 3. Political partnerships 4. Critical reflection and problem-solving skills 5. Flexibility and creativity	1. Community participation 2. External Leadership 3. Political partnerships 4. Stakeholder engagement 5. Local disaster risk awareness

The resources proposed by Norris to deliver community competence are in the left-hand column. The theme and policy objectives for community competence, in the Provisional framework, are in the right-hand column.

In Norris's categorisations, social capital and community competence are closely linked, with the distinguishing feature being that community competence is enabling of effective action or 'the networked equivalent of human agency' (Norris *et al*., 2008). This indicates an overlap between 1. Community action and 2. Collective efficacy and empowerment. These were replaced by the policy objectives of community participation and external leadership and empowerment. Collective efficacy was identified as the universal theme for community competence.

The Provisional framework places a greater emphasis on leadership than the Norris Model. It includes a category of external leadership which complements the policy objective of internal leadership for social capital. The links between stakeholder engagement and external styles of leadership and empowerment were explored by Porteus (2013).

As was pointed out in the last section, citizen participation was moved from social capital to community competence and renamed 'community participation'. This replaced 1. Community action. The broader term 'community' is preferred over 'citizen' which infers people of voting age and would exclude certain groups. 'Participation' is preferred over 'action' because it signifies a purposeful strategic intent in a specific activity that includes other partners or participants.

The decision was made to pair empowerment with collective efficacy as the universal theme for community competence. 'Collective efficacy is a desirable outcome in the process of empowering groups or communities.' (Paton, 2001). Efficacy, is a quality held by individuals and/or groups who have the belief or conviction that a goal they set out to achieve can be achieved (Bandura, 1977, 1997, 2000, 2006, 2010). 'The main focus of community competence is on collective action including decision making, which is rooted in empowerment and collective efficacy.' (Kulig *et al.*, 2013:763). Collective efficacy is also seen as the bridge between social capital and community competence (Kulig *et al*., 2013). How collective efficacy (either as a product or an antecedent of empowerment) binds all of the policy objectives for community competence is explained further in Chapter 5.

'Non-adverse geography' translates into local or 'place-based' disaster risk awareness and mitigation activities to build disaster resilience (Kulig *et al*., 2013). While it is not included in the Norris model it was identified as a 'sub-scale' in the Index of Perceived Community Resiliency, developed in an associated study (Kulig *et al.*, 2013). Non-adverse geography is a perception that 'physical environment is a positive factor in one's health and that the community is not geographically remote or isolated' (Kulig *et al.,* 2013:771). Because the term is a negatively expressed concept that may be confusing, it is understood as the sense of relative risk or safety imbued in a geographical location. Cutter asserted that non-adverse geography is a factor in community competence (Cutter *et al.*, 2008b) and it has also been correlated with ecological resilience (Cutter *et al*., 2014; Kulig *et al*., 2013, cited in McCrea *et al*, 2014:276). Connections were made between 'non-adverse geography' and local ecology and risk awareness in the Disaster Resilience of Place (DROP) and the Community and Regional Resilience Initiative (CARRI) models for disaster resilience (Cutter, 2008a, 2008b). In the Australian context a report following the 2009 Victorian bushfires advocated for more attention to local 'place-based' approaches to build disaster resilience (Taylor and Goodman, 2015). The importance of taking climate change into account in approaches to disaster resilience policy implementation and the localised variations in climate change impacts was raised in Section 2.3. This is yet another important reason to include non-adverse geography as a policy objective in the Provisional framework.

The term 'stakeholder engagement' is included because it is subtly but significantly different from community engagement (a policy objective for social capital). As described earlier, community engagement generally refers to individuals or groups who will be directly impacted by a policy. Stakeholder engagement has political (in the broader sense of its meaning) overtones and refers to engagement in a strategic or targeted manner with those who may not necessarily be recipients of a policy or program but who nonetheless, have a role to play, or an interest in its implementation. This may place them in a position of influence with potential to assist or undermine successful implementation (Steynjes, 2017, Porteus, 2015). Community engagement and stakeholder engagement, are terms that are often used interchangeably (Head, 2007b; Butcher and MacLennan, 2010; Wells *et al.*, 2013; Porteous, 2013) and, as an activity, the two may occur simultaneously. The distinction between these terms and their theoretical connection to disaster resilience is discussed further in Chapter 5.

Critical reflection, problem-solving skills, flexibility and creativity have not been made explicit in the Provisional framework. The reason is because these are discussed by Norris *et al.* (2008) as qualities primarily at the local level. Nonetheless they are important. To recognise this and the need for public policy to support these qualities across the system, they were up-scaled in the Provisional framework. That is, they were incorporated into the consideration of appropriate forms of governance for disaster resilience policy implementation. Governance is conceptualised as subsidiarity in an additional Policy Domain in a later form of the Provisional framework in Section 3.4.

Table 0-3 Development of the Policy objectives for Economic development

Norris Model of networked dynamic adaptive capacities	Provisional framework for disaster resilience policy implementation
ECONOMIC DEVELOPMENT	ECONOMIC DEVELOPMENT (Sustainability)
Resources	Policy Objectives
1. Fairness of risk and vulnerability to hazards 2. Level and diversity of economic resources 3. Equity of resource distribution	1. Equitable risk allocation 2. Economic diversity 3. Equity of resource distribution 4. Security of livelihood

The resources proposed by Norris to deliver economic development are in the left-hand column. The theme and policy objectives for economic development in the Provisional framework are in the right-hand column.

Each of the three resources of economic development in the Norris model were retained with small changes to their labelling. The policy objective of 'security' as it relates to the social aspects of security. This largely refers to having a sense of confidence in the secure the ability access and maintain a livelihood. On a larger scale the idea of security can be extended to national, state and regional prosperity that comes from having a stable economy, a stable government and a society where law and order is maintained. This may however, be more relevant to some developing nations than to Australia. Security is important to include in the policy objectives for economic development for a number of reasons: it has direct relevance to people's lived experience; it is a key factor in social resilience (Adger, 2000) and in Australia, Richardson highlighted how security, particularly confidence in the ability to maintain a livelihood and physical safety are adaptive capacities for disaster resilience (Richardson, 2014; Handmer and Dovers, 2013). Note that for disaster resilience, a sense of physical safety is captured within the 'non-adverse geography' policy objective for community competence where it is operationalised by activities that encourage local disaster risk awareness.

Level and diversity of economic resources and Equity of resource distribution are the second and third resources in the Norris model. Normatively, both equity and diversity of economic assets (Norris *et al*., 2008), can be assisted by government policies on taxation, social welfare and other redistributive strategies, employment, small business, regional development, foreign investment, competition, superannuation, energy and environmental policy, to name a few (references). These two resources have basically been retained in the Provisional framework although the second has been rephrased as 'Economic diversity' reflecting that it is applicable at all scales.

Sustainability was identified as the theme for economic development and is defined as 'Meeting the needs and aspirations of the present generation without compromising the ability of future generations to meet their needs.' (Brundtland, 1987:292). As mentioned in Chapter 2, studies of sustainability bridge natural ecology and the humanities, and resilience has come to be regarded as integrated with sustainability (Achour *et al.*, 2015). Sustainability, within the context of natural disasters is defined as the ability to tolerate and overcome damage, diminished productivity, and reduced quality of life from an extreme event without significant outside assistance (Mileti, 1999:4). Sustainability and its relationship to economic development for disaster resilience is discussed in Chapter 6.

Table 0-4 Development of the Policy objectives for Information and Communication

Norris Model of networked dynamic adaptive capacities	Provisional framework for disaster resilience policy implementation
INFORMATION AND COMMUNICATION	INFORMATION AND COMMUNICATION *(Behaviour change)*
Resources	Policy Objectives
1. Narratives 2. Responsible media 3. Skills and infrastructure 4. Trusted sources of information	1. Resilience narratives 2. Access to trusted information 3. Skills and infrastructure 4. Information flow between sectors

The resources proposed by Norris to deliver information and communication are in the left-hand column. The theme and policy objectives for information and communication are in the right-hand column.

Information and communication is more operational than the other three policy domains (Sherrieb *et al.*, 2010). It is included with 'communication' in a suite of policy instruments for 'emergencies and adaptation' (Handmer and Dovers, 2007). This suggests that it functions at a lower level than a policy domain; however, it also identified by Handmer and Dovers as a *universal* policy instrument for disaster management (Handmer and Dovers, 2013, pp. 140-156). This elevates it to a priority action in policy implementation where it is emphasised in relation to learning and behaviour change (Handmer and Dovers, 2013, pp. 126-127). This universality is reflected in its inclusion as a dynamic adaptive capacity within the Norris model and justifies its inclusion as a policy domain in the Provisional framework. The addition of 'information' is necessary to capture the importance of the message or content that is to be communicated. To promote disaster resilience, the message supports and frames the narrative. Central to the disaster resilience message is the exhortation to acquire information and skills to share responsibility and to mitigate and manage these risks (Commonwealth of Australia, 2011a; Commonwealth of Australia, 2012c; Standing Council for Police and Emergency Management, 2012a:3-4).

It was reasoned that 2. Responsible media and 4. Trusted sources of information are so closely linked as to justify a combined policy objective. A responsible media is one that acts in accordance with professional journalistic standards. This includes openly distinguishing between opinion and facts, employing balance and the use of credible and reliable sources. It acts within a professional ethical framework and code of conduct, avoids sensationalism and is mindful of

doing no harm (Accountable Journalism: Monitoring media Ethics across the Globe 2020). These qualities are conducive to developing the public's confidence that the information they receive from the media can be trusted and relied upon. Sources of information other than the mass media play a role in disaster resilience policy implementation that need to be acknowledged in the Provisional framework. These include government, families and friends and social media. These sources must also be trustworthy because the perception of trustworthiness will have a bearing on people's uptake of information. Importantly, a perception that information can be trusted may not necessarily mean that information is accurate and reliable. This goes to the idea of behaviour change that is discussed in Chapter 7.

'Multi-directional information flow' has been added to encapsulate the idea that disaster resilience occurs within, is enabled by, and is a product of a system. The need to share information effectively and for interoperability in the disaster management system has been extensively advocated by commissions of enquiry following severe disaster events (McLeod, 2003, Teague, 2010; Holmes, 2012). As discussed in Section 2.4 the National Strategy for Disaster Resilience is a national strategic policy mechanism. The need for coordination of effort, favours the choice of this type of policy instrument, and both rely on effective horizontal and vertical information and communication flows. Without a multi-directional flow of information between the different levels of government and the various sectors, a national strategic coordinating policy becomes less effective.

The important role of government in formulating and leading effective communications activities during, and in the aftermath of, disasters is also well recognised (Conkey, 2004). This approach has been effective in promoting road safety and public health (Delaney *et al.*, 2004). For example, the Federal government partnered with academia and the media to develop resources to assist the media to report mental health and suicide (Hunter Institute of Mental Health). Their aim was to reduce the stigma surrounding mental illness and the chance of copycat suicide. Governments are also well placed to marshal the professional skills and substantial financial resources needed for conducting national public awareness and information campaigns using the mass media.

The proposition that arises from the Provisional framework is that to effectively build national disaster resilience, implementation should operationalise the policy objectives that align with the four policy domains of social capital, community competence, economic development and information and communication. To test this proposition, the Provisional framework was applied to case studies of disaster resilience policy implementation in the Australian disaster management system.

Various policy mechanisms are used to implement the policy objectives that are presented in the Provisional framework. If policy mechanisms achieve these objectives then this has the effect of enhancing disaster resilience. I have used the case studies to look for examples of how government, business and the non-government sectors have set about achieving these policy

objectives. From there, assumptions can be made about good practice in disaster resilience policy implementation. Synergies will be created when various policy objectives are at work simultaneously and span various policy domains. For example, community competence can be fostered when government engages with communities and this leads to individuals and groups becoming empowered to participate in the policy development and implementation process. The process may involve the facilitation of, and facilitation by, internal and external types of leadership.

1.16 Application of the Provisional framework

This section describes the development of the method used to apply the Provisional framework and how the data was collected. The method was mixed and consisted of the development and analysis of five case studies. These were examined through the lens of each of the four policy domains (social capital, community competence, economic development, and information and communication) in Chapters 4 –7. Consideration was also given to the overlay of federalism on each with reference to the principles of subsidiarity. Reflection on the utility of the Provisional framework was woven throughout this process.

To make the methodology more robust, the literature-based methods used in the thesis were complemented by an empirical dimension involving case study interviews.

Case studies are a form of interpretive qualitative research that:

- provide detailed contextual information;

- assist in the management of complex theoretical issues by providing a way to consolidate multiple variables derived from theory;

- allow investigation of the context for policy implementation; and

- answer questions and provide data to test assumptions that may otherwise not be documented (Ritchie and Lewis, 2003; Baxter and Jack, 2008; NcNabb, 2013).

Data was obtained from primary and secondary sources: Primary data came from semi-structured interviews conducted with case study participants and from documents (some unpublished) sourced from the case study organisations. Observational data was collected from a meeting organised by the Lake Macquarie City Council to update the community on implementation of its Local Adaptation Plan for Flooding including due to Sea Level Rise (Lake Macquarie City Council, 2016c; Lake Macquarie City Council, 2016b). Academic research and grey literature including published reports, and project reviews, some of which were initially identified in Chapter 2.

1.16.1 Selection of the case studies

The primary research component for this thesis was developed and conducted in accordance with national and university standards (National Health and Medical Research Council and Australian Research Council, 2015; Australian National University, 2015a, 2015b). Five case studies were developed from five disaster resilience projects or activities. One was chosen from each of the three levels of government and one was chosen from the business sector and one from the not-for-profit sector. This was to correspond with the different levels within the federal system and to capture sectors outside government, each of which has an important role within Australia's disaster management arrangements.

Initiatives that manage a specific disaster resilience policy or program were shortlisted if they showed potential as an example of good practice implementation and would yield information about one or more of the policy domains and their associated policy objectives. This method of selection of the participant organisations is an example of 'purposive sampling' where participants are selected for inclusion because they fulfil criteria set by the researcher (Ritchie and Lewis, 2003, p.78-80). Practical considerations were also taken into account that included: an early indication of the willingness of the organisation and its staff to participate within a time-frame that was mutually agreeable; geographic accessibility of the organisation (having regard to remaining with the available budget); and an expectation that the organisation would allow the use of internal documents, some of which might be unpublished. A number of federal and state government programs were identified through the project literature review in Section 2.3.2; whereas, others were familiar to the researcher from her previous experience in the emergency management sector, or were found as part of regular monitoring of disaster resilience and emergency management issues on public access internet sites or in the media.

1.16.2 Development of the case studies

An in-principle agreement to participate in the research was obtained through liaison with key personnel from the five disaster resilience programs. A full explanation of the research purpose and methodology was provided and their approval to the interview format and questions obtained as part of the ANU Research Ethics Approval Application process. Liaison and data collection required site visits which occurred during March to July 2016.

As a prerequisite and prior to recruitment of research subjects, I completed training in research ethics and human research protocols from the Australian National University.

This research was partially sponsored by the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC). As a condition of funding, the BNHCRC requires its sponsored research to facilitate the transfer of knowledge into practice (Bushfire and Natural Hazards Cooperative Research Centre, nd): one mechanism being through contact with 'end-user' organisations that have partnered with the BNHCRC. The Federal Attorney-General's Department (AGD) is the main end-user organisation for this thesis so, as a first step, the end-

user contact in AGD was informed and provided with information about the research and the agencies that would be approached to participate. This was to ensure protocols around conducting research with a federal government agency (Geoscience Australia) were followed and so that information about the project could be coordinated with other jurisdictions through the Australian and New Zealand Emergency Management Committee (ANZEMC).

In mid-2015, I identified key contacts from each organisation and sent them an introductory email that provided project information and sought their interest and in-principle agreement to participate. This procedure is required by the ANU in order to submit a Human Research Ethics Approval Application. This initial contact was backed up with the offer to meet face to face, or to have a telephone conversation, to answer questions and discuss the request in more detail. A sample of the introductory email from the researcher is at Appendix 2. A letter of introduction was requested by the prospective participant at the NSW Office of Emergency Management from the Chair of the supervisory panel for the thesis at the Australian National University. The letter from Associate Professor Eburn can be read in Appendix 3. Following this, a Human Research Ethics Approval Application was submitted which was approved on 25 September 2015 (Appendix 5). The case study organisations were then informed that work could formally proceed, and more detailed information was provided about the process for the data collection including the interviews. Each of the organisations was asked to provide relevant internal and external documents at this point so that they could be studied prior to the scheduled interviews.

Ongoing liaison occurred with the case study organisations from the end of 2015 until the commencement of interviews in April 2016, during which time interview questions were agreed with the participants, refined and dates for the interviews were confirmed. The interview questions are provided in Appendix 4. The schedule of interviews is provided below in Table 3.1.

Table 0-1 Interview Schedule

#	Program	Organisation	Level of governance	Location & dates	Number of people interviewed
1	National Flood Risk Information Program	Geoscience Australia	Federal Government	Canberra, ACT, 2 May 2016	1
2	National Partnership Agreement on Natural Disaster Resilience 2013-15	NSW Ministry of Justice (formerly Ministry of Police and Emergency Management)	State Government	Sydney, NSW, 28 April 2016, 6 May 2016, Kincumber, NSW, 6 May 2016, Telephone, Canberra 3 September 2016	3
3	Planning for future flood risks	Lake Macquarie City Council	Local Government	Boolaroo, Charlestown, Blacksmiths, Shire of Lake Macquarie, NSW 3-4 May 2016	3
4	Australian Business Roundtable on Disaster Resilience and Safer Communities	Insurance Australia Group	Private Sector - business	Sydney CBD 21 April 2016	2
5	Rivers and Ranges Community Leadership Program	Rivers and Ranges Community Leadership Program	Not-For-Profit	Yarra Ranges, Victoria 15-16 April 2016	7

1.16.3   Data collection: document study and interviews

Documents requested from the participating organisations included predominantly unpublished information relating to all or any of the following: governance, reporting arrangements, funding policy (including amount of funding, how it is distributed, form of contractual agreement, performance indicators), strategic plan, data and data collection systems, communication, coordination strategies, stakeholder engagement activities planned and/or undertaken, technical/scientific detail.

Interviews were conducted face-to-face and were semi-structured to encourage participants to speak freely and to draw out contextual information. The conversations were recorded and later transcribed. They were then provided to the respective participants in accordance with the procedures agreed with them and that were documented and approved in the Human Research Ethics application 2015/554 at Appendix 5.

To minimise the time participants needed to devote to liaison, interview preparation, and the actual interview, each organisation was asked to nominate no more than four key informants. Even so, one organisation, the Rivers and Ranges Community Leadership Program nominated seven people for interview. I was not made aware of these extra numbers until the day I

commenced the field work. Because the prospective interviewees had already made arrangements to donate their time and because each of the seven was very interested in participating, I decided that I would include them all in the interview schedule.

The interview questions (Appendix 4) were provided to the organisation and the interview participants no longer than one week prior to the arranged dates of the interviews. This had been previously prepared and negotiated as part of the earlier ethics approval, case study development and liaison. Given the interviews were conducted with staff with expert knowledge of the project, the questions were relatively detailed. They consisted of a set of questions. The set included a core question and a number of supplementary questions that were intended to be used if deemed appropriate to the conversation and if time permitted. The core questions are provided below and, as mentioned the full set of questions is at Appendix 4.

The National Flood Risk Information Project core question:

How does/will the National Flood Risk Information Project disseminate and embed knowledge and skills for mitigating flood risk across all levels of the community?

These NFRIP interview questions were primarily designed to produce responses linked to the domains of information and communication. The domains of social capital and community competence were also explored by asking about how information is shared. With regard to the project's complex group of stakeholders, the interview participants were also asked about how stakeholders are engaged and networks created. This served to highlight the role of trust between stakeholders, including those working at various levels of government.

The NSW Community Resilience Innovation Program core question:

How is the federal National Partnership Agreement on Natural Disaster Resilience (NPA-NDR) being implemented in a state government jurisdiction, (in this case, NSW) and how do federal financial arrangements (including intergovernmental agreements) support or hinder this process?

This question and the supplementary interview questions were designed to produce responses to highlight federal issues through the mechanism of National Partnership Agreements, which are included under the Federal Financial Arrangements (Council on Federal Financial Relations, 2019). Trust in and within government, the ability to create effective networks and community engagement were mentioned in the questions in order to relate them to social capital.

The Lake Macquarie City Council core question:

Local government is the interface between government and the community. How does it manage the challenges it faces (for example, authority and resourcing) to capitalise on its local strategic advantage for building disaster resilience and adapting to climate change in local populations?

This question and the supplementary interview questions relate to the role of local government in the federal system, the economic development domain through the policy objective

of economic diversity, and to community competence through the policy objectives of external leadership, community participation and stakeholder engagement.

The core question put to the Australian Business Roundtable for Disaster Resilience and Community Safety (ABRDR):

> How are the partnerships and networks that make up the ABRDR supported and maintained? Given that a major objective of the ABRDR is to partner with and influence government, how is it building a relationship with government? Is it effective and how do you know?

The ABRDR membership predominantly reflects business interests so it links with the economic development domain (particularly the policy objective of risk allocation). It is also connected to community competence via the policy objectives of political partnerships, external leadership, and stakeholder engagement.

The Rivers and Ranges Community Leadership Program core question:

> How is disaster resilience policy being implemented at the local level by a not-for-profit organisation?

This and the supplementary interview questions were largely developed to link to the domains of social capital and community competence and their corresponding policy objectives.

Each of the interviewees was allocated a unique identifier, consisting of letters and numbers. These were are used to reference interview responses. All of the interviews were transcribed and, as agreed in early negotiations and documented in the ethics application, each interviewee was provided with a draft transcript of their interview. No revisions were requested. Some early analysis was done using key term and/or key word search in conjunction with the Provisional framework. This practice was discontinued because it did not highlight the nuanced content of the conversations or add value in terms of generating new information. Instead the analysis was done by repeated reading of the transcripts with regard to the elements of the Provisional framework to promote deep learning and interpretation of the concepts and ideas (Ritchie and Lewis, 2003; Srivastava and Thomson, 2009:75-76)

1.16.4   Case studies

Box 3-1 Case Study #1 The National Flood Risk Information Project (Federal Government)   The National Flood Risk Information Project (NFRIP) was a major National Strategy for Disaster Resilience (NSDR) project. It arose from the recommendations of the National Disaster Insurance Review conducted following major flooding in Queensland during 2010 –11 (Commonwealth of Australia, 2011a) and aimed to improve the quality of existing flood information and enhance flood models and flood modelling techniques. Whole-of-government approval for the project was given by the then, Standing Council on Police and Emergency Management who agreed that a nationally consistent approach was needed for flood

modelling (Standing Council on Policy and Emergency Management, 2011, Communique). The NFRIP was one of the few NSDR initiatives that received dedicated government funding: $12.9 million over four years from 2012–2016. The Federal Attorney-General's Department (AGD) provided policy oversight of the NFRIP as part of its broader responsibility for emergency management policy, including national flood risk information policy. The National Guidelines for the National Flood Risk Information Program were developed in 2012 by AGD in conjunction with state and territory government to underscore a commitment by all levels of government to cooperate to share flood information (Commonwealth of Australia, 2012b).

The NFRIP consisted of three components, each of which relied on being able to legally access and use open data. These were: Water Observations from Space (WofS): Australian and US archival satellite (LANDSAT) data from 1987 to the present was analysed to produce the first continental scale map showing where flood waters have encroached in the past; the Review of the Rainfall and Runoff Guidelines (RRG), the definitive manual for flood scientists. The RRG were first developed in 1958, revised in 1977 and 1987, and last republished in 1998 (Hazelwood, 2016b). These early versions largely relied on NSW and US data modified for Australian purposes. The latest RRG, which was conducted by Engineers' Australia, consists of a database of 100,000 Australian storm events and a number of other valuable technological improvements; and thirdly, the Australian Flood Risk Information Portal is an on-line portal with information and resources which aims to facilitate national sharing and access to accurate and reliable flood maps and flood risk information. It was intended that the portal would include access to several thousand existing flood studies and facilitate access to all future flood studies.

While flood studies are often produced with public funds, ownership and custodianship of flood maps is very diverse and can include state governments, state government flood plain management authorities, local governments, the insurance industry, and flood consultants. Many states have their own flood study data bases but do not provide public access.

Water Observations from Space (WofS) and the Review of the Rainfall and Runoff Guidelines (RRG) were successfully implemented without significant obstacles. The Australian Flood Risk Information Portal (the portal) encountered problems associated with impediments to the free flow of information. It was discovered that the problem was not one of a lack of infrastructure or project capacity, but was due to unwillingness among some data custodians to provide the information. This reluctance was for two major reasons: a perception amongst the holders of the information that they may face litigation if information that cannot be guaranteed to be 100% accurate is published; and confused or restrictive copyright arrangements that prevented legal sharing and re-use of flood information. With approximately $150 million of publicly funded flood hazard information prevented from being used due to copyright restrictions, this represented a significant loss of opportunity to strengthen flood disaster resilience as well as a potential waste of public investment. To address the first hurdle, Geoscience Australia, as part of the NFRIP communication strategy ran workshops and forums to provide stakeholders with

accurate information about the chance of litigation in respect of measures to mitigate flood risk. The research evidence suggests that this is far lower than commonly believed (Eburn, 2008).

Geoscience Australia proposed a National Accord for the Procurement of Hazard Information to establish a nationally coordinated approach to encourage reforms to procurement practices and to remove ambiguity around copyright ownership of hazard risk information. This was included in its submission to the Productivity Commission Inquiry on Data Availability and Use (Geoscience Australia, 2016). These principles may be taken forward in new legislation that is being developed by the Office of the National Data Commissioner that was established the 2019 as part of the government's response to the inquiry (Australian Government, 2019b). In the meantime, Geoscience Australia, as part of its core business to protect public safety, is continuing to advocate for owners to change the default copyright of all flood maps and flood risk assessment and management plans to allow open access. This includes countering the concerns of copyright holders about the potential for loss of commercial returns by demonstrating that information in the public domain will result in lower overheads that can be passed on to the client. Stakeholders were also able to be shown that when flood information is re-used and models are applied repeatedly for various locations and requirements, the original model and material improves in quality and versatility. The NFRIP demonstrated how careful implementation is overcoming barriers that may prevent the community learning about, and taking appropriate action to mitigate its flood risk. This will foreseeably provide substantial gains in disaster resilience at relatively little cost

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Box 3-2 Case study #2 National Partnership Agreement – NSW Natural Disaster Resilience Program (NPA-NDR)

This case study has a dual focus: it explores the characteristics of National Partnership Agreements, that provide a key federal funding mechanism for the National Strategy for Disaster Resilience; and it considers the implementation of the Community Resilience Innovation Program (CRIP). The CRIP is a NSW government managed program funded under the National Partnership Agreement – Natural Disaster Resilience Program (NPA-NDR). Up until the expiry of the previous Natural Disaster Resilience Agreement in June 2018, the NPA-NDR was the only dedicated federal source of national funding for disaster mitigation activities. It provided approximately $26 million annually divided between each state and territory on a per capita basis (Commonwealth of Australia, 2017-18). The NPA-NDR required that funds be matched 1:1 by the states and territories. Funding has typically been disbursed to emergency service organisations and local government with local governments required to provide one-third the amount of funding received from their state or territory government. More information about the federal National Partnership Agreement – Natural Disaster Resilience as it formed part of the Australian disaster management arrangements is provided at Appendix 1.

In 2017-18 the federal government contributed $6.8 million to the NSW government that matched it with another $6.8 million. The NPA-NDRP has traditionally taken a top-down approach. It is given its authority under the Federal Financial Arrangements. NPA's were created as part of the reforms to the Federal Financial Arrangements during the last decade. They are appropriated through the Federal Parliament and are intended to provide flexibility for each state to determine its priorities for allocation of the funds, albeit in accordance with high level national strategic outcomes. The federal government requires each state and territory to must submit an implementation plan covering the period of the NPA and each jurisdiction must also report to the federal government against key performance indicators that are linked to National Strategy for Disaster Resilience principles.

An NPA to fund disaster mitigation activities was first established in 2003 following the COAG review of mitigation. It was later rebadged in 2009 following the adoption of the National Disaster Resilience Statement and Framework, the National Strategy for Disaster Resilience's predecessor. Apart from the addition of a requirement to abide by amendments to the national building code and to directly reflect the priority action areas for the NSDR, the NPA's broad intent, funding policy and level of funding has remained relatively unchanged until its recent suspension by the federal government. The NPA-NDR term expired in June 2018 and it is no longer publicly available on the Federal Financial Relations website. A new NPA to replace this agreement had not been adopted as at June 2019.

With the exception of the NSW CRIP the other NPA-DRP programs are legacy programs that have formed part of the federal disaster management funding apparatus for several decades. These are: the Bushfire Risk Management Grants Scheme, managed by the NSW Rural Fire Service; the Floodplain Grants Scheme, managed by the NSW Department of Environment and Heritage, and the Emergency Volunteer Support Scheme that, along with the CRIP, is managed by the NSW Office of Emergency Management (OEM) (NSW Government Department of Justice and Office of Emergency Management, 2019). The NSW OEM, through its grants team, also administers the NPA funding relationship with the federal government for both the NPA-NDR, and more recently the 'Prepared Communities' National Partnership Agreement (formerly the National Emergency Management Program) known in NSW as the State Emergency Management Projects (Commonwealth of Australia, 2019b; NSW Government Department of Justice and Office of Emergency Management, 2019a). The CRIP was established by NSW in accordance with NSDR principles. It differs from other NPA-NDR programs because it does not fund physical disaster mitigation measures but aims to build social capital to promote community resilience. To do this it relies on building networks and connections, creating trust and using community engagement as a key tool (NSW Government Department of Justice and Office of Emergency Management, 2019c). No other jurisdiction has adopted a similar program as part of its NPA-NDR program mix. This case study provides lessons about the implementation of a novel

disaster resilience program with a focus on social resilience and in terms of its delivery via a long-standing top-down federal funding mechanism.

Box 3-3 Case study #3 Lake Macquarie City Council - Marks Point and Belmont South Local Adaptation Plan for Flooding including due to Sea Level Rise (LAP)

'I think it was successful in that we have gone from conflict to collaboration as we say..' (Interview, LMCG50, 3 May 2016)

Lake Macquarie is a large saltwater tidal lagoon in the northern part of the Central Coast of NSW, adjoining Local Government Areas of Newcastle in the North and Wyong in the South. The NSW government requires councils to take sea level rise into account as part of their planning for flooding risks (Lake Macquarie City Council, 2019). This was done in accordance with the previous NSW State Government legislation on Sea Level Rise Benchmarks. In 2008, Lake Macquarie City Council (LMCC) conducted flood mapping that included predictions of sea level rise (SLR) due to climate change (Lake Macquarie City Council, 2008). The NSW Government sea level rise benchmarks were later rescinded by the NSW Government, leaving these decisions to be made at the local level informed by 'projections that are widely accepted by competent scientific opinion' (Lake Macquarie City Council, 2019).

Many residents living around the shores of Lake Macquarie purchased their land many years previously, planning to fund their retirement by subdividing and selling part of their property. This contributed to community anger directed at LMCC that was triggered when it adopted the Lake Macquarie Flood Plan in 2012 (Lake Macquarie City Council, 2012). The community's strong reaction centred around fears of falling land values and rises in property insurance premiums (Giles *et al.*, 2016). The LMCC decided that, instead of one plan, a number of plans with highly localised information were needed to support the community to manage and adapt to the hazards that had been outlined in the Lake Macquarie Flood Plan. This this end, LMCC commenced local consultations in April 2013 on the development of the first Local Adaptation Plan (LAP) that was to focus on the Marks Point and Belmont South areas of Lake Macquarie. The consultations had limited success in gaining community support for action on flooding due to sea level rise. Residents' objections were largely based on their scepticism about climate change as a cause of sea level rise and their lack of trust in the predictions of the height of future sea levels.

LMCC has made a public commitment to community engagement as a core activity in every facet of its operations (Lake Macquarie City Council, 2016b; Lake Macquarie City Council, 2017-18). Subsequently, it renewed its efforts to obtain the participation and collaboration of the community in the development and implementation of the LAP. A number of people who had attended the consultations, were invited by LMCC to form a community working group in May 2014. Initially this group numbered 30 people which proved too large to be efficient. Some

continued to express misgivings about the lack of predictive accuracy of the estimates for sea level rise. A major concern was that LMCC might contemplate adopting a policy of 'retreat' that would cause some residents to be forced to abandon their homes, or at the very least to impose hazard restrictions on their land. This issue emerged as major sources of resistance by the community. Subsequently, a sub-committee of 11 people was formed at the suggestion of community members (Lake Macquarie City Council, 2016b pp.12-13). The smaller group included people with skills in research who were also willing to contribute a lot of time to analyse the information independently and bring it back to discussions with LMCC. A second round of consultations during November 2013 gradually shifted the focus of the discussion: These changed from a debate between the LMCC and the community about the accuracy and reliability of climate change science, to a more instrumental approach that focused on adaptation to flooding (regardless of the cause). Eventually, the community working group came to an arrangement with the LMCC about a process to develop the LAP. This would allow the community working group to first develop criteria to evaluate the adaptation options that had been generated in previous consultations and workshops. 'show-stoppers' that would eliminate certain adaptation options automatically were agreed upon. In particular, retreat was rejected as an option, followed by those of lesser impact, including loss of lifestyle. Agreement was also negotiated between the Community Working Group and the LMCC that the sea level rise predictions would be replaced with actual sea level rise measures over time, as this information became available. This would be accompanied by time frames for adaptation measures to be implemented that could be adjusted back in accordance with actual data (Lake Macquarie City Council, 2016b, 2016c, 2017a

).

The adoption of agreed trigger points and thresholds for action meant that adaptation measures would be planned but did not have to be implemented until a critical threshold was reached. The LAP 'Planning for future flood risks' was published as a 10 year plan with provision for annual reporting and review as part of the LMCC's routine procedures. The LAP would also be reviewed as required, including in response to community or council concerns or should significant changes occur in the broader policy, legislative, or scientific context. The LAP for Mark's Point and Belmont South was adopted by Council after a period of public display and consultation in 2016 and is currently being implemented. It has provided a template for negotiations that have commenced for the development of other LAPs in the Lake Macquarie Shire. LMCC received a National Climate Change Adaptation Research Foundation (NCCARF) Climate Change Adaptation Champion Award in 2011 and 2017 (National Climate Change Adaptation Research Facility, 2019b). Furthermore, LMCC's work to develop climate change, flood risk and sea level rise programs is highlighted on the NCCARF Local Government Portal as an exemplar of good practice with 'cost' and 'leadership' nominated as two of its critical success factors (National Climate Change Adaptation Research Facility, 2019a)

Box 3-4 Case study #4 - Australian Business Roundtable for Disaster Resilience and Safer Communities

The Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) was established in 2012 by Insurance Australia Group (IAG), a multinational insurance corporation operating across Australia, New Zealand, Thailand, Vietnam and Indonesia. In Australia, IAG is the parent company to several insurance companies, including NRMA Insurance and Suncorp insurance. IAG provides the ABRDR with secretariat support and dedicated staffing. The ABRDR is primarily concerned about the increasing cost of disaster recovery and reconstruction. Its stated goals are to work collaboratively with government to effect change in public policy and increase investment aimed at building safer and more resilient communities, and to actively improve the capacity of people and businesses to better withstand future natural disasters (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019). The ABRDR activities centre around advocacy to government to commit more funding to disaster mitigation and to reform and promote other policies to support disaster resilience. Membership of the ABRDR is high level and consists mainly of Chief Executive Officers from key areas of the business sector: insurance (IAG), reinsurance (Munich Re), building and construction (Investa Ltd), telecommunications (Optus), and banking (Westpac). The humanitarian and social welfare sector is also represented by the Australian Red Cross (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019).

The ABRDR meets face-to-face, twice per year on average, and it has a working group with delegates from each of its organisations who meet more regularly to progress the ABRDR agenda, including within their own organisations and networks. IAG provides secretariat funding support and the member organisations provide funding to share the costs of ABRDR's activities.

The ABRDR has commissioned a number of reports that focus on providing evidence to advocate for government policy change. The ABRDR's first report in 2013 calculated the current and future economic costs of disasters in Australia and demonstrated the significantly greater benefits of investment in mitigation over spending in relief and recovery (Deloitte Access Economics, 2013). This report was the basis for a submission that the ABRDR made to the Australian Productivity Commission Inquiry on Natural Disaster Funding (Productivity Commission, 2014) Other ABRDR reports recommend: centralised national platforms to facilitate open access to data relevant to disasters to support resilience policy development and implementation, research and to prioritise investment in accordance with risk (Deloitte Access Economics, 2014); the routine inclusion of disaster mitigation elements into infrastructure planning and development supported by cost-benefit analyses (Deloitte Access Economics, 2016a); and factoring in the economic costs of the social impacts of disasters to disaster policy (Deloitte Access Economics, 2016b). The ABRDR's most recent report, focuses on resilience in

states and territories in recognition of their key role in areas not directly managed by the federal government. For example, infrastructure funding and development, land use planning and building controls, emergency management, data collection and provision and various community programs (Deloitte Access Economics, 2017:50). As well as its reports, the ABRDR hosts a website that includes its reports and multi-media facts and statistics about the incidence and costs of natural disasters. These appear to be targeted toward the whole community compared with its earlier materials, but similarly highlight the disparity in spending that favours disaster relief and recovery over mitigation. The ABRDR, in a first for a private sector organisation, received the certificate of distinction in the UN Sasakawa Awards for Risk Reduction at the International Conference on Disaster Risk Reduction in Sendai, Japan in March 2015 (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2015). ABRDR has indicated a willingness to share expertise with, and provide advice to government, primarily in the field of disaster risk management. The aim would be to develop an evidence base and strategies to target and incentivise investment in disaster risk mitigation, primarily via strengthening major publicly owned infrastructure. While there is no formal mechanism for ABRDR to provide advice to government, it has met with government on a number of occasions, including to present its first report to the federal government at an event organised by IAG at Australian Parliament House. It also presented *The Economic cost of the social impacts of disasters* (Deloitte Access Economics, 2016b) to a meeting of the Law, Crime and Community Safety Council (LCCSC) in April 2016. The LCCSC was, at that time, a committee of the Council of Australian Governments. Its membership included Federal and State government ministers with responsibility for policing and emergency management and a representative from local government. Government did not issue a formal response to the ABRDR reports.

Box 3-5 Case study #5 Rivers and Ranges Community Leadership Program (RRCLP)

The Rivers and Ranges Community Leadership Program (RRCLP) is a not-for-profit organisation that was established in 2014 with philanthropic donations, following the 2009 Black Saturday Victorian bushfires. Its area of influence is loosely linked to the local government boundaries of Mitchell, Murrindindi, Nillumbik, Whittlesea and the Yarra Ranges (Rivers and Ranges Community Leadership Program, 2019). The RRCLP was founded when residents in fire-impacted communities indicated that communities would have had greater capacity to drive ongoing community recovery and resilience-building activities if their leaders had had access to peer networks and support. 'The RRCLP objectives include Build a base of confident, skilled and committee community leaders

- Provide a network of community leaders across the region

- Support and encourage both existing and emerging leaders

- Develop leaders to enable and drive change in the region' (Rivers and Ranges Community Leadership Program, 2019).

The RRCLP conducts an open selection process every year to choose 15 to 24 program participants who make a commitment to serve their community. They undertake a minimum of 23 program days within a ten-month training program or learning experience. The program emphasises personal development with the expectation that each person will become a community leader who will be a key resource to assist their communities to prepare, plan, respond and recover from crises (Rivers and Ranges Community Leadership Program, 2019), Rivers and Ranges Community Leadership Program, 2014). One of the RRCLP's organisational priorities is the implementation of its stakeholder engagement strategy through which it seeks to establish, maintain and grow its network of supporters and sponsors. These are drawn from every sector of the community and include, but are not limited to, other locally based not-for-profit organisations, small business and larger corporations, local government, state and federal government agencies and departments, and state and federal politicians (Rivers and Ranges Community Leadership Program, 2015).

The process to establish the RRCLP was assisted by other community organisations in neighbouring areas. In 2011 Community Leadership Loddon Murray Inc. teamed with the Foundation for Rural and Regional Renewal to conduct a Community Leadership Feasibility Study across the 2009 Victorian Bushfire-affected communities. The findings supported the notion that resilience to future crises could be created by establishing and strengthening community leadership networks. This idea was taken up by the Mitchell Community Resource and Advocacy Group (MCRAG) that proposed to establish the RRCLP (Mitchell Community Resource and Advocacy Group, 2015; Rivers and Ranges Community Leadership Program, 2019). From this, a workshop of community leaders was held which facilitated the formation of a steering committee to progress the proposal, which included the development of a business plan (Rivers and Ranges Community Leadership Program, 2014). The formation of an advisory group followed in late 2012, which garnered stakeholder support through a number of community roadshows held in 2013. In April 2014 a Program Manager was appointed. Later that year in order to allow RRCLP to apply for funding, it was agreed that Community Leadership Loddon Murray Inc would auspice RRCLP, which then became an unincorporated organisation. This required the appointment soon after of a RRCLP interim board, and the inaugural Rivers and Ranges Leadership Program was established in June 2014 (Rivers and Ranges Community Leadership Program, 2019). When the existing auspice agreement expired at the end of 2015, a new arrangement was negotiated with the Mitchell Community Resource Advocacy Group, noting plans for the RRCLP to become incorporated by the end of 2018 (Mitchell Community Resource and Advocacy Group, 2015). The RRCLP became a member of the Victorian Regional Community Leadership Program (VCLP) in 2014. The VRCLP, established in 2011, receives funding from Regional Development Victoria, and functions as an umbrella organisation that

provides strategic support and four-year funding grants to a network of locally-based leadership organisations (Victorian Regional Community Leadership Programs, 2011). The RRCLP, which now receives VRCLP funding, is unique in a number of ways: it is the only Victorian leadership program to be set up entirely with philanthropic donations and to exist independently of the VRCLP; it is the only leadership program with a specific focus on disaster resilience; and it is the only project within this broader state government network that includes a metropolitan council as well as regional councils. The RRCLP is continuing to expand and mature and it achieved its goal of becoming an incorporated body in March 2017. This, and the acquisition of a more sustainable level of funding, allowed the Program Manager to be promoted in 2018 to the role of Executive Officer (Rivers and Ranges Community Leadership Program, 2019), followed by the appointment of an Administration Officer and the contracting of a Program Manager {Rivers and Ranges Community Leadership Program, 2018).

1.17 A method to determine the influence of federalism

The Norris model provides a solid foundation for the development of the Provisional framework. This, and its application to the case studies is central to the thesis methodology. However, a gap in the methodology remains around how to answer the third part of the research question, which involves determining how the characteristics of the Australian federal system impact on disaster resilience policy implementation. This presents a challenge. Information on Australian federal policy mechanisms is ubiquitous but values-based principles for federalism that could be considered equivalent to the policy objectives for social capital, community competence, economic development, and information and communication are not common in the academic or grey literature.

The absence of clear federal policy objectives limited the ability to conduct a separate and specific analysis of the impact of federalism. As flagged in the discussion at the end of Chapter 2 (Section 2.5), the review of the concept of subsidiarity in Section 2.3.3, did, however, identify factors that could serve as pathways between federalism and disaster resilience policy implementation. It was decided that these would be suitable to use as policy objectives. Subsequently, subsidiarity theory is applied to the conceptualisation of good practice in disaster resilience policy implementation in Chapters 4, 5, 6 and 7. Therefore, I have proposed subsidiarity be the fifth policy domain for disaster resilience policy implementation and that it should be incorporated into the final version of the Provisional framework, that is the Disaster Resilience Policy Implementation (DRPI) Framework.

The federal policy settings and mechanisms outlined in Section 2.4 included the Australian Constitution, intergovernmental agreements, intergovernmental coordination arrangements, federal financial arrangements and whole-of-government approaches especially, national strategic policy. These are discussed in terms of issues they raise that are relevant to the disaster

management system as a whole. This forms part of the methodology because it provides the analysis of the impact of the federal system on disaster resilience policy implementation as per the third element of the research question.

'Power-sharing' was initially identified as an overarching principle for Australian federalism. However, while this is a term that is applicable at all scales of the system, its political overtones do not adequately communicate anything of the democratic ideals that might underpin the spirit of Australian federalism as a pathway for the successful implementation of disaster resilience policy. Instead, and because subsidiarity encapsulates a way of implementing policy that is conducive to disaster resilience outcomes, 'shared responsibility' is proposed as the unifying theme for an evolved version of the Provisional framework as depicted in Figure 3.5 below.

Provisional Disaster Resilience Policy Implementation Framework				
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change	Power-sharing
Policy Objectives	1. Networks	1.Political partnerships	1. Security	1.Resilience narratives	1.Capacity-building
	2.Place-based attachment	2. Stakeholder engagement	2.Economic diversity	2.Trusted information	2. Open access to information
	3.Community engagement	3.External Leadership	3.Equitable resource distribution	3.Skills and infrastructure	3.Negotiated roles and responsibilities
	4.Internal leadership	4.Local disaster risk awareness	4.Shared (equitable) risk allocation	4.Multi-directional information flow	4. Coordination
		5.Community participation			5. Stakeholder engagement

Figure 0-5 Provisional Disaster Resilience Policy Implementation Framework

Figure 3.5 includes the additional draft policy domain of subsidiarity with the associated policy objectives of capacity building, open access to information, negotiated roles and responsibilities, coordination, and stakeholder engagement. It should be noted that the process of negotiating and agreeing roles and responsibilities for disaster resilience would require some functions to be devolved. The point was made in Chapter 2 that for devolution to be consistent with the authentic application of subsidiarity, authority must be devolved along with the corresponding function.

1.18 Conclusion

Two propositions emerged from the development of the thesis methodology.

To effectively build national disaster resilience:

1. Policy implementation must operationalise policy objectives that align with the four policy domains of social capital, community competence, economic development, and information and communication.

2. Implementation of disaster resilience policy in the context of Australia's federal system of governance should be guided by the principle of subsidiarity and its policy objectives.

These propositions are tested in Chapters 4–7 by the application of the Provisional framework and the description and discussion of the results. This highlighted its strengths and weaknesses, including some instances where the findings varied from the existing research. It was also found that the boundaries between the different elements of the Provisional framework are permeable. This is reflective of the systems-based theory on which the Provisional framework rests and serves to highlight the importance of coordination, and the opportunity it brings to maximize effectiveness through the creation of synergies within this system.

Chapter 4: SOCIAL CAPITAL

1.19 Introduction

Provisional Disaster Resilience Policy Implementation Framework					
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change	Power-sharing
Policy Objectives	1.Networks	1.Political partnerships	1. Security	1.Resilience narratives	1.Capacity-building
	2.Place-based attachment	2.Stakeholder engagement	2.Economic diversity	2.Trusted information	2.Open access to information
	3.Community engagement	3.External Leadership	3.Equitable resource distribution	3.Skillsand infrastructure	3.Negotiated roles and responsibilities
	4.Internal leadership	4. Local disaster risk awareness	4.Shared (equitable) risk allocation	4.Multi-directional information flow	4.Coordination
		5.Community participation			5. Stakeholder engagement

Figure 0-1 Provisional Disaster Resilience Policy Implementation Framework

The shaded area in the Provisional framework (Figure 4.1) indicates the social capital policy domain and policy objectives that are the subject of this chapter.

Chapter 4 reviews the literature on social capital to explain its importance to disaster resilience and to validate the elements of the Provisional framework that relate to social capital. The Provisional framework is then applied through a social capital lens to the five case studies

introduced in Chapter 3. This allows inferences to be made about the characteristics of successful, or less successful, approaches to disaster resilience policy implementation.

Much of this chapter and Chapters 5, 6 and 7 are devoted to the explanation of the policy domains and policy objectives and their theoretical backgrounds. These discussions aim to bring together information from different fields of study. As a result, the reader is presented with what may seem to be a bewildering array of concepts and terms, many of which have similar or overlapping meaning. One of my aims is to condense and clarify concepts and terms associated with the Provisional framework. This will make it more robust and strengthen the logic for assessing the case studies. social capital and community competence are the two policy domains that are the most closely linked. This is acknowledged by Norris *et al*. 'Community competence which we view as the networked equivalent of human agency'. 'It might be said that social capital and communication are prerequisites for community competence '(Norris *et al*., 2008:141). In Section 4.4, the federal policy issues (federalism, subsidiarity, and policy mechanisms) that impact in the case studies are discussed from the perspective of building social capital for disaster resilience. Chapters 5, 6, and 7 do the same in terms of community competence, economic development, and information and communication.

1.20 Theoretical background

The Norris model (Norris *et al*., 2008) provided the basis for the inclusion of social capital as a policy domain within the Provisional framework. This section describes the origin of the concept of social capital and the increase in academic and policy interest in the subject late last century. Of particular relevance is the appearance of social capital in research in the areas of social ecology, climate change adaptation and disaster resilience. This work reinforces the linkages between social capital and the four social capital policy objectives in the Provisional framework: networks, community engagement, place-based attachment and internal leadership. This enhances the validity of the Provisional framework and assists in the interpretation of the case study data in Section 4.3.

There are multiple definitions of social capital. While these vary in terms of their exact wording and level of detail, they share certain commonalities, including references to networks, social structures and relationships. 'At its core, social capital theory provides an explanation for how individuals use their relationships to other actors in societies for their own and for the collective good.' (Adger, 2003:389). One that summarises its main qualities was developed by Woolcock: 'The information, trust and norms of reciprocity inherent in one's social networks' (Woolcock, 1998:153).

According to Coleman social capital is:

..a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors –whether persons or corporate actors - within the structure. Like other forms of capital, social capital is productive, making

possible the achievement of certain ends that would not be attainable in its absence. (Coleman, 1988:S98)

The earliest description of social capital appeared in 1916 when the term was used and defined as, 'good will, fellowship, mutual sympathy and social intercourse among a group of individuals and families who make up a social unit' (Hanifan, 1916:130). This was an account by teachers in a rural community school in West Virginia, US, who embarked on a program of community engagement to bring geographically isolated citizens together. The study recounted how shared social, educational and sporting activities strengthened business links that ultimately brought economic benefits and improved general well-being to the area. A local community centre provided the focus for much of the activity that started with a community survey and meetings to gather information about the residents and their needs and concerns. While it was initiated by teachers, pupils managed the early program and families and residents later actively managed activities and determined priorities. For example, a community meeting identified the poor state of local roads and initiated fundraising to improve them (Hanifan, 1916:138). This provides an example of the how social capital was created by a predominantly bottom-up implementation style (See Chapter 2).

According to classical economics, the terms 'capital' applies to a means of production in the economy. Apart from the early sociological example from 1916, the idea of social capital was conceived within the field of economics where it offered a social element to the understanding of different forms of capital: 'The technical view of classic capital from which other commonly cited forms of capital developed, involves both social relationships and an investment process producing a return in the market place' (Lin *et al*., 2001, cited in Australian Bureau of Statistics, 2004:5).

Networks are a city's irreplaceable social capital. Whenever the capital is lost, from whatever cause, the income from it disappears, never to return until and unless new capital is slowly and chancily accumulated (Woolcock, 1998:192).

The term 'social capital' was proposed as a form of human capital, when it was mentioned in a 1977 labour market study that cited a lack of social connections and access to information as barriers to employment opportunities for minority groups (Loury, 1977:176). Around the same time, 'the first systematic contemporary analysis of social capital' was attributed to Bourdieu (Portes, 1998:3) who defined three different types of capital including economic, cultural and social (Bourdieu, 1985, cited in Anheier et al., 1995:862-863). Two schools of thought can be identified, one which argues that social capital is a quality of individuals and one that is solely associated with collective action. The collective action position is exemplified in Bourdieu's work. Bourdieu argued that social capital consists of the amount and quality of resources held by a group and the social relationship that provides access to them. This access is confined to a limited elite group and is associated with ensuring the continuing status of this group (Bourdieu, 1985, cited in Portes, 1998:3-4).

Coleman challenged the idea that there are differences between economic and sociological understandings of social capital, claiming that both could coexist as outcomes within social capital theory. He identified three forms of social capital including obligations and expectations, information flow and capability, and norms accompanied by measures or sanctions that encourage compliance with a behaviour (Coleman, 1988:S119). The view that all forms of social capital are public goods is relevant for its uptake into public policy, discussed further in Section 4.2.3. Coleman claimed that this characteristic distinguished social capital from other forms of capital (1988). Economic and non-economic applications of social capital were described by Adger, as was the relationship between individual and collective social capital (Adger, 2003). From a non-economic perspective, Adger saw social capital as relevant to general human well-being; in economic terms, he explained it as a commodity with relevance to the operation of markets, the sharing of information and financial risk and 'claims for reciprocity in times of crisis' (Adger, 2003:392).

Meanwhile, Putnam, a political scientist, brought the concept of social capital into the mainstream discourse (Aldrich and Meyer, 2015) and his perspective has been called the 'most far reaching part of the social capital hypothesis' (Arrow, 2000:4). Putnam argued that civic engagement and political participation through activities such as churchgoing, volunteering, union membership, voting in government elections etcetera, had declined in the United States in the previous quarter-century, and that this correlated closely with a decline in levels of social trust (Putnam, 1995). To support this view, Putnam pointed to findings from a social survey that measured a drop in the proportion of Americans who believed that 'most people can be trusted' from 58%, in 1960, to 37%, in 1993 (Putnam, 1995:6). Included among the explanations for this trend were increased social and geographical mobility, greater participation of women in the workforce, and the rise of technology as a source of leisure. Putnam held the view that public policy could influence the level of social capital either negatively or positively. For example, slum clearance policies and closures of small post offices and schools to achieve cost efficiencies may undermine local level networks and social capital. On the other hand, some policies can enhance social capital including tax incentives for charitable donations, provision of community colleges, and certain municipal regulations such as a requirement to erect front porches on homes (Putnam, 1995:8-9). Later, in '*Bowling Alone: The collapse and revival of American society*' Putnam (2000) expanded these ideas to assert that evidence for the erosion of social capital could be seen in a shift away from a focus on collective well-being to one of individualism. This, in turn, was resulting in social isolation and a deterioration in general social well-being. Lin took a different approach and proposed that the rise in opportunities offered by the Internet for social networking would strengthen social capital (Lin, 1999).

The identification of different types of social capital (Adger, 2003; Putnam, 1995; Putnam, 2000; Woolcock, 1998) has contributed to research at a number of levels. It has increased our general understanding of the settings in which different forms of social capital operate and their

relative strengths and weaknesses. Definitions of the three main forms of social capital are provided in the Productivity Commission's Research Report on Social Capital:

Bonding social capital refers to relations among relatively homogenous groups (such as an ethnic, religious or socioeconomic groups), and it strengthens the social ties within the particular group.

Bridging social capital refers to relations between heterogeneous groups, and it strengthens ties across such groups. Examples of bridging social capital include the civil rights movement and ecumenical religious organisations.

Linking social capital refers to relations between individuals and groups in different social strata in a hierarchy where power, social status and wealth are accessed by different groups (Productivity Commission, 2003:18).

Understanding that there are different forms of social capital can inform our thinking around suggestions for activities to enhance social capital for disaster resilience (Aldrich, 2010; Aldrich and Meyer, 2015). The significance of different forms of social capital to disaster resilience is discussed further in Section 4.2.1 and 4.2.2.

Theories of social capital are not without their critics and some go so far as to claim that the use of the term 'capital' in this context is incorrect (Arrow, 2000:4). This is based on the argument that it was scientifically unsound to borrow the term from economics and introduce it into social science when it cannot be explained by economic theory (Fine, 1999; Ruttan, 2001; Kadushin, 2004). According to Kadushin the term 'social structures' is more accurate' than social capital (Kadushin, 2004:4). Concerns about terminology aside, it is important to point out that the phenomenon of social capital has negative as well as positive connotations (Cox, 2000; Cox, 2007; Cox and Weir, 1995; Kadushin, 2004; Putnam, 1995; Putnam, 2000). A major disadvantage of social capital has been identified as solidarity (Bourdieu, 1985), particularly 'bounded' or excessively strong bonded forms of social capital, characterised as a lack of bridges to other groups or individuals (Portes, 1998; Woolcock, 1998). Strong group connections and identification are products of social capital. These can create social norms that exclude external influences and are highly resistant to change. This can manifest as zeal (Coleman, 1990, cited in Portes:8). which, in the extreme, can encourage risk-taking, violence and other forms of anti-social behaviour (Productivity Commission, 2003). Other critics say that social capital can stifle economic growth when certain groups, from positions of strength and solidarity, are able to dominate access to resources (Woolcock, 1998). An Australian study explored the idea of negative social capital and distinguished it from solidarity and the negative outcomes with which it had become associated (Cox, 2000). An approach that balances a combination of each of the different forms of social capital has more lately been favoured. This avoids the potential for negative effects resulting from overly strong bonding within certain groups and is more likely to create social cohesion (Australian Bureau of Statistics, 2004; Productivity Commission, 2003;

Burt, 2000). The challenges associated with measuring social capital may also be problematic. These mainly relate, not unlike some of the criticisms of resilience, to the tendency for the cause and effects to become conflated (Adger, 2000; Kulig *et al.*, 2013). Lin proposed a solution to this by focusing on two elements of social capital; resources and relations. Of these, she argued that embedded resources and social networks can be adequately measured. The former by quantifying the wealth, power and status of the people in the social network and the latter by assessing the relative distances between individual nodes and strategic locations in a network. A strategic location offers competitive advantage by providing access to additional benefits. For example, a bridge could be considered a strategic location because it may offer access to more or better information (Lin, 1999).

In Sections 4.2.1, I explain the theory that indirectly links social capital with disaster resilience through the concepts of networks, attachment to place, community engagement and internal leadership. In Section 4.2.2, I describe the direct linkages between social capital and disaster resilience. This serves to emphasise the strength of the case for the inclusion of these elements in the Provisional Framework.

1.20.1   Social capital: links to the policy objectives

As outlined in Chapter 3, Norris *et al* identified network structures and linkages, social support and community bonds, and roots and commitments, as three social capital capacities (Norris, 2008:137-140). These was subsumed within 'networks' to become the first policy objective in the Provisional framework. Community engagement, attachment to place and internal leadership, are the remaining three social capital policy objectives. The reasons for the selection of these four concepts as policy objectives were outlined in Chapter 3. Their theoretical relevance to the social capital policy domain, is discussed in the following sections.

Networks

While it is generally agreed that networks are integral to social capital, there has not been general agreement on the type of network that best supports social capital, including whether closed or open networks are preferable. Coleman (1998) compared closed and open social structures in terms of their ability to develop desirable behaviour in children. The closed networks were characterised by social structures with close links between each parent, with grandparents, and with other parents. It was found that the closed social networks supported ongoing monitoring to reinforce the desired behaviours and created social norms that discouraged unacceptable behaviour. Thus, the closed social networks enhanced social capital compared to those that remained open. The idea that there is a relationship between more dense networks and the creation of social capital is consistent with the discussion of social capital in the category 'Network structures and linkages' in Norris *et al*. (2008:138).

In contrast, others argue that networks of varying densities will each offer advantages in terms of different outcomes. For example, a closed network will work best to maintain and share

resources within that group or social structure, while an open network can provide access to a broader set of resources that can offer greater opportunities (Lin, 1999). Lin also introduced the idea of social capital as 'networks of relationships' (Lin *et al.*, 2001). This view takes account of the different types of social capital based on the nature of the networks that it produces. The different networks are defined in Section 4.2.1 as bonding, bridging or linking (Productivity Commission, 2003; Australian Bureau of Statistics, 2004). The Australian Bureau of Statistics (2004), drawing on the Productivity Commission's report (2003) nominated networks as the primary indicator that could be used to measure social capital.

Internal leadership

Leadership is where 'individuals or groups undertake initiatives that stimulate and facilitate the position of others', as well as when, 'individuals, on the basis of personal characteristics and experience or through tradition and/or position occupied, hold dominant positions within the group (Black and Hughes, 2001, cited in Australian Bureau of Statistics, 2004:82). Norris *et al*'s description of social capital cites effective leadership as a characteristic of disaster resilient communities owing to its role in generating a sense of social support and efficacy amongst community members (Norris *et al*., 2008). Kulig *et al*. (2013) built on this by demonstrating the connection between social capital and leadership in the Updated Community Resiliency Model and the Index of Perceived Resilience. Similar to the Provisional framework, the models depict factors that are determinants of resilience rather than depicting resilience itself. Leadership is placed within a category labelled 'interactions as a collective unit' which is grouped with two other resilience categories 'expression of a sense of community' and 'community action' (Kulig *et al.*, p.760-761). Eleven indicators of resilience were then cross checked against five resilience models (Norris *et al*., 2008, Maybery *et al*, 2009, Cutter et al., 2008a, 2008b, all cited in Kulig et al., 2013). The model draws connections between leadership and community competence (Norris *et al.,* 2008; Kulig *et al.*, 2013), two of the models that also relate leadership to social capital. These are: 'Leaders in my community listen to the residents;' and 'my community has strong community leadership' (Kulig *et al.*, 2013:766-767). While these studies do not directly distinguish internally- focused from externally-focused styles of leadership, distinctions can be made by comparing the various leadership functions that come into play to deliver resilience outcomes. For example, leadership that is characterised by responsiveness, that values and builds teamwork, creates clear organisational structures, lines of authority and defined roles and responsibilities (Pfefferbaum *et al.,* 2007:351) matches with an internal style. Leadership was identified by the Australian Bureau of Statistics as a key interpersonal skill along with teamwork and was included as a priority amongst the set of indicators it developed for social capital. One of these is mentoring, which is said to be a 'component of current social capital related policy' {Australian Bureau of Statistics, 2004:82}. Mentoring is an activity that aligns with an internal leadership style and the corresponding internal leadership policy objective in the Provisional framework.

Internal, external and hybrid forms of leadership were identified in a typology of project leadership, trust and social capital based on an investigation of the role of leadership in the performance of two project teams (Tansley and Newell, 2007). Initial commitment and trust of the team was built up by internal leadership using bonding social capital. Bridging social capital came into play through external leadership where ongoing management support for team activities was obtained. This reinforced the initial commitment and trust of team members. Hybrid leadership is where elements of both internal and external leadership approaches were evident (Tansley and Newell, 2007:361. Bonding forms of social capital with community leadership are aligned with internal leadership and have been shown to correlate with better disaster recovery outcomes in terms of community satisfaction and speed of rebuilding {Aldrich and Meyer, 2015:260). At least one social capital assessment tool (Krishna and Shrader, 1999, cited in Black and Hughes, 2001) recognises the significance of leadership. The tool, which is used by the World Bank assesses leadership across different dimensions that align with the concepts of internal and external leadership (Sherrieb *et al.*, 2010).

To summarise, the discussion above has identified two forms of leadership for disaster resilience: internal leadership and external leadership. The former is generated within a community and builds internal capacity for positive action within that community. External leadership builds and marshals community agency to exert influence and to bring about change that may reach beyond the community using methods like political activism and lobbying government to change laws. The two forms of leadership are not mutually exclusive; both support community participation and can operate in tandem. Internal leaders may be perceived as effective if they are able to gain the trust of the community which enables them to coordinate, articulate and actualise community views and readiness for change. External leadership could be assessed by asking whether community leaders are effective in motivating people to act collectively and creatively to respond to stresses and shocks (including disasters) or other challenges that may affect their community.

Attachment to place

Norris *et al* (2008) proposed three psychosocial dimensions of social capital: a sense of community, place attachment and citizen participation (Norris *et al*., 2008:139). Due to their similar meanings, the first two are included in the Provisional framework as the policy objective Attachment to place. This is linked to the concept of non-adverse geography which was one of the additional sub-scales of Community competence and Social capital developed by Kulig *et al* (2013). As I explained in Chapter 3, the term, Non-adverse geography has been changed to Local disaster risk awareness and moved to the Community competence policy domain, and the citizen participation resource was recast as Community engagement in the Provisional framework. The relationship of community engagement to social capital is discussed in the next sub-section.

A sense of community refers to the connections people feel to others who share the experience of living in a particular geographical location or of belonging to a certain group.

Although it is similar, attachment to place differs in that it captures a shared emotional connection to a place rather than to the people who live there (Norris *et al.*, 2008). These two factors are complementary and disaster resilience will be enhanced when both coexist. People who have connections to a place, whether emotional or structural, derive a sense of identity and belonging to that place that can be a strong motivation for them to recover and rebuild after a disaster. Similarly, a disaster can strengthen people's attachment to their place and their community; thereby, strengthening their resolve to overcome adverse circumstances Whittaker discussed the 'spatialisation of the concept of social capital' (Whittaker and Banwell, 2002:256) and how members of an Australian rural community's personal sense of identity is closely bound with their experience of connection to their community and their physical environs. This concept was used to inform the design of government programs aimed at building community capacity. Another study, with more direct relevance to disaster resilience, found that people who have a strong emotional attachment to place will prepare more effectively to reduce the impact of a disaster (Mishra *et al.*, 2010). If attachment to place is neglected in policy implementation it can undermine resilience (Norris *et al.*, 2008). This occurred following the Victorian bushfires in 2009 when situations occurred when local knowledge and authority and people's feelings of connection to their community were disregarded by state government (Taylor and Goodman, 2015). A sense of community and attachment to one's neighbourhood when adequately supported can, over time, translate into additional disaster resilience capacity, which can be more effective and sustainable because it has local relevance and acceptance. Another distinction between disaster resilience-related concepts that is important to note is that between attachment to place and 'place-based' concepts. The former, as described above, is a subjective quality; whereas, the latter describes observed activities and approaches to develop disaster resilience, tailored to and informed by local conditions and risks, knowledge, and participation. Place-based approaches focus on the identification and assessment of local vulnerabilities and strengths. This can be done using tools like the Community and Regional Resilience (CARRI) Index (Cutter *et al.*, 2008a) and the Disaster Resilience of Place (DROP) model (Cutter *et al.*, 2008b). The information and knowledge that is produced can then be incorporated into locally-appropriate plans and activities. This idea is captured in the Provisional framework as Local disaster risk awareness in the Community competence policy domain. This was first discussed in Chapter 2 and is raised again in Chapter 5.

Community engagement

Community engagement was first introduced in Chapter 2 where it was identified as the fourth social capital policy objective in the Provisional framework. Community engagement, as a strategy to operationalise social capital, is defined by the Australian Institute for Disaster Resilience as: 'The process of stakeholders working together to build resilience through collaborative action, shared capacity building and the development of strong relationships built on mutual trust and respect' (Australian Institute for Disaster Resilience, 2013:2). The selection

of community engagement in the Provisional framework was influenced by its inclusion as a sub-scale of the Index of Perceived Resiliency (IPCR) (Kulig *et al.*, 2013:770).

Frequent references to the similarities and interconnection between the social capital and community competence policy domains in the Provisional framework are made in this thesis. This warrants further explanation before proceeding: The links between the two and the reason for their separate categorisation in the Provisional framework can be explained by referring to a study by Head (2007b)about community engagement as a form of public participation. Head interpreted community engagement as an umbrella concept that incorporates partnership and collaboration; and citizen and community participation in all its forms. It entails 'building institutional bridges between government leaders and citizenry' across three sectors of government, business and the community or third sector (2007b:441). In his analysis, Head identified the goals and benefits of community engagement for each of these sectors. He concluded that they operate along a continuum of action with goals ranging from: to inform; to consult; to involve; to collaborate; and finally, to empower (Head, 2007b:445). Thus, community engagement is an ongoing and active process to build capacity for community participation. In the Provisional framework, the 'inform' goal, that was also identified by Head (2007b) corresponds with the community engagement policy objective in the social capital policy domain; whereas, the other public participation goals identified by Head correspond with the Community competence policy objectives. Head's study makes the case for community engagement as a precursor, or precondition, for participation, in the place where capacity building needs to occur. Thus, I take the position that the social capital and community competence policy domains co-exist on a continuum. Appropriate forms of social capital, in sufficient quantities, will provide the prerequisite conditions to support the development of self and collective-efficacy, or agency (See Chapter 5). This will translate into community competence, which has a greater capacity to culminate in action for disaster resilience than social capital on its own. A sense of the temporal nature of community engagement and community participation is reflected in Head's comment that 'building capacity for longer term joint interaction may be as important in the early years of a program as ensuring immediate and tangible on-ground benefits for communities' (Head, 2007b:450).

Community engagement is a useful tool for government to manage complex and interconnected or 'wicked' policy matters where shared responsibility is needed (Australian Public Service Commission, 2012; Head, 2007b). Some implementation *principles* that invoke community engagement can serve as proxies for disaster resilience implementation. Studies that demonstrate links between community engagement and the development of environments that enable community resilience can be useful. For example, the work of Head that was discussed above is relevant. Butcher claims that community engagement is characterized by horizontal and vertical partnerships and is not merely a 'marketing exercise' (Butcher and MacLennan, 2010:22). Wells and colleagues compared community resilience with individual preparedness and concluded by stating that 'community engagement is essential to advancing community resilience

goals but that few operational models exist through public health departments' (Wells *et al*., 2013:1178). Limited community engagement and 'ineffective regulatory frameworks, not technical limitations' (Godden and Kung, 2011), are cited as a barrier to climate change adaptation by Godden and Kung (2011). Bennett stressed the importance of community engagement for implementing health emergency legal provisions in Australia. These include federal quarantine law, state and territory public health legislation and disaster provisions and the International Health Regulations as the suite of key national and sub-national policy mechanisms for preventing the spread of serious infectious diseases, domestically and internationally (Bennett *et al.*, 2012). Moore provided examples of exemplary practice in developing countries that reinforced the prevailing view that government policies need to support grass roots community disaster resilience through community engagement (Moore *et al.*, 2012).

Therefore, in this thesis, connections were made between: community engagement and social capital; community engagement and the practical implementation of community resilience policy more broadly; and specifically to disaster resilience policy.

1.20.2 Social capital: direct links to disaster resilience

In spite of the reservations raised earlier in this chapter, social capital has been incorporated into policy development in a number of countries. This has occurred in Australia and has been aided by the association between social capital and disaster resilience.

Indirect and direct links were made between social capital and resilience, including disaster resilience, in a number of studies during the 1990s and the early 21st Century. A connection was made between social and ecological resilience, in the context of natural resource management in Vietnam, where it was found that social capital supports resilience in resource-dependent livelihoods and is central to adaptive capacity (Adger, 2000) particularly to hazards associated with climate change. A body of work followed that reinforced the connections between resilience and climate change adaptation via environmental economics and governance (Adger, 2003; Adger *et al*., 2005; Adger *et al*., 2011; Folke *et al*., 2005; Folke, 2006). The interchangeable meaning of social capital and collective action, for climate change adaptation, was demonstrated as was the idea of adaptation as a social process . Social capital was cited as a factor that enables adaptive governance arrangements to be developed to implement successful approaches to manage ecosystems during crises. The key to success of these arrangements is seen as the self-organisation of social networks between different organisations, agencies and individuals. This leads to the creation of bridging organisations where cross fertilization can occur between different knowledge systems and experiences to support collaboration and conflict resolution (Folke *et al.*, 2005:441). Social capital is emphasised as important to the understanding and effective management of the social aspects of uncertainty and change in ecosystems (Folke, 2006:261).

The idea of creating or expanding networks to adapt to climate change in all its unpredictability, can be translated to hazards and disasters: 'uncertainty often leads to efforts to

broaden the scope of actors, agents and knowledge that can be marshalled' (Comfort, 2005, cited in Norris *et al*., 2008:138). Thus, it was propounded that a networked approach is necessary 'as opposed to hierarchical systems for disaster response' (Norris *et al*., 2008:138). Some researchers went as far as to suggest that social capital approaches should be directly applied in disaster management: 'Social capital relations that are generated and maintained for noneconomic purposes are often a necessary component of coping with extremes in weather and other hazards and their impacts' (Adger, 1999; Ribot, 1996, Pelling, 1998, all cited in Adger, 2003:392).

1.20.3 Social capital and public policy

At a time when top-down managerial approaches to policy implementation were the norm Adger championed the value of bottom-up programs in environmental management to deal with climate change (2003). Cooperation and trust (the universal theme for social capital in the Provisional framework) between citizens and institutions was needed to establish bottom-up programs by generating social capital: Social capital 'does not exist in a political vacuum, and its existence alters the power relationships between civil society and the state' (Bebbington and Perreault, 1999 cited in Adger, 2003:391). Adger argued the potential of bottom-up programs to enhance disaster resilience by building support for interventions at local levels to create greater acceptance and sustainability. Bottom-up approaches were seen to give practical meaning and support for the disaster resilience policy principle of 'shared responsibility'. This was because they could alter perceptions of ownership of a problem like climate change (Adger, 2003:401). Coleman found that all forms of social capital are a public good, distinguishing it from other forms of capital (1998: S116-S119). This added weight to the idea that social capital, often seen as the province of civil society, is equally, if not more, relevant to the business of governments. This point was picked up in public policy when social capital began to appear in policy documents and reports issued by government and other public institutions. For example, The World Bank synthesised theoretical and applied social capital research to clarify its potential in programs designed to alleviate complex social and economic problems (World Bank, 2000). The Productivity Commission (Productivity Commission, 2003) conducted research on social capital to explore its potential for application in public policy and stated 'Social capital is not only a quality of civil society but it also involves public organisations and institutions' (2003:8). The was followed by the development of an indicator framework by the Australian Bureau of Statistics (2004) to measure social capital aimed at policy and program design.

A close association can be seen between social capital theory and disaster resilience policy when the focus of the research is on the application of social capital in organisational and institutional settings to influence governance and policy implementation (Coleman, 1988; Rueschemeyer and Evans, 1983, in Woolcock, 1998:156; Zurita et al., 2017). This idea is central to social capital as a function of groups, including institutions, as well as communities, and is an important point that feeds into the uptake of social capital as a public policy outcome. Adger

(2003) also suggested that institutional networks are important: Social capital is a concept in economics with 'private and public elements based on trust, reputation and reciprocal action' (Adger, 2003:387). This indicates that implementation arrangements grounded in social capital contribute to outcomes, and are not merely a vehicle to deliver policy. Social capital also has a purpose in relation to risk and being able to live with risk. 'But the concept of social capital also promises to explain how the civil society interacts with the institutions of market and state in a systematic manner, one that is relevant to the nature of the climate-related risks outlined earlier.' (Adger, 2003 p.389).

Aldrich is a leading proponent of the interconnection between social capital and disaster resilience, particularly in relation to resilience-based recovery. 'social capital is the engine of long term recovery' (Aldrich, 2010:1). He uses case studies of Katrina, Kobe earthquake and the Asian tsunami to show that effective disaster recovery is related to the level of social capital and is not related to the level of physical destruction or the amount of financial assistance that flows to an area. The latter two demonstrated remarkable rates of economic recovery; whereas, the recovery following Katrina foundered even though it had greater material capacity. He includes statistics to demonstrate this and notes that better outcomes could also be attributed to the first responders being local people rather than out-of-town emergency services (Aldrich, 2010:5)). Apparently, individuals with stronger and more numerous social connections received more assistance than their less well connected neighbours (Aldrich, 2010). Aldrich also sees networks as synonymous with social capital and argues for a focus on social infrastructure rather than physical infrastructure in disaster recovery. Similar to its application in the Norris model (2008), Aldrich characterises social capital as a resource that mediates risk and provides people with the capacity to deal better with risks and actual shocks. Aldrich's article provides evidence that government agencies need to recognize the role and importance of social capital. To do this regional social networking should be encouraged and social capital approaches should be built into the provision of recovery assistance information, For example, more support could be made available to people in disaster affected communities by providing coordinated information to residents about when their neighbours are returning. This was also said to encourage a less passive attitude among local people, where those with higher levels of social capital were less likely to rely on officials and are more likely to help themselves and each other. Place-based attachment manifested in strong social networks among local people may impact on decisions to remain in a community and contribute to its economic recovery or exit a community after a disaster (Aldrich, 2010). The study notes a lack of attention to social capital and the critical need for policy responses that integrate social capital into planning, and in the aftermath of a disaster. This will be achieved by programs that provide positive support for social resources to 'maintain, restore and develop social networks' (Aldrich, 2010:9) Innovative methods are proposed to increase social capital and create incentives for local community participation. Examples are time banking and community currency where volunteers receive rewards in kind in exchange for labour; and programs in Japan

and the United States where volunteers receive credit notes that can be exchanged for goods and services from local merchants (Lietaer, 2004, Richey, 2007; cited in Aldrich and Meyer, 2015:262). The need for government to take more account of social capital in disaster policies was stressed again by Aldrich in 2015. This later paper expanded on this by emphasising that too much effort goes into the restoration and investment in hard infrastructure and material measures for disaster preparation and recovery; whereas, government policies need to take more account of social capital. 'Despite the evidence about its efficacy, resilience research and disaster management practice have yet to fully embrace social capital as a critical component' (Aldrich and Meyer, 2015:256). Note that this study highlights a connection between social capital and community competence similar to that which is depicted in the Provisional framework. Where they differ is that Aldrich does not perceive of community competence as a goal in its own right, but rather as means to achieve social capital. For example, the focus is on operationalising social capital through policies that encourage community participation to achieve the action-oriented outcome of community competence. 'Social Capital thrives in an environment where residents believe in their efficacy as citizens and have trust in each other and their representatives' (Aldrich, 2010:11-12).

In the grey literature, social capital is viewed as an in a number of international and Australian disaster management policy documents and reports (Federal Emergency Management Agency, 2011; Australian Bureau of Statistics, 2004; Productivity Commission, 2003; National Research Council Committee on Private-Public Sector Collaboration to Enhance Community Disaster Resilience (NRC), 2011; Taylor and Goodman, 2015; Australian Institute for Disaster Resilience, 2013). The Productivity Commission (2003) considered the application of social capital to government policy and proposed that it is enabled by implementing policies that build informal relationships, networks and stakeholder trust, provide information to people which is relevant to their own roles and values, and give people the skills to socially engage and to deal with conflict. With reliable and valid measurement cited as one of the main obstacles to the wider adoption of social capital as a policy aspiration, much of the report assesses progress and limitations in indicator development and identifies areas for future research. This report provides a comprehensive account of social capital research and provides a fulsome discussion about the application of social capital to public policy development and implementation. In conjunction with the PC report, the Australian Bureau of Statistics developed a framework for measuring social capital based around evaluating the quality and quantity of social networks (Australian Bureau of Statistics, 2004). Other Australian policy documents identified how engaging non-traditional or spontaneous emergency volunteers has the twofold benefit of enhancing social capital and increasing disaster workforce capacity (Australian Institute for Disaster Resilience, 2017; Organisation for Economic Co-operation and Development, 2007; Price-Robertson and Knight, 2012).

1.21 Social Capital in the Case studies

This section examines the five case studies that were introduced in Chapter 3 through the lens of social capital. The cases studies relate to five disaster resilience activities or programs that were, or are, being implemented by agencies or organisations at each of the three levels of government, plus one each from the business and not-for-profit sectors. Responses from expert interviews and documentation from the organisations was used to assess and discuss how each activity supports the development of social capital for disaster resilience.

1.21.1   National Flood Risk Information Project: GeoScience Australia (See Box 3-1)

When the National Flood Risk Information Project (NFRIP) was chosen as an empirical case study for this thesis, it was viewed as an example of disaster resilience policy implementation that would highlight approaches contained within the policy domain of information and communication. This expectation was borne out (See Chapter 7) and insights were obtained into several other policy domains that were not originally anticipated, including social capital. The area where evidence of factors associated with implementation to support social capital is most pronounced is in relation to networks. From a broader thematic perspective, the issue of trust was also seen to cut across some of the opportunities and barriers encountered in the implementation of the NFRIP.

The lived experience of the project provided lessons that were valuable for the development of this thesis based not only on the experience of project implementation in a formal sense, but also through awareness of omissions from the early implementation planning and design phase. The NFRIP was deemed to have added value in terms of social capital, in terms of the attention to connections and networks.

The completion of the revised Rainfall and Runoff Guidelines (RRG) was a highly successful outcome of the NFRIP. These had not updated since 1987 and were long awaited in the scientific community (See Chapter 3, Section 3.3.4). The RRG were completed within budget and within the time frame. The development of the RRG is an example of best practice by building capacity for whereby the latest scientific evidence can be effectively translated into flood policy. In particular, The RRG can inform land use and development to prevent construction in flood prone areas or to mitigate flood risk that may impact the built environment. If people know that land use policies are supported by the best scientific evidence available it can build credibility, and therefore, enhance trust in policy decisions (Bosomworth, 2015).

The Australian Flood Risk Information Portal (the Portal) was the second of three components of the NFRIP. It produced some negative as well as positive outcomes that are both instructive for this thesis. The complexity of the tasks involved in developing the portal required GA to establish new external networks and renew existing ones. Longstanding networks existed between GA and the geophysical sciences community, flood engineering and consultancy sector,

and related professional bodies. At the outset, implementation of the NFRIP involved several areas within GA. This, in itself, presented a coordination challenge. The NFRIP activated internal networks in the form of policy linkages and working relationships across the agency that did not previously exist, or existed only in an administrative sense, prior to the NFRIP. However, at the same time, the division of the NFRIP policy and project functions between the Federal Attorney-General's Department (AGD) and GA posed risks (Australian Government, 2016b; Geoscience Australia, 2014). More effective collaborative arrangements and clearer allocation of roles and responsibilities between GA and AGD may have gone some way to alleviating this problem.

The fundamental goal of the NFRIP was to coordinate national access to flood information including flood maps and flood risk management plans through the portal. Unfortunately. obtaining this material proved difficult when many owners or custodians of the information resisted requests to share this information through the portal: This was identified by GA as an impediment to the effective implementation of the project (Interview, Geoscience Australia, GA42, 2 May 2016). Much of this concern centred around the fear of being held liable for loss or damages should the information be deemed inadequate or incomplete. The other key area of difficulty that could have been identified pre-implementation through a thorough community consultation and engagement emerged as a potential deal breaker for this project. This was the discovery that the federal government may breach copyright should it publish the material on the portal due to the flood studies having multiple owners. This demonstrates the importance of trust and community engagement to allow to provide input so that concerns can be addressed and to ensure cooperation and coordination for effective policy implementation.

Although GA has the capacity to undertake national projects and programs demanding coordination and high levels of technical and scientific expertise, it had not previously managed such a complex and multi-faceted initiative. There are indications that GA's leadership supported innovative solutions in line with experimental type approaches that involve 'learning by doing' combined with devolved authority and light touch regulation. The manager of the NFRIP reported that his senior management team allowed him the autonomy to re-evaluate project goals based on learnings (Interview, Geoscience Australia, GA44, 2 May 2016). This has transformed the NFRIP. Although the official project is complete, work continues as part of an integrated approach of GA to its organisational goal of supporting community safety. This provides an example of a learning organisation (Finger and Brand, 1999): Geoscience Australia recognised the systemic nature of successful implementation and responded appropriately in terms of network creation, community engagement and strong internal leadership. On the other hand the application of the provisional framework highlighted occasions where a lack of trust was an issue, particularly between different levels of government.

1.21.2   New South Wales Disaster Resilience Program (See Box 3-2)

The potential for the NSW Disaster Resilience Program to generate social capital is discussed in this section. This involves consideration of the activities that the program supports, particularly the National Community Resilience (CRIP) Program and aspects of the main funding mechanism, the National Partnership Agreement – Disaster Resilience Program (NPA-NDR). The NPA-NDR (NSW) is characterised as a 'top-down' approach to disaster resilience policy implementation (Interview OEMW61, 6 May 2016. As a federal government program the agreement is negotiated at the highest level of government and formalised between the prime minister and First Ministers of each state and territory. Accountability to the federal government is achieved by annual state and territory government reporting on performance against indicators developed by each state and territory and agreed by the federal government. (Interview, OEMA65 13 September 2016). Top-down approaches do not include or have limited bottom-up and horizontal mechanisms to support of implementation at lower levels and across other sectors. As such they are generally not considered to be conducive to the generation of social capital. At first glance this description appears to be consistent with the NSW NPA-NDR: the NSW NPA-NDR-NDR does not have a formal process for feedback, review or consultation with local level stakeholders. Discussions and negotiations for the NPA are held at ministerial level with limited transparency. Thus, the design of the NSW NPA-NDR does not directly promote the development of multi directional networks that are determinants of social capital. In this regard the NPA arrangements could be deemed not to support the development of social capital. The majority of NPA-NDR funds are allocated to local governments and emergency service organisations. Community volunteers provide most of the emergency services' workforce (Commonwealth Attorney-General's Department, 2012). In this way it could be assumed that the NPA-NDR is being implemented in line with the objective of 'attachment to place'. The emergency services are, however, organised hierarchically (McLennan *et al.*, 2016), which may discount the extent that local emergency service personnel are able to provide input to funding decisions.

The disaster resilience policy objectives for social capital, community engagement are not explicitly stated as a condition for eligibility for NSW NPA-NDR DRP funding. Notwithstanding this, commitment to community engagement is evident in the Community Resilience Innovation Program (CRIP. The CRIP is a relatively recent addition (2013-14) to the suite of programs funded under the NSW DRP (NSW Government Department of Justice and Office of Emergency Management, 2019). The CRIP is 'a coordinated approach to community engagement for emergency risks' (NSW Government, 2019). It was designed specifically to align with the NSDR; whereas, the other programs, albeit valuable in their own right, are legacy programs that have formed part of the federal disaster management funding apparatus for several decades. Although demand for CRIP funding, (an which has averaged between $1 million - $1.8 million annually) significantly exceeds supply (NSW Government Department of Justice and Office of Emergency

Management, nd), this can encourage collaboration and the creative use of funding by challenging recipients to get more done with less {Interview, RVM13, 15 April 2016}. The CRIP relies on building networks and connections, creating trust and using community engagement as a key tool. An evaluation of the CRIP has not been conducted so it cannot be ascertained whether it has achieved these goals.

Connectivity is one of the signs of an effective network (Australian Bureau of Statistics, 2004) and the components of the NSW NPA-NDR DRP are partially integrated from a structural point of view. This impacts on its capacity to effectively target state priorities that are not well articulated in a policy sense (Interview, OEMW62, 5 May 2016). The bushfire program is managed by the NSW Rural Fire Service, and the Flood Risk Management Grants Program is managed by the NSW Department of Environment and Heritage. Both programs bear the hallmarks of very well-established programs that continue to reflect their intention of supporting core elements of the emergency services. The volunteer funding element is directly managed by the NSW Office of Emergency Management (OEM) and the other two elements, the state-wide emergency management programs and the CRIP program are managed from the same area that administers the NPA. Where the programs are co-located provides capacity to build more and better connections with stakeholders across the program:

'..there is no linkages, either between each other or really between our Office of Emergency Management. And that is a bit of a problem, that's a challenge that they are always facing up against a little bit. The schemes that sit within the Office of Emergency Management have more linkages (Interview, OEMW62, 5 May 2016).

The NSW government showed commitment to community engagement for disaster resilience by establishing: a NSW Community Engagement Stakeholders Group. This group, which oversees the CRIP program has established synthesised top-down and bottom-up implementation pathways: to NSW community service organisations, community engagement units within the NSW emergency services agencies; and through the NSW Government to the high level Australian and New Zealand Emergency Management Committee. It was reported that the NSW Community Engagement Stakeholders Group is working together in a very cohesive way: a certain amount of isolation within their home agencies is contributing to this cohesion, as members seek support and networks outside of their own organisations (Interview, OEMW63, 6 May 2016). In terms of the actual CRIP program, it provides a model that other jurisdictions have not emulated to date.

The NPA has positive features that are unrelated to the policy objectives proposed in the provisional framework. A 'top-down' approach is not inherently inferior to a 'bottom-up' method for policy implementation and can be appropriate in certain circumstances, or as one element within a suite of approaches operating across various scales. While combined or synthesised approaches to implementation are ideal in a system, in terms of establishing feedback loops and building collaborative networks, the NPA-NDR as a top-down mechanism provides a platform

for national coordination and a formal national commitment (in both a political and administrative sense) to the only dedicated federally funded program targeting disaster resilience. This is a necessary high-level connection, and it is in this national arena that leadership and championing of the program can contribute much to its ongoing support and success. The long standing inter-governmental commitment to this arrangement via the Council of Australian Governments (COAG) indicates commitment within the political leadership. Indeed, as has been shown previously in this thesis, high level whole-of-government leadership can be an appropriate means of reforming the system to deal with 'wicked problems' such as disasters. However, with the possible exception of the CRIP, the extent to which the NPA-NDR has been able to shift disaster policy toward approaches that support the determinants of resilience appears minimal. Since the National Strategy for Disaster Resilience was adopted in 2011 the NPA-NDR has been amended to require that funded initiatives comply with updated national building codes; and reflect the national priority areas for the National Strategy for Disaster Resilience. In accordance with the provisional framework, this points to the need for complementary (external and internal) forms of leadership. This is discussed further in Chapter 5.

To summarise, the capacity of the NSW NPA-NDR-NDR to support social capital varies across levels of implementation. Leadership (internally focused) to unite and marshal shared effort and commitment to further the aims of the program is apparent at the state government agency level among officials. Community engagement is evident at inter- and intra- project level, and networks and connections have emerged at the state government/community interface.

1.21.3 Lake Macquarie City Council Local Adaptation Plan for Flooding including due to Sea Level Rise (Marks Point and Belmont South) See Box 3-3

The Lake Macquarie City Council (LMCC) has previously been recognised for its good practice in environmental policy implementation (See Box 3-3 in Chapter 3). Similarly, in this thesis, LMCC's pre-eminent achievement is in its approach to community engagement, a determinant of social capital. Indeed, the importance of social capital was a theme in discussions held at a Stakeholder Steering Group meeting to review implementation of the LAP which I attended on 3 May 2016. A LMCC councillor expressed the view that the creation of social capital is 'the greatest achievement of the project' and that LMCC had demonstrated 'how to build community capacity par excellence and is an example of best practice' (unpublished meeting notes, Lake Macquarie City Council, 3 May 2016). LMCC involved the broader community of ratepayers early and often in consultations for the LAP. The design of the consultations was integral to the community engagement plan and was based on the International Association for Public Participation standard (nd)). The approach, strategic and flexible; progress was reviewed regularly with a commitment to a long-term process. There was not a 'one size fits all approach to the community engagement' strategy and LMCC was conscious of the importance of building trust (Interview, LMCG54, 3 May 2016):

inform, engage, consult, collaborate, empower and so we set out to collaborate which meant that we worked, you know closely with the community to come up with a joint approach and what we decided to do as an organisation was that we thought that bringing the community with us and having a certain level of understanding was important and that although we had a sort of time-frame, we weren't going to force the process ahead of where the community was (Interview, LMCG51, 3 May 2016).

Early consultations were 'lambasted' (Interview LMCJ56, 3 May 2016) by key community members, who criticised the council regarding the format of the first stage of the consultations: a LMCC staff member was seated at each table and given the role of scribe and to report back to the group. The impression was that the outcome was a foregone conclusion and had been heavily engineered by council. Council later took note of many of the questions and requests voiced at this meeting to respond to the issues that had been raised in the early consultations. Additional information sessions that were tailored to specific issues were provided for interested residents. For example, guided foreshore walks, and a seminar where a representative from the Insurance Council of Australia answered the audience's questions. This was seen as positive even though many people remained sceptical of assurances from the insurance industry that flood mapping, risk assessment and flood risk management plans by LMCCC were not linked to higher insurance premiums. What came across very strongly was that the mere action of LMCC responding to a request for information was significant, NOT whether or not residents agreed with what was being proposed. It was also clear that the process itself had enormous impact on building social capital, and it was the chance to express conflicting views that in the longer terms resulted in better outcomes. It was clear that the process was very challenging and uncomfortable for most, if not all, of the participants. A willingness to engage with conflict and perseverance to work through the issues and accept that mistakes are a necessary part of the process work, were essential ingredients of the success of the LMCC community engagement approach. It provides an example of an evaluative approach consistent with experimental models of policy design and implementation (See Chapter 3).

Another strategy of the LMCC was the identification of actors who had very strong views that challenged some of the basic assumptions of the LAP, particularly the veracity of the sea level rise predictions due to climate change. LMCC stratified the consultations so that these strong ideological positions did not distract from consultations with the other group who were more amenable to the proposition of sea level rise and incorporating that within the flood planning process.

The policies of the NSW Government, were seen by LMCC to create barriers to success of the project. NSW has a highly prescribed approach to developing flood mapping. Flood management is delegated to local councils, but their autonomy to manage local flooding issues has been undermined largely due to the actions of the NSW State Government. For example, the NSW Government repealed existing legislated benchmarks for sea level rise. This was seen by

LMCC to reduce the credibility of the LAP with their residents (Interview, LMCG60, 4 May 2016).

1.21.4 The Australian Business Roundtable for Disaster Resilience and Safer Communities (See Box 3-4)

The Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) extensive networks provide potential for it to create social capital, albeit at a high level of the system. The membership of the ABRDR allows it to reach into key areas of the business and humanitarian sectors that have an interest in disaster resilience. These include the re-insurance industry, building and construction, finance, and telecommunications. The Australian Red Cross provides a strategic link to non-government disaster resilience social programs. In addition, the IAG is a parent company to a number of insurance companies. The membership is at CEO level and each member organisation has made a commitment to promote the ABRDR and its goals within their own organisations. To encourage take-up within organisational networks, and to drive implementation of the ABRDR's work program, a working group of middle and upper level managers from each of the ABRDR member organisations is responsible for implementing the ABRDR's work program within their own constituencies. 'It is not just the CEO level, it is what happens underneath and the interconnectedness of those organisations' (reference) Their continuing participation on the ABRDR and its capacity building within the business sector to establish and strengthen advocacy for its policy agenda signals the ABRDR's ability to exercise internal leadership. A major ABRDR goal is to establish networks with government to further disaster resilience. ABRDR and government partnerships or collaboration is or has occurred includes the attendance of government officials at a launch of its first report in xxx (this event was organised by ABRDR), an invitation from government for the ABRDR to brief the Council of Australian Governments' former Law, Crime and Community Safety Council on the 'Social Impacts of Disasters on references to ABRDR reports in various government documents. This indicates some progress toward achievement of its goal to establish a relationship with government, or external leadership capability. External leadership is discussed further in Chapter 5.

1.21.5 Rivers and Ranges Community Leadership Program (See Box 3-5)

The Rivers and Ranges Community Leadership Program (RRCLP) has its origins in the local experience of the Black Saturday fires in Victoria in 2009. It also arose as a philanthropic response to the need to support and strengthen local leadership capacity. During the bushfires and in their aftermath, people took on leadership roles to help steer their neighbourhoods through the disaster and in order to build hope and confidence for the future. Some of these leaders found that they could not sustain this effort and much of this leadership capacity was lost to individual 'burn-out' associated with feelings of being overwhelmed by their experiences. Feedback was received that

many would have continued to contribute if they had been able to connect with other leaders to share experiences and provide mutual support or to access from external sources for training and skills development (Rivers and Ranges Community Leadership Program, 2019).

Today, the RRCLP has evolved and although it retains an organisational consciousness of the disaster from which it arose, it is sustained by an approach that ensures its ongoing relevance to its community. As its name suggests, it enhances disaster resilience primarily through leadership. The RRCLP's goal to create community leaders demonstrates both internally focused and externally focused leadership development. In accordance with the Provisional framework, this section considers the implementation of the policy objective of internal leadership in the RRCLP. External leadership, a policy objective of community competence, is discussed in Chapter 5.

The RRCLP model is underpinned by the importance of nurturing leaders to rally community capacity and build connections within and across communities to create a store of social capital. It has operated with only one employee up until 2017 when it was able to recruit a communications officer. It gained funding from the Victorian Regional Leadership Program which allowed it to expand its networks and diversify its access to funding sources. The RRCLP is linked to local government boundaries and is the only member of the VRLP that includes a metro council as well as regional councils. Even so, it relies substantially on philanthropy, an indicator of social capital (Australian Bureau of Statistics, 2004) and has managed to expand and diversify its funding sources over time. The RRCLP recruits to the program by reaching out to individuals with leadership potential. If RRCLP participants are drawn from an organisation, as they often are, the approach builds the capacity of the organisation rather than diverting or co-opting its capacity. Fundamental to the RRCLP is the view that many people have leadership qualities that may be unrealised or go unnoticed. People with leadership potential are in every age group and every strata of society. Community leaders are not necessarily people who are in existing positions of authority or with recognised status; moreover, not being an incumbent leader can be an advantage (Interview, RMD15, 15 April 2016).

While the RRCLP approach is primarily facilitated by the development of leadership, its activities cut across and overlap with each of the other social capital policy objectives of networks, community engagement, and place-based attachment. It harnesses both overt and latent leadership capacity of individuals and combines this with the creation of a leadership network approach. The RRCLP requires new recruits to undertake an intensive training program that emphasises self-discovery, personal disclosure, learning, and sharing of personal stories. This is aimed at establishing the relationships that are integral to the leadership network. Other training is provided to equip participants with information about the political process, government, liaison and skills development in areas of advocacy, communication and the broader political social, economic and environmental context in which they and their community operates. This component aligns with the policy objective of external leadership and complements the internal leadership goals of

breaking down barriers and the creation of strong personal and group connections through authentic communication. This was a strong theme in the testimonies of RRCLP participants interviewed for this thesis who summarised the goal of the RRCLP as one designed to build trust between the participants (Interview RTM, 16 April 2016).

There is evidence that attachment to place is a factor that contributes to the success of the RRCLP. The RRCLP identifies with its geographical region and it capitalises on the commitment that is felt by its graduates in terms of identification with the Yarra Valley. Place attachment is also more prominent in the RRCLP compared with other Victorian Leadership Programs: RRCLP is distinct from other members of the VCLP for two reasons: the RRCLP area is designated, not by Local Government Area boundaries but by the geographical area that was impacted by the 2009 fires; and it is the only Victorian community leadership program that has an explicit goal of building resilience to disasters or shocks.

During the interviews the participants would often steer their response back to their experiences within their own organisation. This indicated that each person wanted and needed to focus on the organisation in which they worked or volunteered rather than the RRCLP. This demonstrated that the RRCLP acts as a catalyst or a facilitator of social capital and disaster resilience.

In terms of effective support for leadership, an RRCLP alumni described how town meetings are an ineffective form of community engagement. She argued that they do not allow expression of a balanced cross section of community views. Instead they provide a platform for a vocal minority and inhibit communication. This discourages potentially effective leaders from coming forward (Interview, RMD15, 15 April 2016). This experience is confirming of guidance on the development of community education, awareness and engagement: 'Community hall meetings are generally considered less effective.' (Australian Institute for Disaster Resilience, 2010:20). In contrast, a successful activity was a community dining project initiated by one of the residents who was to become a RRCLP graduate. This regular activity met people's need for food and at the same time provided a safe environment where both negative and positive emotions could be expressed and in which people felt comfortable about seeking or receiving help (Interview, RJT23, 16 April 2016).

1.22 Discussion

The cross section of disaster resilience activities, which I have discussed above, provides a mosaic of information about how their practices may enhance or inhibit social capital. To begin with, it is not suggested that all disaster resilience initiatives need to deliver outcomes in all of the four domains to be effective. Effective disaster resilience policy implementation will result from the component parts of the disaster resilience system employing sound practices that are flexible enough to apply across a range of settings and sectors. Importantly, as part of a federal system, the components need to be coordinated both vertically and horizontally. They need to establish a

coherent and sustainable national strategic disaster management system, underpinned by resilience principles and practices, to prevent, prepare for, respond to, and recover from natural disasters.

The Rivers and Ranges Community Leadership Program (RRCLP) provides some examples of good practice in social capital on a number of fronts. These are concentrated in its networking and leadership achievements. The RRCLP established new networks across a number of Victorian local government areas that geographically represent the areas that were affected by the 2009 Victorian fires. Not only this but, joining the Victorian Regional Leadership Program has meant that the RRCLP has facilitated broader networks beyond its own local government areas. This expands options available to communities that still face issues associated with recovery from the 2009 catastrophe. RRCLP's program of individual self-development and the trust formed between participants is illustrative of the internal leadership qualities articulated in the Provisional framework. Its community engagement strategy incorporates the identification of program participants, activities to attract sponsors, and training programs and skills development.

I observed a devolution of authority and function, a combination of top-down and bottom-up approaches, the use of the predominant disaster resilience federal financing mechanism, an intergovernmental agreement titled the National Partnership Agreement (NPA) on Natural Disaster Resilience (Commonwealth of Australia); negotiated roles and responsibilities; and an increase in emphasis on place-based approaches, albeit at the state and territory level. For example, the 2017-18 NPA incorporated a requirement for state-wide disaster risk assessment and identification of priorities to which funding was to be directed. On a slightly more negative note, a case study interviewee believes that the efficiency of the NPA is constrained by excessive bureaucratic hurdles due to its predominantly top-down style. Since the case study interviews were conducted, a new intergovernmental agreement, the NPA on Disaster Risk Reduction, has replaced the expired 2017-18 NPA on Natural Disaster Resilience. The aim is to bring it into line with the National Disaster Risk Reduction Framework (Commonwealth of Australia, 2018). The National Disaster Risk Reduction Framework articulates a commitment by all levels of government over five years to develop or identify funding mechanisms to 'address existing high priority risks across all environments' (Commonwealth of Australia, 2018:16). The new NPA came into effect in March 2020. It will be implemented in line with an action plan that was released in mid 2020 (Australian Government, 2020). With its enhanced focus on implementation, including a stronger emphasis on better targeting of risk reduction activities in accordance with state and territory risk assessments; and more attention to evaluation and governance, it will be important to review the performance of the latest NPA in the future to assess how effective it is in reducing disaster risk and ultimately, building national disaster resilience.

The National Flood Risk Information Program is an example of how not all the case studies played out as expected. Coordination may have received less attention than was ideal in spite of detailed and stringent implementation plans that specified the need for stakeholder engagement,

a standard inclusion in the Geoscience Australia management approach (reference). A flaws in the implementation of the National Flood Risk Information Portal was the presumption of a solution even before the problem had been identified. The logic of sharing flood information in the form of a national point of access to all past, present and future flood maps, flood risk assessments and management plans seemed sound and indicates a high level of concern with local place-based approaches to disaster resilience. This is an example of how social capital, manifested as a strong sense of ownership over the flood data, resulted in negative outcomes. It may also reflect a lack of trust between the various project stakeholders. Nonetheless the nature of Australia's federal relationships may have militated against an unwillingness to share information, which was by no means common to all custodians of the flood data. The Australian cooperative form of federalism is less likely to result in some of the excesses of solidarity or strongly bounded networks (Aroney, 2011).

In conclusion, across the set of case studies, all of the policy objectives for social capital were seen in action. Some of the results were predictable and others were less so. For all five case studies, the Provisional framework was moderately helpful in terms of signaling good practice, although it also proved to have limitations. It was sometimes difficult to clearly identify and specify information relevant to each policy objective. I attribute this to the different scales of the projects. Trying to compare activity at the local level with activity at the highest level of government may be problematic. For example, community engagement conducted by the federal government may look different to a community engagement process undertaken by the Lake Macquarie City Council (LMCC). The LMCC has a very clear and identifiable policy on community engagement. A community engagement strategy and a report about its outcomes was included in the LMCC documentation on the development of the Local Adaptation Plan. While engagement of one's community infers the local citizenry of a project that is implemented at the local level; engagement of community in a national project implies engagement of a different community or community of interest. For example, the NFRIP community is comprised of the networks of agencies with responsibilities to implement the project. These included the staff within GA, other government agencies such as the Bureau of Meteorology, Commonwealth Scientific and Industrial Research Organisation, the Federal Attorney-General's Department, as well as custodians of flood information, in particular, state government agencies. The difficulties experienced by the NFRIP indicates that development of social capital activities aimed at improving the quantity and quality of networks needs to be a priority. Both bonding and bridging types of social capital have a role to play, and to a lesser extent, linking social capital. These networks grow when organisations and institutions that manage disaster resilience activities reach out across the system and minimise the extent that they work in silos.

Chapter 5: COMMUNITY COMPETENCE

1.23 Introduction

Working definitions of community competence were adopted in the development of the Provisional framework (Figure 5.1) and were introduced in Chapter 3.

Provisional Disaster Resilience Policy Implementation Framework					
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change	Power-sharing
Policy Objectives	1. Networks	1.Political partnerships	1. Security	1.Resilience narratives	1. Capacity-building
	2.Place-based attachment	2.Stakeholder engagement	2.Economic diversity	2.Trusted information	2. Open access to information
	3.Community engagement	3.External Leadership	3.Equitable resource distribution	3. Skills and infrastructure	3. Negotiated roles and responsibilities
	4.Internal leadership	4.Local disaster risk awareness	4.Shared (equitable) risk allocation	4.Multi-directional information flow	4. Coordination
		5.Community participation			5.Stakeholder engagement

Figure 0-1 Provisional Disaster Resilience Policy Implementation Framework

The shaded area in Figure 5.1 highlights the Community Competence Policy Domain and its related policy objectives: political partnerships, stakeholder engagement, external leadership, local disaster risk awareness and community participation. These policy objectives were adapted from the original Norris framework, as described in Chapter 3.

Community competence is:

'the capacity of a community to assess and generate the conditions required to demand or execute change' (Eng and Parker, 1994; cited in Brown and Kulig, 1996 p.34) and 'A process by which groups, communities and aggregates work together to identify problems and needs of the community that includes agreeing on goals and priorities and implementing specific strategies to meet their identified problems and needs' (Cottrell, 1980, Goeppinger et al., 1982, both cited in Brown and Kulig, 1996:33).

Chapter 5 follows a similar format to Chapter 4 insofar as much of it is devoted to the explanation of the policy domains and policy objectives and their theoretical backgrounds. This highlights the connections between some of the terms and concepts.

Section 5.2 provides an overview of community competence theory and explains its importance to disaster resilience in terms of these policy objectives. This forms part of the third tranche of the thesis literature review and helps to validate the elements of the Provisional framework that relate to community competence.

The Provisional framework is then applied, through the community competence lens, to five case studies in Section 5.3. This allows inferences to be made about the characteristics of disaster resilience policy implementation in terms of community competence.

Finally, in Section 5.4 the case studies are discussed from the perspective of building community competence for disaster resilience; and any federal policy issues this has raised.

1.24 Theoretical background

The definition of community proposed by Cottrell, uses the term 'community' to mean 'collectivities ranging from neighbourhoods and rural villages to vast urban settings and even the world' (Cottrell, 1976, cited in Goeppinger and Baglioni Jr., 1985:518). This accords with the view, expressed over thirty years later and adopted in this thesis, that community is a broad concept that can be applied at all scales (Norris *et al*., 2008). In the case studies examined in Chapters 4, 5, 6 and 7 the term is applied to mean the group or groups involved in implementation, including the target audience for the activity.

The term ***community competence*** was introduced by Cottrell (1976) into the field of community development where it appeared primarily in relation to health promotion and public health (Goeppinger *et al.*, 1982). Community competence was said to occur where:

the various component parts of the community are able to collaborate effectively in identifying the problems and needs of the community, can achieve a working consensus on goals

and priorities, can agree on ways and means to implement the agreed upon goals, and can collaborate effectively in the required actions (Cottrell, 1976 p.176).

Community competence emphasises the achievement of change:

The capacity of a community to assess and generate the conditions required to demand or execute change…a process by which groups, communities and aggregates work together to identify problems and needs of the community that includes agreeing on goals and priorities and implementing specific strategies to meet identified problems and needs. {Cottrell, 1980, Goeppinger *et al.,* 1982, both cited in Brown et al, 1996:33).

Eight dimensions of community competence were identified: commitment, self-other awareness and clarity of situational definitions, articulateness, effective communication, conflict containment and accommodation, participation, management of relations with the wider society, and machinery for facilitating participant interaction and decision making (Cottrell, 1976, cited in Goeppinger and Baglioni Jr.,:509-510). These were further defined and used in studies to measure community competence {Goeppinger et al, 1982; Goeppinger and Baglioni Jr., 1985; Eng and Parker, 1994). Of the eight, 'participation' and 'management of relations with the wider society' relate to the policy objectives of community participation and political partnerships. 'Machinery for facilitating participant interaction and decision making' relates to governance and is relevant to the implementation of disaster resilience. Goeppinger provides the following guidance on this:

The community needs formal mechanisms for facilitating interaction and decision making ie rules and standardized modes of procedure. These mechanisms and/or procedures must be flexible and responsive or they impede the functions they are designed to facilitate (Goeppeng and Baglioni Jr., 1985:510)

The original eight dimensions of community competence were found to be dynamic and to develop from individual social interactions into a more external focus (Eng and Parker, 1994:214). These social connections can leverage change through deliberately managed contact with external institutions and officials. The most change was seen to occur where relations with wider society were targeted. This highlights the connection between community competence and the facilitation of political action, expressed in the Provisional framework as political partnerships. Eng's work also demonstrated the importance of a prerequisite level of leadership for this 'process of development' to occur. (Eng and Parker, 1994:215)

The eight community competence factors were later adapted to four competence factors. The first is democratic participation style that incorporates four of the original eight. The remaining three are the incidence of crime, the adequacy of resources, and decision-making interactions (Goeppinger and Baglioni Jr, 1985:517-518). Goeppinger and Baglioni, held that Cottrell had implied that to qualify as a community, a collective must be able to solve problems using all four competence factors (Cottrell, 1976, cited in Goeppinger and Baglioni Jr., 1985:518). Regardless

of whether community competence consists of a set of eight or four community factors, both sets convey a positive sense of citizen or community participation and engagement with the political process. They also align with a style of leadership that seeks to engage with external sectors and power structures. This is known as 'external leadership' in the Provisional framework.

Johnson and Mullins studied religious congregations and developed a community competence model and scale (1990) that was based on an early public health approach to psychology, where prevention rather than treatment of illness was emphasised (Iscoe). Johnson described community competence as knowing:

'how to acquire and deploy resources' with the 'will to muster what they perceive themselves to need and how to allocate scarce resource. They recognize their resourcefulness, competent communities view themselves as having multiple alternatives. A sense of skilfulness produces optimism; a competent community thus has a sense of its own positive potential and are 'problem solvers.' (Johnson and Mullins, 1990:260)

Groups that achieved higher scores were shown to have a greater tendency to achieve congregational goals, referred to as 'participation' and 'effectiveness' (Johnson and Mullins, 1990). Lochner later linked community competence with social capital and claimed it to be one of four social capital 'constructs' along with collective efficacy, psychological sense of community, and neighbourhood cohesion (Lochner *et al.*, 1999:260).

Collective efficacy

Bandura's research on the concepts of efficacy and its psychological mechanism, agency, where 'individuals are producers of experiences and shapers of events' (Bandura, 2000:75), makes an important contribution to the explanation of community competence (Bandura, 1977, 1997, 2000, 2006, 2010). There are three types of agency: personal; proxy (where people who do not have personal control over aspects of their lives increase their sense of well-being by getting others to advocate or influence on their behalf); and collective (Bandura, 2000).

Efficacy can be an attribute of individuals (self-efficacy) or groups. Self-efficacy is defined as:

the belief that one has some control or mastery over the events in one's life, ranging from a greater willingness to take risks and tackle difficulties, and an increased likelihood of developing new skills or using existing ones, and a greater resilience in the face of failure, criticism or loss. (Bandura, 1997; cited in Butler, 1998:470)

The concept of self-efficacy is close to the idea of individual agency but is stronger in that it has the additional feature of self-belief in the likelihood of the successful outcome of the action that is taken (Bandura, 2010). Self-efficacy can influence 'people's receptivity to information and the likelihood of their acting to deal with hazard consequences*'* (Bachrach and Zautra, 1985, Lyons, 1991, Bandura, 1997, Yates *et al.*, 1999, Bishop *et al.*, 2000, all cited in Paton and Johnston, 2001, p. 273).

It is important to note that collective efficacy is not the sum of individual efficacy but is a product of a range of interrelated factors within a community, including social and physical (Brown and Kulig, 1996). Collective agency or 'a shared belief in the power to produce effects by collective action' is similarly aligned with collective efficacy (Bandura, 2000:75). Group efficacy or collective efficacy is a desirable outcome in the process of empowering groups or communities (Paton, 2001a, 2001b). Importantly, all of these terms convey the message that community competence is underpinned, not merely by the instinct for survival or even action in and of itself, but by the addition of self-belief and confidence, as it applies individually or as individuals within groups. The cognitive element of self-belief is a key ingredient that increases the likelihood of achieving a given outcome (Bandura, 2010).

Self-efficacy and collective-efficacy can be influenced by the nature of leadership. Chen argued that the two have different mechanisms that correspond with the level of leadership. Higher levels of organisational leadership influence collective efficacy more than lower levels of organisational leadership, particularly through the clarification of workers' roles and responsibilities (Chen and Bliese, 2002). Coordination among group members will also influence performance. This has implications for understanding the role of leadership within government and its capacity to influence community competence.

With the exception of its inclusion in the Norris model (2008), the term 'community competence' appears infrequently in research that is directly related to disaster resilience. Community competence is conceptualised within the Norris model as 'the networked equivalent of human agency' (Norris *et al*., 2008:141). Norris *et al.,* go on to say that 'social capital and information and communication are prerequisites for community competence' (2008:141).

In light of the infrequent use of the term community competence in relation to disaster resilience, there is benefit from a short explanation of a more commonly used term: 'community capacity'. Community capacity is, according to Norris *et al*, very close in meaning to community competence (Norris *et al*., 2008 p.136) and is described as:

the characteristics of communities that affect their ability to identify, mobilise and address social and public health problems and the cultivation and use of transferable knowledge, skills, systems and resources that affect community and individual-level changes consistent with public health-related goals and objectives. (Goodman *et al*., 1998, cited in Norris *et al*., 2008:136)

However, the meaning of community capacity in this thesis is not fully synonymous with community competence. It differs in the sense that capacity is a virtual quality or potential, whereas, community competence refers to the action that achieves the goal (Goodman *et al*., 1998).

1.24.1 Links between disaster resilience and community competence

The Australian researcher Paton, concurred with Norris *et al.,* (2008) that community competence is an indicator of community resilience (Paton *et al.*, 2001a). In 2013 the Index of Perceived Community Resilience was developed and included additional characteristics or 'sub-scales' of leadership and empowerment, community engagement, and non-adverse geography. These were said to align with the adaptive capacities of social capital and community competence. The index was tested and corroborated in two Canadian fire-affected communities using interviews, community profiles and a household survey (Kulig *et al.*, 2013). Non-adverse geography (Kulig *et al.*, 2013:771) was found to be a concept that is related to attachment to place and to the 'perception that the physical environment is a positive factor in one's health and that the community is not geographically remote or isolated.' (Kulig *et al.*, 2013:771). These conditions are conducive to disaster resilience, whereby people feel safe and do not perceive physical threats within their environment or neighbourhood. When associated with social capital this 'links most strongly with concepts of ecological resilience discussed in the Disaster Resilience of Place (DROP) model or hazard mitigation ideas of the CARRI model' (Cutter, 2008a, 2008b, cited in Kulig *et al.*, 2013:771).

Community competence was included as one among six indicators of community resilience in the Disaster Resilience of Place (DROP) model (Cutter *et al.*, 2008a). The DROP model is comprised of 'candidate variables' or factors that include 'local understanding of risk, counselling services, absence of psychopathologies, health and wellness and quality of life' (2008a:604) Cutter, however, views community competence as a type of resilience related to attachment to place and a sense of community. This differs to its meaning in the Provisional framework which connects attachment to place with social capital, not to community competence. It also does not reflect collective efficacy, the quality that allows groups of people to work together effectively to achieve shared goals or to take collective action. In the Provisional framework, collective efficacy is the theme that underpins community competence, even though it has been associated with social capital by some researchers. Adger saw collective action as an outcome of social capital 'I contend that social capital has explanatory power specifically in the area of collective action for environmental management' (Adger, 2003:389). Kulig takes a more neutral position by suggesting that collective efficacy is the bridge between social capital and community competence (Kulig *et al.*, 2013). Indeed, a critical distinction between community competence and social capital was made that confirmed the coupling of collective efficacy with community competence in the Provisional framework. Ostrom and her colleagues observed that a direct connection between and collective action is unjustified (Ostrom, 1998, Ostrom and Ahn, 2003, 2007), stating that '..collective action cannot be explained by social capital alone' (Ostrom and Ahn, 2003:6). A 'second-generation collective action theory' proposed as 'the organising tool for social capital discourse' (Ostrom and Ahn, 2003:17) was developed and accounts for this gap.

Second-generation collective-action theories incorporate a behavioural element and assume that people are willing and able to put aside self-interest to achieve successful collective action far more frequently than was assumed by first generation collective-action theory (Ahn and Ostrom, 2002, Gintis, 2000, Henrich 2004, Ostrom, 1998, all cited in Ostrom and Ahn, 2003:18). Thus, an important similarity between second-generation collective action theory and community competence theory was proposed. Community competence operates in the space between capacity for disaster resilience and action for disaster resilience in the form of policy implementation. This expands on, and reaffirms the separate status given to it by Norris *et al* (2008) and verifies its inclusion in the Provisional framework as a discrete policy domain. Sherrieb expanded on the work of Norris *et al*. when she described social capital and economic development as structural capacities compared with community competence and information and communication, which she saw as processes. These processes were described as groups coming together to achieve consensus and make decisions (Sherrieb *et al.*, 2010). Again, this emphasises the collective and action-based nature of community competence.

As previously mentioned, the meaning attributed to the term 'community' in this thesis aligns with that of the Norris model. Community is 'composed of built, natural, social and economic environments that influence one another in complex ways (Norris *et al*., 2008 p.128). This is consistent with the concept of community being applicable to groups or collectives operating at various scales within a system. Related to this is the relationship between community resilience and questions about whether a group of resilient individuals makes a resilient community (Kulig *et al*., 2013). Brown argues that community resilience is not simply an aggregate of individual resilience but it relies on complex relationships between a range of other factors, including physical conditions and social structures (Brown and Kulig, 1996). Brown's view reinforces the systemic nature of resilience and the key premise of this thesis that a systems approach should inform good practice design and implementation of disaster resilience policy.

1.24.2   External leadership

As mentioned previously, the term community competence is not generally used in disaster resilience research in the same context as leadership and empowerment, except by Norris and Kulig and their colleagues (Kulig, 1996; Norris *et al*., 2008; Kulig *et al*., 2013) However, leadership, particularly externally focused leadership, is firmly linked to the meaning of community competence as it is described in earlier paragraphs of this chapter and in Section 3.3. In this thesis, leadership with an external focus seeks to mobilise community agency to encourage political participation. This process may result in the establishment of political partnerships between government and the community or across various sectors. Leadership that garners political participation is defined as 'a behaviour that seeks to influence government actions by affecting public policy decision making. It can include voting, fundraising or other work to support political campaigns, or activism-type behaviour like public demonstrations, boycotting

or purchasing a particular product for political reasons (Verba *et al.*, 1995, cited in Park, 2013:1643). The Australian Bureau of Statistics stated that 'Leadership is a related concept to power relationships' (2004 p.82). The idea of power relationships is associated with external leadership where people are empowered in a political sense.

Internally focused leadership (a social capital policy objective) is more akin to leadership aimed at capacity building, which does not necessarily proceed to action.

External leadership characteristics include those displayed when a leader champions a team or group and works to further its interests (Haslam *et al.*, 2010). This form of leadership has much in common with the concept of 'social leadership' which is 'the act of orchestrating adaptive change in groups, organisations, communities' (Porteous, 2013:2). Leaders, in accordance with a social leadership model, do not necessarily have power or authority. Social leadership leads people on a journey to discover the issues and values that concern them through a process of open questioning and where uncertainty can be acknowledged and adaptation to changing circumstances is facilitated (Heifetz, 1994; Williams, 2005; Porteous 2013).

The idea of social leadership goes hand in hand with a method of community decision-making, introduced in Chapter 2, known as localism (Hildreth, 2011). Localism supports decentralised decision making, it empowers people and moves away from problem-solving approaches that are dependent on authority, particularly authority that is bestowed on the basis of technical knowledge, skills and understanding. It requires a process of adaptation which, while it may be aided by authority, is more powerful because it culminates in acceptance of uncertainty and the need to take responsibility to adapt to the reality that not all risk can be eliminated. This is a more complex process that may be uncomfortable and fraught with conflict for the participants but, in spite of this, is more likely to achieve satisfactory outcomes (Porteous, 2011, 2013).

A prerequisite for community competence may well be very similar to the qualities of overall good quality leadership. These are consistent with emotional intelligence and factors associated with transformation and 'change management'. It has also been proposed that 'good' leaders as individuals need to be decisive and open, focused on achieving, determined and accessible, to have integrity and intellectual versatility. They also need to show consideration for individuals and involve others in the formation of values and network (Leban and Zulauf, 2004).

1.24.3   Stakeholder engagement

Given the overlaps between the policy domains of social capital and community competence, a short discussion about the difference between community engagement (a policy objective of social capital) and stakeholder engagement (a policy objective of community competence) is provided below. The terms stakeholder engagement and community engagement are often used interchangeably (Butcher and MacLennan, 2010; Head, 2007b; Porteous, 2013; Wells, 2013) or may be conflated in the research and policy literature. 'Community engagement is the process of stakeholders working together to build resilience through collaborative action,

shared capacity building and the development of strong relationships built on mutual trust and respect' (Australian Institute for Disaster Resilience, 2013 p.2). This thesis makes a distinction between these two terms that is reflected in the way that they are included and applied in the Provisional framework. Their differences relate to their timing, level of influence, target audience, location and officers' and industry associations' involvement (Steynjes, 2017). Porteous (2013) argued that participation in decision making is built into stakeholder engagement but, not necessarily into community engagement. The group of people who are directly impacted by the activity, or are the target group for a project, or are recipients of a service etc. are the subject of community engagement, for example consultation with local residents whose building insurance premiums rise due to increased flood risks. In this sense, community engagement is done because it is seen as a standard requirement for the implementation of public policy (Head, 2007b), or to inform and obtain specific acceptance and support for implementation. This may extend to gaining the cooperation of community members and encouraging their participation in implementation activities. Stakeholders, compared with community member in general, have more capacity and are in a position to exercise influence over the implementation of a disaster resilience activity or to advocate for or against different disaster resilience measures. They may, or may not be, directly impacted by a policy, program or activity. Stakeholder engagement, as a policy objective of community competence, is characterised by collective efficacy. It includes activities to marshal resources and mobilise action, to solve problems and make changes.

The linkages between the concepts of social capital and community competence were highlighted in Sections 5.1 and 5.2. These connections occur via collective efficacy, described earlier as a bridge between the two; and through the concept of 'community capacity'. Community capacity is the 'capacity, skills and assets of community members and the opportunities for them to use these aspects in problem-solving' (Brown and Kulig, 1996:32-33). As seen in Chapter 4, social capital is very well developed in the general and disaster management literature, whereas, research on community competence is less so. Nonetheless community competence warrants inclusion in the Provisional framework as the second policy domain because it differs from social capital. Community competence is needed to achieve change that results in improvement, 'bouncing forward' rather than restoration to a previous state 'bouncing back' (Manyena, 2006; Manyena *et al.*, 2011)

1.25 Community Competence in the Case studies

The following section discusses how the five multi-level case studies employ the policy objectives of political partnerships, community participation, stakeholder engagement and external leadership to enhance community competence for disaster resilience. The term 'community' is used in the broad context described in Section 5.2.

1.25.1   National Flood Risk Information Project

The achievements of community competence was a fundamental goal of the National Flood Risk Information Project. The underlying aim of the NFRIP was to improve nation-wide access to information about floods. This would empower citizens to acquire and apply this information to undertake flood mitigation on their properties if needed. Its implementation was conceived and designed with clear and explicit lines of accountability, good governance, a communication strategy, a sound policy context, dedicated resourcing, and detailed planning and skilled project management (reference). In spite of this, unexpected and unplanned for barriers to the success of the NFRIP arose. As discussed in Chapter 4, and noting the similarities between community engagement and stakeholder engagement:

'There's a problem, portal is gonna fix it. GA build the portal. When really we should have said government had devised the solution before knowing what the problem was. What is the problem here and what problem are we trying to solve? Is building a portal going to solve that problem? Well no in actual fact, building this portal has actually identified or highlighted the problem. So that's the real problem that we are addressing' (Interview, Geoscience Australia, GA44, 2 May 2016).

It has been mentioned that agreement for the NFRIP was obtained at the highest level of government across all jurisdictions. It was assumed that this would facilitate federal government access to flood information. As a result of political expediency, stakeholder engagement was not given the necessary priority in the early stages of the NFRIP. Notwithstanding that it is outside of the scope of this thesis to consider the issues at the intersection of politics and policy, GA acknowledges that a top-down approach was problematic: even though the GA documentation includes a plan for stakeholder consultation, this process did not identify salient issues. A number of the state-based flood data custodians were fearful or apprehensive about relinquishing the information. This was in spite of ostensible political partnerships that looked to guarantee successful implementation of the NFRIP. However, it was not until the project was well advanced that it became clear that insufficient attention had been given to consultation and activities to enable collaboration with those operating at other levels of the system. This highlights the importance of stakeholder engagement and political partnerships, remembering that in the Provisional framework, the latter is concerned, not with politics in the usual sense but with polity and power relationships within a system.

After four years, two out of three key high value outcomes have been achieved. Firstly, the Rainfall and Runoff Guidelines have been reviewed and updated which is the definitive guide for flood engineers and consultants and, secondly a comprehensive analysis and documentation of all archival satellite imagery of flooding has been undertaken by project end, June 2016. In addition, complex IT infrastructure, data definitions and standards for the Australian Flood Risk Information Portal had been developed, testing completed, national roadshows of the portal's capability conducted and hundreds of flood maps, flood risk reports and risk management plans

obtained. Unfortunately, the contribution of the portal was hindered because of confused or overly restrictive copyright arrangements. This meant that all of the flood information obtained for the NFRIP had to be removed from the portal subject to copyright clarification. I assess this to have constrained community competence by delaying the dissemination to the community of flood information and reducing opportunities to mitigate flood risks and to potentially negotiate reduced insurance premiums.

On the other hand, community competence was judged to have been boosted in other ways: each of the three components of the NFRIP action has contributed to significant collective gains in the potential for all Australians to increase their local disaster risk awareness: The new Rainfall and Run-off Guidelines provide accurate and up-to-date information down to highly localised scales (Hazelwood, 2016b), and the LANDSAT imagery analysis has improved Australia-wide capacity to more accurately predict and manage flooding risks at the local level. In turn, this updated and localised information supports effective implementation. In this way stakeholders are able to perceive their local geographical environment as 'non-adverse' or one where they can better understand and manage local flood risks.

This case study highlighted a lesson for large scale initiatives which are driven from the top-down: do not underestimate the importance of stakeholder engagement; of carefully identifying the project target group; and of scoping interventions and activities that contribute toward the overall strategic goal. Fortunately, GA allowed the NFRIP project managers the authority and autonomy to address these issues. As a result, solutions were identified that are providing medium and longer-term benefits: efforts by GA to encourage data holders to ease copyright restrictions on flood data has enabled the portal to be reinstated; and a wider campaign by GA to free up access to publicly funded information will potentially deliver better overall policy outcomes in the long term.

The thoroughness of GA's internal project planning and implementation showed an appreciation of the importance of negotiation and agreement of roles and responsibilities. The disadvantages identified by GA in relation to the separation between it and the Attorney-General's Department of the NFRIP policy oversight role from its implementation function, points to the need for GA to strengthen its capacity for national policy management and coordination. This gap could be addressed by the application of subsidiarity principles, including devolved authority, supported by negotiated roles and responsibilities and support for capacity building.

1.25.2   *NSW Disaster Resilience Program*

The NSW Disaster Resilience Program (NSW NPA-DRP) established the Community Resilience Innovation Program (CRIP) 2013-14. Before the CRIP, the NSW NPA-NDR funding was predominantly allocated to the emergency services (with some to local government) for mitigation activities. It did not facilitate shared responsibility or wider community involvement beyond the emergency services. Community service organisations play a significant role in

disaster management (see Appendix 1). The CRIP provided a NSW government funding mechanism to community service organisations to participate in building disaster resilience that had not previously been available to them. This process is facilitating formal and less formal stakeholder engagement between emergency service organisations and the community sector. In addition, a stakeholder steering group has been established that includes representatives from each sector.

Even so, it is a CRIP requirement that 'applications from non-government organisations must include written endorsement from a government agency with emergency management responsibilities on the endorsement form provided' (NSW Government, 2019 p.2). Emergency service organisations predominantly operate according to a 'command and control' or 'top-down' hierarchical style while community organisations are more likely to subscribe to a governance and operating style that is multi-directional.

The CRIP project guidelines (NSW Government, 2019) make direct reference to the seven priority actions of the NSDR including those that fit most closely with community competence: 'Lead change and coordinate effort' and 'empower individuals and communities to exercise choice and take responsibility' (Commonwealth of Australia, 2011a). The CRIP guidelines for applicants also refer directly to the NSDR community engagement framework which emphasises empowering communities (Australian Institute for Disaster Resilience, 2013). Thus, the CRIP may be in a position to influence the culture of the disaster management sector to make it more open to multi-sectoral activity, consistent with community development and disaster resilience approaches.

The NPA documentation including the community engagement framework is cautiously worded in terms of the emphasis it places on empowering communities to participate in disaster resilience. 'An approach that seeks to empower communities is relatively new in the emergency management sector' (Australian Institute for Disaster Resilience, 2013:3). The use of the term 'empowerment' in this document refers to people being empowered to address disaster risks. There is also a caveat on the role of non-emergency services personnel 'different types of engagement and levels of community involvement are required for different phases of an emergency.'(REF) It goes on to explain that it is appropriate to work collaboratively with the community to prepare a 'town fire plan' but that a command and control approach is necessary when a town is threatened by a fire because of the 'legislated obligation of response agencies' (Australian Institute for Disaster Resilience, 2013:4). This message is ambiguous, making it unclear how community empowerment functions alongside what could be interpreted as a selective approach to community engagement and empowerment. More work needs to be done in this area, particularly to examine the interface between the legislated responsibilities of emergency service agencies and the role of community service organisations. For example, Community Resilience officers, in NSW, have been located within emergency services offices in NSW. It was reported that these officers feel isolated because of the low priority given to disaster

resilience by the emergency services. Interestingly, this sense of isolation was one of the reasons cited for the success of the community engagement sub-committee (CESC) stakeholder group. This group was established by the NSW Office of Emergency Management within the Department of Justice and is the steering group for the Community Resilience Innovation Program (CRIP). The CESC stakeholder group gives disaster resilience officers the opportunity to network with like-minded people working in both the emergency services sector and the broader community services sector. NSW Office of Emergency Management staff, who chair this committee and provide it with secretariat support, report that the non-emergency management sector organisations are very interested in getting involved in disaster resilience work. 'The community services sector has an absolute appetite to do this sort of work. And they see themselves as absolutely having a role in this within their community, particularly for their clients.' (Wendy Graham, former Manager NSW Office of Emergency Management).

NSW CRIP provides an example of disaster resilience best practice in Australia. It is notable that it is funded under the NPA–NDR, a program which has been a bastion for formulaic funding approaches for the emergency services for a long time. The CRIP is innovative in nature because it combines top-down and bottom-up approaches. The program was approved by the NSW bureaucracy, and at ministerial level, with little or no resistance and almost no red tape. This is particularly surprising given the CRIP is not co-funded like the other components of the NPA-NDR. An explanation for this apparent paradox may be that the NPA program retains a degree of flexibility because it is a federal program that is implemented in the states. Therefore, it is detached from its federal origins which buffers it from state-level political scrutiny. The lesson is to look for new and innovative ways of doing things within existing resources, not to underestimate the importance of having a champion (Interview, OEMW 6 May 2016). and the political partnerships provided by a group like the CESC stakeholders. In conclusion, CRIP is a good practice example of community competence for disaster resilience: through stakeholder engagement, empowerment, community participation and partnerships. It is considered a model disaster resilience program nested within an incongruous federal funding mechanism.

1.25.3 Lake Macquarie City Council: Marks Point and Belmont South Local Adaptation Plan for flooding including due to sea level rise (Marks Point and Belmont South)

The Lake Macquarie City Council's community engagement activities were shown to build disaster resilience through strengths in both social capital and community competence policy domains. LMCC staff were mindful to consult in accordance with the IAP standard that prioritised community capacity building and information and communication community and stakeholder engagement was an exemplar of community and stakeholder engagement. It also devolved aspects of the process to the community through the Community Steering Group. Members of this group

had expertise that amounts to a level of competence that may not have existed and been appropriate to do in a different community

Some contrasts were found between Lake Macquarie City Council (LMCC) documents and information obtained from interview relating to the development of the Local Adaptation Plan (LAP) that shed light on the extent to which this process supported community competence. The LMCC is clear in its commitment to community engagement, a policy objective for social capital, which relates to the establishment of a relationship within the community where a disaster resilience policy initiative is implemented (See Chapter 4 and 5.2 for an explanation of the differences between community engagement and stakeholder engagement).The consultations on the LAP with residents of the Lake Macquarie Shire are relevant to both the building of social capital and the ratcheting up of that capacity to become community competence.

The LMCC sought to establish relationships with a broad group of local government stakeholders, including the NSW Government (particularly the Office of Environment and Heritage), the Hunter Water Corporation, Telstra and local energy providers, and the Hunter Valley Research Foundation:

'We invited other government agencies and other service providers who were involved in the community to be involved in the process. There wasn't a lot of uptake with that but some key services providers like the water authority, for example, which is separate from council and who have got a lot of infrastructure that will be affected, certainly came to the early consultations and kept up with what was happening and had input into the final report. Some of the other private ones like the communications companies and the energy providers and so on, were informed but not really active participants' (Greg Giles, LMCC, Interview, 030516).

Included in the group of LMCC LAP stakeholders with industry wide and national influence was the Insurance Council of Australia (ICA). The ICA was also included as a stakeholder because residents were concerned about increases in the cost of insurance, LMCC was trialling the ICA's Building Resilience Rating Tool, and because the LAP aims to encourage incentives for householders to conduct building modifications and measures to reduce flood risk (Lake Macquarie City Council, 2016b, Appendix 1). One of the goals of the LAP is to work with the insurance industry to 'make their risk assessment and risk pricing more transparent and consistent' (Lake Macquarie City Council, 2016b, Appendix 1). The ultimate aim would be, not just for the LMCC but for all consumers of building insurance products to see the insurance industry base its insurance premium calculations on individual household flood risk ratings (Productivity Commission, 2014). The LMCC has demonstrated an ability and willingness to develop partnerships across different sectors and stakeholder organisations. It has links with national research networks and agencies including National Climate Change Adaptation Research Facility (NCCARF), CSIRO, and The Antarctic Climate and Ecosystems Co-operative Research Centre (ACE CRC). The ACE CRC worked with Sydney University's Architecture Faculty to design buildings for communities vulnerable to sea level rise. In addition, it was praised by NCCARF

for 'Engaging communities vulnerable to sea level rise (in the Lake Macquarie areas of Dora Creek, Swansea, Belmont) in a community empowerment process to discuss and develop local climate change adaptation plans.' (National Climate Change Adaptation Research Facility, year not known).

Political stakeholders played a role in the LMCC LAP 'So in this regard it appears the process was really initiated and supported by the elected councillors and they continue to support it very strongly all the way through' (Interview LMCG, 3 May 2016). One councillor challenged the position taken in relation to aspects of the LAP. He played an important role with a group of local residents who organised themselves to challenge the LMCC's early approach to LAP development. This forged a collaboration between Lake Macquarie residents and the LMCC that eventually resulted in the successful LAP. This is a demonstration of action to establish political partnerships, remembering that political partnerships arise from participation in the political process and can refer to formal and informal power relations. The informal political relationships that came into play during the implementation of the LAP were more significant than the formal ones.

Community participation is stated as an explicit goal of LMCC on its website under the 'Shape Lake Mac' initiative. Various LMCC projects are listed and people are invited to provide their feedback.

The LAP process was an exemplar of community competence. Although community participation was a characteristic of the process, it did not occur as originally envisaged by LMCC. The account from LMCC staff contrasted with the account from community leaders in that the former did not emphasise the role of community activism, even though it was a key driver. What both did, however, agree upon were the constraints under which local government works. Concessions were made to the fact that local government has limited autonomy and self-determination which in turn impacts on its ability to work authentically and fearlessly with local constituents. The final outcome demonstrates a high level of support, throughout the process, for actions that gave full rein to the forces of community competence. According to community members, the outcome would have been far different if he and his counterparts had not become involved in the process to the extent that they did. In other words, it was not by design that the Marks Point and Belmont South Plan happened but through an organic process where power sharing arrangements were negotiated between residents and the LMCC. In addition, the community working group was self-organising and included people who were highly motivated with a core of professional skills. There was and remains mutual respect between the individuals. LMCC staff were acknowledged for their commitment, skill and tenacity. The LMCC also had a very strong overt commitment to community participation that they were under pressure to uphold, or else be seen as disingenuous. It persisted to engage with community members to achieve the goal and was willing to work through conflicts experienced throughout the process (reference)Both also managed to retain a sense of ownership, sometimes expressed through a

narrative of tactical manoeuvring, which allowed both the LMCC and the residents to retain a sense of control. Therefore, my conclusion is that prescriptive detail about how to move forward was not a significant factor in their success, but it was their willingness to proceed in the spirit of community control. This included an approach that was taken by the LMCC that allowed experimentation and reflexivity.

1.25.4   Australian Business Roundtable for Disaster Resilience and Safer Communities

In section 5.2.1 of this chapter it was shown that community competence is achieved through collective efficacy. This is supported by externally focused leadership which facilitates action for change through stakeholder engagement and the forging of political partnerships. The structure and operational approach of the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) had characteristics that appeared to make it well placed to generate community competence. The ABRDR consists of chief executives in the Australian insurance, building, humanitarian/welfare, telecommunications, banking and finance sectors. Thus, the ABRDR is a microcosm of national multi-sectoral leadership capacity for disaster resilience (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019). The high-profile positions within the market place enjoyed by these corporations imbues them and their CEOs with a level of influence within the corporate world and across the community more broadly. The view that a group of corporate leaders is required to provide the necessary level of influence and leadership was expressed in an interview with a spokesperson for the ABRDR,

It was put to those organisations directly by our Chief Executive Officer (CEO) at the time that we needed their CEO's involvement and if the CEO was not involved then we didn't want you and if the CEO failed to participate, we will show you the door. (Interview ABRD30, 21 April 2016)

This implies that CEOs will be effective leaders for the ABRDR. Indeed, CEOs do have authority within their respective organisations but, as discussed in Section 5.2, effective leadership and authority are not the same thing. Authority can be defined as 'power in return for services' (Porteous, 2015). These services can involve the fulfillment of expectations, problem-solving and the maintenance of stability (Porteous, 2013). A key point of difference between authority and leadership is that leaders, 'ask the difficult questions' (Porteous, 2013:534). Although each of the CEOs have authority within their respective organisations and it is inherent in their seniority, they may not be effective leaders. Indeed, in practice, 'leaders are often authorities but may not be leaders' (Porteous, 2015).

ABRDR has published a number of reports to support the case for change to government policy, including an increased disaster mitigation investment (particularly for government owned assets), the pooling of data on disaster relevant issues, and the sharing of disaster risk information (Deloitte Access Economics, 2013, 2014, 2016a, 2016b., 2017). Its premise is that when

governments receive robust economic evidence, they drive policy decisions. 'Quality data leads to better analysis, analysis drives insight and greater insight changes behaviour' (Deloitte Access Economics, 2014:4). For the purposes of building community competence, the provision of credible evidence can empower those who seek change. ABRDR could also be said to have shown leadership by investing in the development of publications that can be used as hooks to partner with government.

The information produced by ABRDR and an expressed intention by whom? to provide access to industry data in a more ongoing and formal arrangement (Personal communication with Anna Kilmartin) may indeed have the potential to shift public policy toward disaster mitigation. However, even though there is a relationship between evidence for change and change itself, this relationship is tenuous (Paton, 2003). 'Increased knowledge is not useful for promoting behaviour change' (Australian Institute for Disaster Resilience, 2010:65).

The ABRDR has demonstrated an ability to engage some key government stakeholders in the national discussion on the need to reform Australia's disaster management system to be more resilient. Even so, ABRDR's achievement of its policy objectives is not a foregone conclusion. One of these objectives is to partner with government to change the system in ways that have been recommended in its reports. The ABRDR points to its submission to the Australian Productivity Commission Inquiry on disaster funding as evidence of success, 'The Roundtable's published White Paper 'Building Our Nation's Resilience to Natural Disasters' was one of the key drivers for a 2014 Productivity Commission review of natural disaster funding arrangements' (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2015). It quotes the citation of ABRDR reports in government communications and the presentation, in 2016, to the Council of Australian Governments (COAG) Law, Crime and Community Safety Council (LCCSC) as mentioned above. There has been no information about the outcome of this meeting in terms of its influence on government policy and decision making, but changes were made to the Natural Disaster Relief and Recovery Arrangements in 2018 that strengthen incentives for investment, by the state and territory governments in disaster mitigation (Australian Government, 2018). This is consistent with some of the recommendations from the Productivity Commission report that was formulated based on input received from over 220 written submissions, including the ABRDR submission, as well as through four public hearings (Productivity Commission, 2019). Other policy aspirations of the ABRDR were not adopted by government, such as the location of an agency within the Department of the Prime Minister and Cabinet to coordinate disaster management and funding (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2014).

Given its emphasis on working with government, the ABRDR's predominant approach is top-down which, compared with multi-directional implementation, is not optimal for the development of disaster resilience (Buckle, 2006, 2001 #183, Sabatier, 1986 #186, Mazmanian, 1989 #1131). The most recent ABRDR research is concerned with state and territory disaster risk

and resilience measures, and the report targets the role of state and territory governments in disaster mitigation. This may signify a more devolved style (Deloitte Access Economics, 2017) for the ABRDR.

ABRDR expresses an aim to engage with stakeholders apart from government. Its ability to achieve this would strengthen its advocacy firepower and the messages it seeks to promulgate. It has a clear line of sight into the business sector through its member organisations (ABRD30 210416). Its inclusion of the CEO of the Australian Red Cross indicates a willingness to work across other, non-business and non-government areas.

A representative from Insurance Australia Group (the convenor of the ABRDR), when interviewed for this thesis, stated that the ABRDR makes use of its business networks to promote its work in a multi directional sense (ABRD30 210416). For example, Insurance Australia Group is sponsoring a 'Confident Communities' project that involves consultation with 3000 people and is also working with the Australian Red Cross to promote the uptake of its RediPlan by developing an app titled 'Get prepared' (Deloitte Access Economics, 2017:64). Notwithstanding these relatively visible collaborations, the ABRDR acknowledges that it is difficult to measure how effective its activities are in promoting disaster resilience influence in the community and in government (non-published source). One example comes from the Insurance Council of Australia (ICA), the insurance industry peak body that conducts activities aimed at engaging a range of stakeholders, including consumers and government. The ICA has a long-standing role representing the insurance industry to federal government (2019a) and has developed a building resilience rating tool that has been promoted by a number of local councils (Insurance Council of Australia, 2019b), and provides on-line resources and seminars to inform people about insurance issues at local government and other community forums. The ICA General Manager of Policy Risk and Disaster attended such a forum convened for residents by the Lake Macquarie City Council.

The ABRDR has invested in setting up a working group comprised of less senior members of the ABRDR organisations (ABRDR Interview_30 210416). This increases its capacity to connect with a range of stakeholders at various levels of the system. For example, a member of the ABRDR working group presented to the Monash University Disaster Resilience Initiative Forum about the ABRDR in April 2016. The ABRDR states that it will establish. 'strategic alliances for change' and deliver in 'critical areas', including community education (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019). However, the ABRDR's awareness of the importance of other stakeholders and how it will engage them and work with government to achieve this vision is not fully articulated in its publications or in practice.

The ABRDR received an award from the United Nations International Strategy for Disaster Reduction (UNISDR) that indicates a level of international stakeholder engagement. With the federal government's enhanced involvement in disaster resilience in the international arena via

implementation of the Sendai Framework (United Nations International Strategy for Disaster Reduction, 2015; United Nations Office for Disaster Risk Reduction, 2018); Merrin-Davies, 2018) this may have the effect of highlighting approaches to disaster resilience policy shared by the ABRDR and the federal government. Again, the ABRDR's high level activity at UNISDR indicates that the messages in the ABRDR reports are filtering through the system in a predominantly top-down way.

The ABRDR has high level leadership capacity that is being directed externally to advocate for changes to government policy. While the federal government has made recent progress toward increasing its focus on disaster mitigation, this represents incremental rather than the transformative change that the ABRDR seeks. Indeed, the ABRDR's ability to generate community competence may be constrained due in large part to its reliance on influencing government, which has proved difficult to achieve.

The ABRDR has contributed to research by producing a number of detailed disaster resilience-related reports. It is important to note that this assessment of the ABRDR's relative lack of success in forging influence with government is not only related to the ABRDR operational model but it may equally relate to a generally underdeveloped take up of opportunities for government and business to share responsibility for disaster resilience (Hunt and Eburn, 2018)

In reviewing the extent to which the ABRDR places an emphasis on creating community competence, it may be fair to say that scale and targeting come into play. The group has the capacity to be influential; it has leadership resources and access to skills and expertise drawn from the corporations that make up its membership. However, certain ingredients for building community competence appear not to have been considered or have been omitted as part of the ABRDR's operating model. In particular, this is predominantly top-down. As such, approaches that could identify and target a broader range of stakeholders and opportunities to enhance community participation may not be maximised. For example, the ABRDR could employ horizontal or multi-directional pathways to capitalise on the reach and influence of associated industry groups such as the Insurance Council of Australia.

The ABRDR's working group and the commitment made by its member organisations to disseminate and promote its agenda through its corporate network signals its intention to leverage community competence. The realisation of community competence in terms of its ability to create political partnerships, engage stakeholders, utilise and direct external leadership capacity to empower others and encourage community participation is a work in progress.

1.25.5   Rivers and Ranges Community Leadership Program

The LMCC LAP gave rise to community competence in an organic sense or as a bi-product of the development of its LAP. In comparison, the Rivers and Ranges Community Leadership Program (RRCLP) is being implemented with a planned and deliberate focus on generating community competence. RRCLP documentation provides a thorough account of the program

from its inception through to its early establishment and ongoing maturation. All of the community competence actions (ie stakeholder engagement, outward focusing leadership, empowerment, community participation, and political partnerships) are articulated in the RRCLP objectives. Effective stakeholder engagement has been instrumental for the establishment of the RRCLP and will be even more critical for its sustainability into the future. For this reason, a stakeholder engagement plan is a centrepiece policy for the RRCLP.

A number of the individuals interviewed, who had graduated from the RRCLP, reported a strong personal sense of self-efficacy as an outcome of the program. RRCLP participants are very outward looking, but this has only occurred after some intense individually-focused personal development delivered through the RRCLP. It appears as if the RRCLP's process for developing social capital has been a necessary prerequisite for developing qualities and conditions consistent with community competence. Activities that create both internal and external modes of leadership were evident in the RRCLP's process of personal and professional development. This allowed the RRCLP to achieve change by leveraging political partnerships, building stakeholder relationships, and working with other sectors to move into other areas of disaster resilience capability, such as economic development. Of the seven people interviewed, two were certain that the program has enabled them to connect with others in positions of power and influence include within the emergency management system.

1.26 Discussion

Chen and Bliese's study on how higher levels of organisational leadership can influence collective efficacy by establishing clear roles and responsibilities, aligns with implementation of the subsidiarity principle (Chen and Bliese, 2002).

When thinking about the place of local government in the federal multi-level governance system, and the opportunities and constraints this places on its capacity to implement successful disaster resilience policy, the LMCC case study provided mixed information. While problems face local government in terms of enacting climate change policy are related to its lack of constitutional recognition, and the subordination of local government to state and territory legislation and authority (Preston and Scott, 2012) these difficulties are balanced by advantages that accord with its roles and responsibilities which accord with the enaction of the subsidiarity principle (Measham *et al.*, 2011) particularly empowered by its planning function. In line with this, LMCC did not see the need for change in this area although there was a sense of resentment, not toward the dominance of the state government in a legislative sense but toward its domineering approach in its dealings with local government (Thompson, 2011). Responsibility for the development and implementation of the LAP was seen to be situated appropriately. Local government is well-positioned to undertake community and stakeholder engagement activities that are essential to the success of the LAP.

'But unless the community is involved at some level these things don't work or don't get acceptance and so that is essential and again it is much easier for local government to do that. That is the right scale for these things to happen' (Interview LMCG49 3 May 2016).

Local government is also seen to have more flexibility than other levels of government and pre-existing responsibility in associated areas (flood management) that allows climate change adaptation to be integrated into its existing functions:

'And so we have basically added the climate change and particularly the sea level rise into that which, you know, in a purely physical sense and in a legislative sense hasn't necessarily been that difficult' (Interview LMCA49 030516).

Initiatives such as the LAP require very localised knowledge for effective implementation:

'We can provide a level of detail about things like hazard assessment and risk management by mapping things at fine scale, by having good knowledge of local infrastructure, of local community values and so on that goes into that risk management that's really important and that state governments generally can't do and they rely on our information and have done for a long while'(Interview LMCA49 030516).

The issue of coordination was a strong theme in the interviews (LMCG60 040516) as were the problems encountered when working with different levels of government. These arise largely because they operate at different levels which can cause confusion and difficulty for local government to gain trust for measures it wants to implement.

If local governments are given Constitutional recognition and thereby that gives them some more power to make their own decisions, not necessarily their own legislation, but maybe to make and defend their own decisions in relation to state and federal government, then providing that applies to the decisions that are being taken at the local scale, that would be really helpful. Because it does allow for councils to apply that local knowledge and come up with really good solutions which they can then apply whether the state government likes it or not.

An Australian report that reflects on the recovery response to the 2009 Victorian bushfires advocates for the integration of the different types of place-based strategies for building disaster resilience in complex systems: 'The integration of rational, instrumental and technological' resources is recommended in complex systems such as those where disaster resilience is the goal (Taylor and Goodman, 2015:217). The same report emphasised how the intervention of government disaster management agencies may inadvertently displace local capacity. It calls for change to allow community and place-based approaches to have the necessary legitimacy and authority in local disaster management, alongside the more hierarchical command and control structures (Taylor and Goodman, 2015). Ten concepts are outlined to guide 'highly adaptive generalisable community resilience'. One of these calls for 'Place-based and community-led regeneration and renewal' to be enshrined in recovery policy and cites in accordance with the subsidiarity principle (Taylor and Goodman, 2015:14).

In summary, I have described the role of community competence in the implementation of five disaster resilience programs. The theme of collective efficacy runs throughout the assessment of these activities. A number of areas of good practice were identified as were a number of difficulties that have highlighted barriers to achieving the policy objectives that foster community competence.

The case studies also reinforced the link between the policy objectives for social capital and community competence. They demonstrated how these two policy domains can be conceptualised on a continuum where the generation of social capital is a prerequisite for community competence and is vital for the action needed to create and enhance disaster resilience.

Chapter 6: ECONOMIC DEVELOPMENT

Provisional Disaster Resilience Policy Implementation Framework					
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change	Power-sharing
Policy Objectives	1. Networks	1.Political partnerships	1. Security	1.Resilience narratives	1.Capacity-building
	2.Place-based attachment	2. Stakeholder engagement	2.Economic diversity	2.Trusted information	2. Open access to information
	3.Community engagement	3.External Leadership	3.Equitable resource distribution	3.Skills and infrastructure	3. Negotiated roles and responsibilities
	4.Internal leadership	4. Local disaster risk awareness	4.Shared (equitable) risk allocation	4.Multi-directional information flow	4.Coordination
		5. Community participation			5. Stakeholder engagement

Figure 0-1 Provisional Disaster Resilience Policy Implementation Framework

1.27 Introduction

Economic development is the third policy domain in the Provisional framework depicted in the shaded area in Figure 6.1 (above).

Economic development is defined as:

> A dynamic process of economic growth where nation states generate sufficient savings and investment in order to diversify their economies, or the growth of national income per capita of developing countries. Such countries need sufficient savings and investment in order to diversify their economies' (Bannock, 1998 p.117).

In this chapter and throughout this thesis the term economic development is considered to be synonymous with economic growth.

Economic growth is concerned with increases in real domestic output or Gross Domestic Product (GDP) over time. GDP can be measured as either: the total value of output or production for the economy as a whole; or expansion in GDP per capita, which indicates the economic standard of living for a country's inhabitants (Jackson an McIver, 2005, p.546). Growth is desirable on both national and per capita scales because it 'lessens the burden of scarcity' and places a nation in a better position to resolve domestic and international socio-economic problems' (Jackson and McIver, 2005 p.547).

Economic development for disaster resilience can be both a 'pre and post-disaster strategy that is protective and restorative**'** (Hallegatte and Przyluski, 2010). In keeping with the scope of this thesis, the emphasis is on disaster resilience in the areas of prevention, preparedness and risk mitigation, with some spill-over into recovery, insofar as it is supports resilience. For example, adaptive measures may be implemented as part of disaster recovery to reduce adverse impacts from future disasters.

In accordance with Figure 6.1 economic development includes policy objectives that aim to achieve security, economic diversity, equitable resource distribution, and equitable financial risk allocation. Economic development and its policy objectives, are applicable to the economy in general and have a flow-on effect to peoples' ability to build and maintain disaster resilience. These policy objectives can be supported by a range of policy mechanisms available within the Australian federal system. As is the nature of systems, cause and effect are not in a linear relationship, so policy levers may not translate directly into the desired outcome. Furthermore, increasing uncertainty associated with a rapidly changing climate will present challenges for economic policy.

Thus, successful implementation of economic development policy for disaster resilience requires attention to the systemic nature of the Australian federation and its underlying disaster management arrangements (Appendix 1).

This chapter briefly outlines the traditional neo-classical approach and other theories of economic development relevant to disaster resilience policy implementation in Australia. I discuss how economic development policy implementation for disaster resilience needs to incorporate sustainability within more traditional economic approaches. I describe certain practices that relate to economic development via the four policy objectives in the Provisional framework and go on to comment on these as they manifest within the five case studies. The strengths and weaknesses of a number of policy mechanisms at work within these cases are highlighted and conclusions are drawn about factors that contribute to effective and less effective disaster resilience policy implementation. It is in this context that the significance of the subsidiarity principle in system-wide strategic economic development for disaster resilience becomes apparent.

1.28 Theoretical background

The classical and neo-classical view of economics is predominant in contemporary public policy (Gans *et al.,* 2003 p.407). In Section 6.2, I explain the main characteristics of neo-classical economics. This provides a platform for descriptions that follow of alternative economic theories or models that have features relevant to disaster resilience. These include innovation, behavioural economics, disaster economics, and sustainability. The idea that the aim of economic development is to grow the economy remains compatible across each with the exception of sustainability theory which is discussed in more detail in Section 6.2.4. Sustainability theory is considered to be particularly relevant because it offers theoretical and practical approaches that directly link economic development with disaster resilience. This supports its incorporation into the Provisional framework as the unifying theme for economic development.

Neo-classical or market economics describes theories of economics that fundamentally rely on the allocation and pricing of resources in society based on supply and demand. This is achieved through the operation of buyers and sellers in markets for goods and services whose decisions are governed by rational self-interest. The quantum of this economic activity provides a self-regulating system that tends to allocate resources efficiently and effectively without, or with minimal, involvement of a central coordinating authority or government. Market failure can occur when certain conditions are not met, including a lack of access to equal or symmetrical information about a particular market, unequal market power, and/or a quantity of buyers and sellers that is insufficient to create competition. Market failure may provide justification for government intervention. Such intervention aims to correct the cause in order to achieve more efficient and equitable resource allocation and may include the use of economic policy mechanisms including regulation, subsidisation, import and export duties and taxation (Gans *et al*., 2003, pp.3-15). The term microeconomics describes the behaviour of individual 'households and firms in terms of their decisions and how they interact in markets within an economy' while

the term macroeconomics is 'the study of economy-wide phenomena, including inflation, unemployment and economic growth' (Stonecash *et al.*, 1999).

Adam Smith is recognised as the 'founder of modern economics'. In his 1776 book *The Wealth of Nations* he advocated that for the economy to achieve optimal efficiency and stability, markets needed to operate freely, coordinated by the 'invisible hand' of prices (Stonecash, 1999, p. 9-10). Known as the 'classical school' Smith's theory has been modified over time and his later contributions are collectively referred to as the 'neo-classical' or 'new classical' group of economic theories. They continue to espouse the existence and power of competitive markets to manage the economy.

Rational expectations theory, which developed from the mid-1970s aligns with neo-classicism, but it factors in the importance of a thorough knowledge of markets and economic policies to anticipate market conditions (Jackson and McIver, 2005, pp.495-498). A variation on the neo-classical approach is the 'Keynesian School' that takes its name from John Maynard Keynes who, during the Great Depression questioned the ability of markets to self-stabilise and argued for a greater role for government in the economy (Heyne, 2000, pp. 437-438, p.522). This was the beginning of what came to be known as 'Fiscalism' which refers to the use of taxation or government expenditure as a way of managing the economy (Bannock, 1998, pp.157-158). More recently, the doctrine of monetarism has become the more accepted method. Monetarism involves the central government's adjustment of interest rates in order to regulate the quantity of money in the economy and control aggregate demand (Bannock *et al.*, 1998, p.279). Monetary policy and fiscal policy are both considered macroeconomic policy levers (Stonecash, 1999).

Rose uses economic analysis or econometrics to measure and compare the relative costs and value of various disaster management activities (Rose, 2004, 2006, 2007). He was concerned about maintaining the usefulness of resilience as a scientific concept to applied econometrics, hence his definition of disaster resilience is located within recovery, with the indicator being the speed of recovery following a shock, be it a financial or a natural disaster. Although he acknowledges the veracity of the evidence from cost-benefit analysis showing the cost effectiveness of disaster risk mitigation (that he tends to characterise as hazard mitigation), he maintains that hazard mitigation is an exercise in loss prevention which is more about resistance to shock, that is protection and hardening to prevent loss and damage, rather than about resilience. In his view this disqualifies it from being considered part of resilience which is concerned with whole system adaptation. He calls resilience 'a more holistic approach that should occur as part of disaster recovery' citing 'smartgrowth' (Godschalk 2000). A global analysis of the risks of economic losses and mortality for natural hazards was conducted in 2005 (Dilley *et al.*, 2005). Its findings suggest that there are certain natural disaster 'hot spots' across the world that are not only exposed to multiple natural hazards, but where risk of loss of life and economic losses are maximized due to combinations of high population densities living in economically productive areas. Many of the areas that are exposed to multiple hazards with the potential for interaction

between them, have high population concentrations. This increases the potential for loss of life and livelihood that is further compounded by damage to major infrastructure like dams and reservoirs that may be needed for the management of droughts and for flood protection (Dilley *et al*., 2005).

In the following sections I discuss innovation theory, behavioural economics and sustainable economic development: These are areas of economic theory that I have identified as having potential to guide good practice in disaster resilience policy implementation. Cost-benefit analysis is afforded special mention in Section 6.3.2 because it provides a tool that allows the value of resilience to be factored into investment decisions.

1.28.1   Innovation theory

Innovation is considered a new theory of economic growth and involves the application of knowledge to produce new knowledge (Bannock et al., 1998, p.208). Therefore, knowledge is central to an innovation economy which can be viewed as applying new, though not necessarily unique, ideas to business in order to achieve higher productivity. Modern economics tends to consider innovation as one of the few remaining and underutilised methods for achieving economic growth (McAllister *et al*., 2003). It relies on forms of capital not traditionally considered as means of production, including knowledge and 'big data'.

'Big data' refers to:

Data sets so large or complex that traditional data processing applications are inadequate; and

> Things that one can do at a large scale that cannot be done at a smaller
> one, to extract new insights or create new forms of value, in ways that change
> markets, organisations, the relationship between citizens and government, and
> more (Mayer-Schönberger and Cukier, 2013, cited in Biddle, 2015:3).

The availability and use of big data has been facilitated by the increase in the use of digital technologies that have provided new data sources. These can yield large amounts of information that are routinely collected from administrative systems, search engine queries, tracking devices like satellites and mobile phones and from social media (Tam and Clarke, 2015). The elements of an innovation system were identified by McAllister *et al*. (2003, pp.154-155) and include a knowledge base which is largely derived from investment. The emphasis is on business investment in scientific and technological research and development, and on market competitiveness. Private incentives are the main driver of market competitiveness and public intervention is employed only in situations where there is a possibility that markets might impede innovation. Higher productivity through an innovation economy means finding more creative ways of working and harnessing all resources, including people and ideas. This lends itself to considering different financing models for funding goods, services and infrastructure. An example of an innovative approach being taken by government is the NSW Social Impact

Investment Scheme which is a partnership between the public and private sectors. It is aimed at achieving social outcomes in areas such as child protection (NSW Government, nd). At a nationally strategic level, the federal government is implementing an Innovation Agenda which extolls the benefits of more collaboration between government and business. Funding of $1.1 billion for an Innovation Fund was provided over the four years, 2015–2019, for a range of measures to encourage data sharing, including through collaboration between industry and research managed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Australian Government, 2019a).

A report prepared by KPMG (2015) identified the need for Australia to seek more innovative financial methods for raising the higher proportion of private funds to address the shortfall in public finance for infrastructure investment. This is where innovation theory can offer opportunities for disaster resilience. Another example that aims to enhance disaster resilience and is included in one of the case studies undertaken for this thesis is the NSW Community Resilience Innovation Program (NSW Government, 2019). Innovative approaches require a greater tolerance for risk and experimentation and on the whole, business has a stronger record of engaging with risk than government (Business Council of Australia, 2014). The importance to disaster resilience of disaster risk reduction and mitigation suggests that more effective collaboration between the public and private sectors could deliver benefits (Hunt and Eburn, 2018).

The creation and sharing of knowledge and information are key factors in achieving economic productivity through innovation (Business Council of Australia, 2014; Commonwealth of Australia, 2015d; Organisation for Economic Co-operation and Development, 2015). Innovation encourages collaboration and lends itself to engaging with a broader range of partners and ideas. The application of innovation theory and practice has the potential to generate novel cost-effective approaches to disaster resilience by leveraging resources and attracting investment for disaster resilience, including for mitigation works that may otherwise be prohibitively expensive in the short term. However, innovation can be hindered by a reluctance to share information due to commercial sensitivities and the competitive advantage that comes from the exclusive ownership of data. Thus, commercial considerations, can impede a more open corporate culture that would support cross-sectoral partnerships. An example is a current lack of transparency in the methodology used by the insurance industry to calculate building insurance premiums in relation to disaster risk (Productivity Commission, 2014; Giles *et al.*, 2016). This can create a barrier to resilience on two levels: it can discourage individual customers from investing in mitigation works on property they are seeking to insure; and it can undermine confidence in the market to provide public goods, including to generate disaster resilience. Johannessen *et al.* recognised a tension between the need for businesses to retain a knowledge base to ensure their competitive advantage, and a dependence on sharing knowledge to stimulate innovation in order to sustain that advantage (Johannessen *et al.,* 1999). They proposed an encultural model of knowledge or skill transmission for innovation that may have particular

relevance for disaster resilience. An encultural model is circular and emphasises a 'system of relations between research and development, structural links, tacit knowledge, interactive learning, the cultural context, social processes, national and regional innovation systems and customer and supplier relations' (Johannessen et al., 1999:134). It is distinct from a linear model and emphasises learning and the links between the various types of knowledge.

While a full discussion of this issue is outside the scope of this thesis more work is needed to investigate how to overcome this barrier. The criticality of knowledge and information for disaster resilience is taken up further in Chapter 7.

1.28.2   Behavioural economics

Behavioural economics is a relatively recent addition to the field of economics that incorporates elements of psychology and sociology. This work was pioneered by Daniel Kahneman, psychologist and winner of the Nobel Prize for Economics in 2002 (NobelPrize.org, 2019 #1297}. Kahneman challenged the traditional economic view of rational decision making with the idea that people have unconscious biases that can influence their decisions and behaviours and which may not deliver the best outcomes (Kahneman, 2011). Decades earlier, Kahneman and Tversky proposed prospect theory that was concerned with how people make decisions under conditions of risk. They showed that people's behavioural choices tend to polarise toward extremes of risk-aversion or risk-taking without regard for the actual probability of loss or gain. This was most commonly exhibited as inconsistent preferences when the same choice was presented in different ways (Kahneman and Tversky, 1979). Later, Tversky and Kahneman looked at choices under uncertain conditions and observed that people's high weighting of low probability events explained the popularity of both lotteries and insurance (Tversky and Kahneman, 1992). These findings have significance for understanding the paradoxical choices people may make in response information about the risk of disasters, and when they are uncertain or have incomplete or a lack of information about disasters and disaster risk. Nudge theory expanded on this with ways of presenting information to 'nudge' decisions in directions that would overcome unconscious biases. The researchers demonstrated the value of applying nudge theory to the implementation of public policy to encourage people to make wise financial choices and adopt healthy behaviours (Thaler and Sunstein, 2009) The development of protocols and tools for the practical application of these principles followed. For example, 'EAST: Four simple ways to apply behavioural insights' was developed by the Behavioural Insights Team, a joint initiative of the United Kingdom Cabinet Office and NESTA, with the purpose of providing education, training and network support to public servants to incorporate these methods into government actions (Behavioural Insights Team, 2014). The method for developing projects must be underpinned by a thorough understanding of the problem and involves four stages: define the outcome by identifying the behaviour to be influenced; understand the context, build the intervention using the EAST Framework; and test, learn and adapt (2014). The Behavioural

Economics Team of Australia (BETA) was created within the Department of the Prime Minister and Cabinet, in early 2016, (Australian Government Department of the Prime Minister and Cabinet, 2019) as part of the federal government's innovation initiative and works across government agencies to factor behavioural science into public policy. For example, it worked with the Department of Health to successfully develop, test and implement behavioural methods that reduced the prescription of antibiotics by 126,000 scripts over six months (Australian Government Department of the Prime Minister and Cabinet, 2019:6). Evaluation and measurement of the effectiveness of behavioural strategies using statistical methods is emphasised as being critical in applied behavioural economics. The ultimate goal is to establish causation between a behavioural measure and the successful implementation of policy. Randomised controlled trials are the 'gold standard' method but if this is not practical, for example, due to lack of data or limited sample sizes, other forms of evaluation should be conducted. Behavioural economics measures have potential application to disaster resilience policy implementation and go hand in hand with experimentalism, which is a model of policy implementation (see Chapter 2) that aims to test government policy to identify effective strategies and to make improvements (de Búrca *et al.*, 2014; Sabel and Simon, 2011; Sabel and Zeitlin, 2012; Sunstein, 2013). The application of behavioural economics can improve tdisaster resilience policy implementation and has the potential to reduce both tangible and intangible disaster losses. Unconscious biases exist in relation to the perception of disaster risks. This, coupled with the low correlation between the delivery of information and the achievement of behaviour change (Paton, 2003, Australian Institute for Disaster Resilience, 2010) indicates that current approaches to disaster risk communication, education and training could benefit from the application of behavioural approaches. This also accords with the thesis findings presented in Chapter 7.

A practical example of behavioural economics can be seen in some of the issues relating to the federal government's Natural Disaster Relief and Recovery Arrangements (NDRRA), which provide funding to the states and territories following a disaster, among other things, for the reconstruction of public infrastructure and assets. These payments, which are reimbursed to the states and territories in future financial years, are triggered once the cost of the damage reaches a pre-agreed threshold. The proportion of funding provided by the federal government compared with the state and territory share of funding rises sharply when state and territory expenditure reaches a certain level. Even though the federal government has proportionally more resources and this could be seen as fair allocation of these, it resulted in inequitable risk allocation because the states and territories were not bearing the full cost of their disaster risk. This constitutes moral hazard in the form of the unintended consequence whereby the states and territories were incentivised not to take full responsibility for their own disaster risk. In turn, this has the effect of discouraging extra expenditure to enable the restoration of infrastructure to an improved standard to make it more resilient to future disasters. Notably, aspects of this problem have since been

addressed in the latest NDRRA which provides greater incentive for disaster mitigation of state-owned public assets and infrastructure (Australian Government, 2017, 2018a).

1.28.3   Sustainable economic development

The best indicator of countries' successful development is no longer sheer Gross Domestic Product but rather risk adjusted, sustainable growth' (Pricewaterhouse Coopers, 2011)

Sustainable economic development links the concept of economic development with the environment and is defined as:

> the notion that economic development should be done in a way that preserves the environment and natural resources. It can also apply to the notion of "steady state growth" a view that human populations should be stabilised and only renewable resources used (Bannock *et al*, 1998 p.401)

This section outlines theoretical links between economic development, sustainability, sustainable (economic) development, and disaster resilience, as well as a number of advances that have been made to operationalise sustainability for policy implementation. This supports the proposition made in the Provisional framework that disaster resilience policy implementation needs to incorporate sustainability via the policy domain of economic development.

In Chapter 2, I described how resilience has theoretical roots across many disciplines and how social ecology has been attributed with the shift of resilience from the material sciences to the social sciences. It is also the field that has given rise to the idea that resilience is linked to sustainability: 'The property that most closely connects with the idea of sustainability is resilience' (Perrings, 2001:323). Achour and colleagues took this further by claiming that sustainability bridges natural systems and human systems, and can be regarded as integrated with resilience (Achour et al., 2015). The interconnection of sustainability with disaster resilience is reflected in the following definition: 'sustainability is the ability to tolerate and overcome damage, diminished productivity, and reduced quality of life from an extreme event without significant outside assistance' (Mileti, 1999:4).

Sustainability first appeared in the academic literature in studies by Martinez-Alier (Martınez-Alier, 1991, cited in Costanza, 1992). Ecologists and economists debated the definition of 'carrying capacity' and whether 'degradation of the resource base' would always result from the use of resources even when they are renewable (Martinez-Alier, 1992:48). Sustainability, however, largely came to prominence with the release by the UN World Commission on Environment and Development of the Brundland Report which provided the following definition: 'Sustainable development is development that meets the needs and aspirations of the present generation without compromising the ability of future generations to meet their own needs' (Brundtland, 1987:43,292).

Efforts to distinguish 'sustainability' from 'sustainable development' followed. This arose from the discussion about the relationship between economic growth and poverty alleviation in developing countries. It was argued that goals for economic development and the environment were not incompatible and new criteria for sustainable economic development were proposed: These were less concerned with national aggregate economic growth than with the goal of reducing poverty through secure livelihoods while at the same time, minimising social and environmental disruption and damage (Barbier, 1987).

Goodland's response to the Brundtland report claimed that it did not go far enough and in order to achieve the goals of sustainability, a departure from conventional ideas of economic growth as 'the unquestioned objective of economic development policy' would be necessary (Goodland *et al.*, 1991:1). Goodland viewed the economy as a sub-system of the global environment and because its resources are finite, he argued that sustainability could not be achieved without trade-offs in economic growth. Countries with greater resources have a greater capacity to pursue simultaneous goals of economic growth and environmental sustainability. Unfortunately, in poorer countries strategies for economic growth are essential to alleviate poverty but at the same time these tend to put greater pressure on the eco-system than they would in wealthier countries. The significance of this goes to the question of whether sustainability is achievable while pursuing economic growth and development. Goodland addressed this by distinguishing between economic growth and economic development. He asserted that the former is quantitative and the latter is qualitative and incorporates the need for improvement and adaptation (Goodland, 1991:2-3). He recommended affirmative action to achieve sustainable growth in developing economies in the form of direct spending on the environment, claiming it was good for the economy in its own right (OECD, 1991, '*The state of the environment'* in Goodland, 1991). Other scholars countered Goodland by arguing that ecological sustainability was not incompatible with economic growth in terms of the traditional concept of increased productivity. They asserted that investment in environmental sustainability could deliver growth, in the form of increased productivity, to rich and poor economies alike (Bartelmus, 1986; Barbier, 1987), especially in the long run (Lélé, 1991). Lélé (1991) also made the point that is important to note for this thesis that, community and stakeholder participation are essential for ensuring that economic development is sustainable.

During the 1990s Pezzey made the links between economic development and sustainability more explicit within economic theory (Pezzey, 1992a; Pezzey, 1992b). His review of the sustainability literature from a multi-disciplinary perspective provided a definition of sustainability from economic theory: 'maintaining utility (average human wellbeing) over the long-term future' (Pezzey, 1992a p.321). Pezzey eschewed the idea that sustainability is mutually exclusive with economic growth, although the Director of the World Bank's Environment Department commented in the Foreword of an economic analysis of sustainable development authored by Pezzey in the same year that 'economic development that erodes natural capital is

often not successful' (Ashry, 1992, quoted in Pezzey 1992b:5). The view that economic development is sustainable on condition that the environment is taken into account was corroborated by Tolba, (Tolba 1987, in Pezzey, 1992b #851) who recognized that better natural resource management would improve sustainable economic development. Overall, this reinforced advice from the Organisation for Economic Cooperation and Development that ecological sustainability is possible concurrent with strategies to increase productivity to generate economic growth (Organisation for Economic Cooperation and Development, 2001).

Parallels were drawn between resilience theory and sustainability theory in an explanation of resilience as it applies to adaptation to change in ecological systems and the long term systemic nature of sustainable development (Dovers, 1995; Dovers and Handmer, 1992). The same study made the distinction that sustainability is a long-term goal and sustainable development is the 'process of moving toward that goal' (Dovers, 1995:93). Three categories were used to analyse the propensity for change by political and other institutions in response to risks posed by natural hazards: resistance to change; change at the margins; and openness and adaptation. These tendencies were further categorised as reactive versus proactive resilience (Dovers and Handmer, 1992) and serve to highlight parallels between sustainability policy and resilience in relation to hazard management. This, and subsequent work was used to develop methods to incorporate the concept of sustainability into policy practice which helped to move the academic discourse about resilience away from ecological theory and towards applied policy research. In Australia, researchers considered sustainability in terms of system responses to change, with policy development and implementation being a means of effecting that change (Dovers and Handmer, 1992; Dovers, 1997; Hezri and Dovers, 2009). Similarly, a systems-based approach that integrates sustainability with resilience planning was recommended in a US study that advocated for a 'complete understanding of the interactions within all the elements of a system (Tobin, 1999:22) Sustainable development was described as a 'pathway of deliberate endogenous change (improvement)' (Dovers, 1997:304) that enables adaptation where conditions are dynamic and uncertain, as in those created by natural hazards (Handmer and Dovers, 1996; Ronan, 2014).

The discussion above reinforces the decision to adopt sustainability as the unifying theme for economic development within the Provisional framework. It does this by demonstrating how the concepts of sustainability and sustainable development are closely linked to resilience theory; how they can be included within economic development and are applicable to developed as well as developing economies. It also explains how the two terms can be understood to mean one and the same thing.

Uncertainty in socio-ecological systems has been identified as a key factor in the application of traditional economic models (Folke *et al.*, 2002; Folke *et al.*, 2005; Folke *et al.*, 2010; Holling, 2001). Folke and his colleagues identified how very uncertain and unstable system can make it difficult to implement policy, and specified disaster resilience as particularly challenging. For example, price signals are difficult to apply when future costs are unknown, highly unpredictable

and based on assumptions of stability (Folke et al., 2002). Later, connecting resilience with sustainability and social and economic factors, Folke *et al*. asserted that not only was economic growth on its own incompatible with sustainability but technological solutions without regard to nature would be inadequate to create sustainable futures (Folke *et al.*, 2002). Walker and Salt emphasise the interdependence of humanity and nature and the need for collaboration as a way of managing socio-ecological systems and building in economic incentives. Management approaches could include creating early warning systems to allow change to be monitored to avoid irreparable damage to ecosystems (Walker and Salt, 2006, 2012). While the theoretical basis for this thinking was emphasised as socio-ecological, Salt and Walker expanded the application of resilience to a variety of settings and sectors, including government policy and hazard management.

In spite of advances in thinking about how to integrate sustainability into social, economic, environmental and disaster risk reduction policies, it was noted as recently as 2015 that sustainability is fragmented. Unfortunately, there are signs that this fragmentation carries over into disaster resilience and there is a need to integrate resilience and sustainability with a focus on the built environment and critical infrastructure resilience (Achour *et al.*, 2015). Indeed, definitions of economic development (including the one provided in the introduction to this chapter) tend to come from mainstream economics and do not take natural disasters or sustainability into account. Even disaster resilience scholars tend to locate economic development within traditional or mainstream economic models. For example, the Norris model, which provides the basis for the Provisional framework, conceptualised economic development in terms of business and industry drawing on sources of capital in the form of available assets and resources (Norris *et al*., 2008). Sherrieb *et al*. (2010) expanded on the Norris model by reviewing indicators for economic development that could be used to measure community disaster resilience. She acknowledged the limitations of gross domestic product as an indicator of economic development and reviewed alternative indicators that are inclusive of social factors and environment, referred to as the 'human aspects of the economy' (Anderson, 1991; cited in Sherrieb *et al.*, 2010:229). However, these could not be used because of problems with accessibility, availability and access to local level data. Neither study identified sustainability as a factor in economic development.

An overseas study that was confined to the application of sustainable economic development in developing countries identified three policy mechanisms from economic theory to operationalise sustainable economic development: cost-benefit analysis (incorporating environmental impacts); resource accounting and macroeconomic policies; and incentives. The need for a combination of top-down and bottom-up approaches was proposed whereby macroeconomic policies would be complemented by local and regional projects and sectoral policies for sustainable economic development (Barbier, 1987:107-108). It was noted that these mechanisms had more chance of success where there are regulatory institutions and arrangements

and reliable economic data. This infers that the policy mechanisms recommended can be successfully applied in developed countries, including Australia.

Figure 6-2 presents a model for disaster risk reduction that integrates sustainability with resilience. The Venn diagram (a) below on the left consists of three dimensions of sustainability: social; environmental; and economic. It was developed by the International Institute for Environment and Development (IIED) in 1969 (International Institute for Environment and Development, 2009, cited in Achour *et al.,* 2015). The Venn diagram (b) on the right depicts the addition of resilience with the earlier model.

Notes: (a) Resilience and sustainability before integration; (b) resilience and sustainability after integration
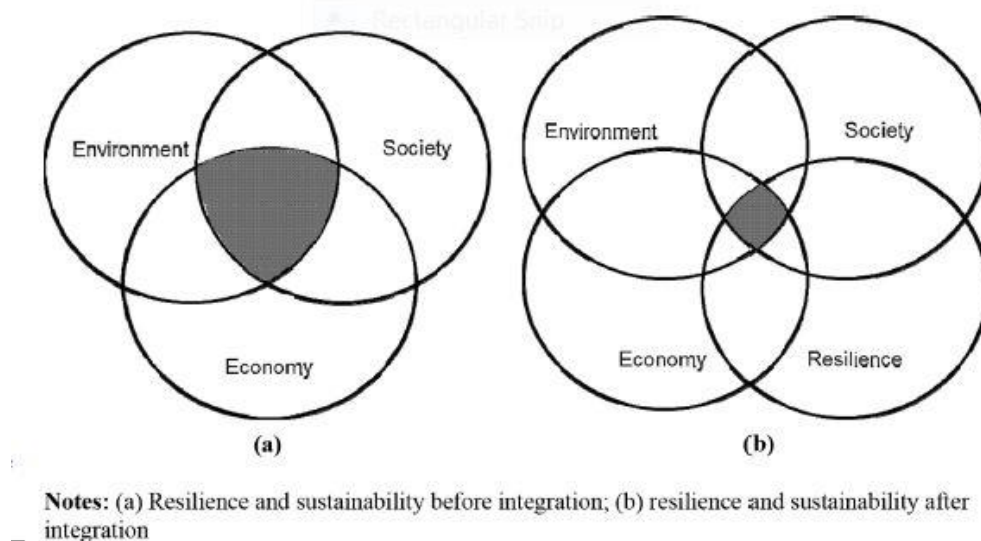
Figure 0-2 A integrated model of resilience and sustainability for disaster risk reduction

The Hyogo Framework was replaced by the Sendai Framework for Disaster Risk Reduction 2015–2030. The Sendai Framework has maintained its integration with sustainable development and has a stronger overall emphasis on resilience and resilience policy implementation (United Nations International Strategy for Disaster Reduction, 2015). Australia reports to the United Nations on progress in the implementation of its national disaster risk reduction goals (United Nations International Strategy for Disaster Reduction, 2018). This may further encourage the incorporation of sustainability goals into Australia's national disaster resilience policy implementation arrangements.

Clearly the policy links between disaster resilience and sustainable development are well established in developmental economics (United Nations International Strategy for Disaster Reduction, 1999, 2014). They are now seen to be joining up on a new front: that of climate change:

Social, economic and environmental sustainability can be enhanced by
disaster risk management and adaptation approaches. A pre-requisite for
sustainability in the context of climate change is addressing the underlying

causes of vulnerability (Intergovernmental Panel on Climate Change 2011, 2012, both cited in Handmer and Dovers, 2013, p.118-119).

Further, the imperative to consider environmental sustainability when devising economic policy is becoming, or has become, equally as important for developed economies as climate change challenges converge with those of natural hazard management (Achour *et al.*, 2015 p.350). The probability of a certain event is only calculable when there is past experience of that event. Without probability there is no certainty and, therefore no ability to predict the future with any degree of reliability or confidence. This situation creates special challenges is critical for disaster resilience policy implementation because of its overwhelming focus on risk management. The study of economics does, however contribute to the practices for assessing and managing risk in an uncertain environment that is relevant to sustainability and adaptation. Where there is uncertainty as seen in predictions of climate change, there is insufficient knowledge to calculate probabilities so alternative approaches are needed for making decisions about investments. One such method is in the field of cost-benefit analysis: referred to as 'other options', it is suitable for climate change adaptation because it builds flexibility into the method (Dobes, 2008; Dobes *et al*., 2016).

Encouraging economic development has also traditionally relied heavily on mechanisms such as incentives to encourage investment and or certain economic behaviours. To be effective this approach tends to rely on short term reinforcement. However, in the field of disaster resilience it is difficult to incentivise behaviours such as investing in expensive mitigation, such as raising house floor levels or the heights dams, when the benefits are long term with little present benefit. It can be argued that many of the economic models that are most commonly applied are inappropriate for disaster resilience because it is a long-term goal with benefits that are, for the most part, intangible. Population health advocates encounter a similar problem when they argue for prevention over treatment of illness (See Chapter 2). There are difficulties in proving that there is a benefit attached to something that has been prevented. From an economic point of view standard cost-benefit analyses may not be not appropriate. An alternative is social cost benefit analysis which factors in tangible and intangible costs and benefits and allows choices to be made between various preventive approaches (Dobes *et al*, 2016).

1.29 Policy Objectives in action

1.29.1   Equity of resource distribution

An equitable share of resources applies at individuals and household levels and at the subnational and national levels. Access to material resources (income) is used either directly to pay for goods or to acquire assets to meet the needs of daily living such as food, housing, clothing and utilities, not to mention non-essential requirements. At subnational and national scales, equitable access to resources is determined by how fairly a nation's resources, acquired from economic activity, are shared between the various groups within that nation, thereby allowing for

the provision of public and private goods and services. This includes healthcare, education, public infrastructure, law enforcement, and financial services etc.

A strengths-based approach has been emphasised in this thesis as an attribute of disaster resilience rather than a focus on vulnerability for reasons that were outlined in Chapter 2. Nonetheless, it is necessary in this section to mention inequity in resource allocation insofar as it reinforces the importance of equitable resource distribution. On an individual scale, inequity can be demonstrated by indicators such as wage disparities between different groups. Importantly the term 'equity' is not an absolute value but one which is relative. Therefore, there may be high levels of resource allocation equity in countries with low levels of economic development, while there may be significant inequities in wealthy countries. Importantly, inequity in the share of resources is a predictor of vulnerability among individuals and groups (reference). For example, it was overwhelmingly the poor (many of whom came from African American backgrounds) who died or were rendered homeless and displaced by Hurricane Katrina. Those who had access to a motor vehicle and could more readily evacuate and those who had access to cash were found to have more options for avoiding the impacts of the hurricane (reference). However, Norris *et al*. reasoned that poverty per se, which she described as the quantum of resources is less important as a determinant of disaster resilience than having diverse resources (Adger 2000, Cutter 2006, cited in Norris *et al., 2008*) and sharing them fairly (Norris et al., 1999).

The demand for resources will always exceed resources, so the question of how to allocate scarce resources in society is central to the discipline of economics (Gans *et al.,* 2003, p.4). This results in unresolved tensions around deciding the optimal allocation of resources between competing priorities. Associated with this concept is the dilemma of 'opportunity cost' which is what is given up to get an item (Gans *et al.,* 2003, p.6).

'There are two broad reasons why governments intervene in the economy - to promote efficiency and equity' (Gans *et al*, 2003 p.11). Resources need to be equally available to citizens and groups to ensure equity of opportunity and optimal participation in economic development. Much has been written about the need for a welfare safety net to correct inequities in resource distribution. One of major reasons to do this, apart from humanitarian motives, is to limit the numbers of people who are excluded from full social and economic participation due to economic disadvantage. This will also reduce negative impacts on the economy that will occur as a result of a large proportion of the population having limited financial resources and poor spending power. At the national level, an equitable distribution of resources, at the highest level, means that 'Gross Domestic Product (GDP)[2] is balanced among sectors. While the quantum of resources available to share amongst the members of a population will vary between different countries depending on their GDP and other economic indicators, the evidence indicates that even in the

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[2] A measure of the total flow of goods and services produced by the economy over a specified time period (Bannock, G, Baxter, R.E & Davis, E. (eds) The Penguin Dictionary of Economics, 6th Edition, 1998)

presence of these differences, an inverse relationship exists between inequities in wealth distribution and the health and well-being of the population**.**

The federal government has a range of economic policy mechanisms at its disposal, some of which derive their authority directly from the Australian Constitution and have the capacity to directly influence disaster resilience. Section 96 Financial Assistance to States, allows the Commonwealth to provide funding grants to the states and territories with conditions and Section 51, Parts xxiii and xxiii empowers the Commonwealth, under the Social Security Act, to pay pensions and other benefits as part of Australia's social services program. The Federal Financial Arrangements give rise to a number of subordinate instruments, including National Partnership Agreements, which is the main mechanism for providing funding to the State and Territory governments for disaster mitigation and risk reduction activities.

As well as in government, economic policy objectives play out in the not-for-profit and non-government sectors, which occupy an important role in the disaster management system. Some, including the Australian Red Cross deliver household disaster preparation and planning programs and implement resilience-based approaches through post-disaster recovery programs (reference). NGOs and NFP organisations are commonly expected to step in and provide services to communities using their mainstream capacity and resources. When these are diverted to disaster relief and recovery tasks there is an opportunity cost. NGOs make a significant contribution to disaster relief and recovery. The pressure this places on resources, particularly over the long term time-frames for recovery. This, and the disparity between the allocation of resource to disaster mitigation compared to disaster response and recovery reflect structural inequities that are barriers to disaster resilience.

The aim of equitable resource distribution for disaster resilience during the response and recovery phases is to ensure people, groups, organisations, businesses etc within the system have options for achieving and maintaining an adequate level of functioning, either by drawing on their own resources or through mobilising resources outside of their direct community. It follows that a fair or equitable distribution of resources is protective (references) although having access to resources is not a guarantee of avoiding loss and damage from disasters altogether. The effect of having an equitable share of resources (in which access to resources is implicit) determines the capacity of people to prepare, plan and reduce their disaster risks. For example, the cost of elevating the floor of a dwelling to reduce the risk of flood damage may cost several thousands of dollars which may be out of reach of many. There is also the common situation of home owners being uninsured or underinsured due to resource limitations. Resource constraints may prevent a community organisation from developing a business continuity plan or having the capacity to relocate to alternative accommodation, deal with power outages etc. Local governments constantly balance competing demands between the need to generate revenue with decisions about land management that may increase hazard exposure and result in environmental degradation. On a larger scale, the cost of major mitigation works, such as raising the level of a

dam, may be considered prohibitive by the asset owner (primarily state and local governments), despite being presented with compelling evidence of the long-term benefits.

Disparity, or large inequities in the sharing of resources and wealth as distinct from the absolute value of resources creates conditions that are counter to disaster resilience. It remains that those with relatively lower economic capacity are less able to withstand shocks including the shock of a disaster. Indeed, this was the Australian government's policy rationale for its response to the Global Financial Crisis (GFC) which was to provide cash payments to people and certain industries to stimulate the economy. While I do not advocate socialist policies and acknowledge the importance of competition and enterprise for economic development, I do contend that unfettered market economics contributes to a culture of winners and losers. Following the GFC, critiques of free market economics highlighted the pitfalls of a globalised economy with weak or non-existent financial regulations and safeguards.

Notwithstanding a level of disenchantment with neo-classical economics, regional, national and sub-national economies primarily continue to operate in ways that reflect a globalised economic environment. This is characterised by urbanisation with populations and economic activity concentrated in cities and large metropolises. Decisions (and the authority to implement decisions) to manage the allocation of resources within and across local communities have become more centralised and production more specialised. This goes hand in hand with an enhanced ability to shift resources including knowledge, goods and services rapidly and efficiently within the system. This is enabled by workforce mobility and advances in technology and infrastructure such as telecommunications and logistics. Within the economic system this creates less reliance on local resources and has advantages in terms of economies of scale. This can create efficiencies resulting in productivity gains and economic growth; however, it can also have disadvantages in terms of over-reliance on maintaining large public and private infrastructure assets for supporting uninterrupted economic and social activities. In relation to disaster resilience this can have the effect of reducing system redundancy[3] and increasing risk should assets malfunction or become damaged or destroyed.

This discussion highlights the somewhat mixed outcomes that may result from implementing a policy with the objective of equitable resource distribution. On the one hand, it is an appropriate policy objective to achieve aggregate economic development and disaster resilience; however, to achieve system wide equity would mean that resources need to be disbursed or devolved to all levels of the system, particularly lower levels. The prevailing economic approach favours the opposite: greater specialisation and economies of scale as ways of building productivity and

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[3] 1. Provision or existence of more than one means or resources to perform an activity or function. http://www.businessdictionary.com/definition/redundancy.html

economic growth. Good practice in disaster resilience policy implementation will ensure that more is done to balance the risks against the efficiencies created by centralisation and specialisation in the supply and provision of goods and services .

1.29.2   Equity of risk allocation

In relation to equity of risk allocation, it is necessary to explain the idea of risk allocation and how this relates to disaster resilience. Risk allocation is interpreted in this thesis in two interrelated ways. In economics risk is: 'the state in which the number of future possible events exceeds the number of events that will actually occur and some measure of probability can be attached to them' (Bannock *et al.,* 1998, p. 364). In disaster management risk is: 'the likelihood of harmful consequences arising from the interaction of sources of risks, communities and the environment' (Australian Institute for Disaster Resilience, 2019a)

Risk, in this sense, is quantified in monetary terms. This has a bearing on decisions around investment where different options have varying rates of return accompanied by different levels of risk. Financial risk has an impact on markets, including the market for insurance, which is the foremost mechanism for managing risk both in a general sense and in the context of disaster resilience. Economic and financial analyses can be used to calculate risk, which may or may not factor in social costs. Note the discussion in Chapter 2 regarding the tangible and intangible costs of disasters and social cost-benefit analysis earlier in this chapter. Secondly, in disaster management, risk is a function of the likelihood and consequences of damage and loss when exposed to a hazard (Australian Institute for Disaster Resilience, 2019a). Loss and damage refers to injury or death of people and loss and damage applies to the built or natural environment. In this context, allocating risk equitably means exercising fairness in assigning responsibility for the costs of potential loss and damage from a disaster, remembering that risk is distinguished from uncertainty for which no probability can be calculated (Dobes *et al.*, 2016). Poorer people tend to be more vulnerable to natural disasters and bear a greater proportion of the total risk than other members of the population (Godschalk, 2003). As was pointed out in 6.3.1, those with a smaller share of resources can be more vulnerable to loss and damage from disasters. This can include a reduced capacity to reduce their risk due to their inability to afford insurance.

It is important to be realistic when considering the role of the insurance industry in relation to managing risk for disaster resilience. Insurance is a mechanism that apportions value to disaster risk or the consequences of disaster impacts. This value is then bought and sold in the marketplace as insurance premiums. A basic principle is that insurance can transfer risk and share some of the risk but it does not bear the whole risk, regardless of the cost of a premium. According to the insurance industry, the steps for managing risk are: assess the risk; decide on acceptable level of risk; ask whether or not the risk can be mitigated; and reduce the risk using either risk reduction or mitigation practices or transferring the risk or part of the risk to someone else, usually the insurance provider. Underpinning this is the need to understand that there is a residual risk for

which a level of tolerance must be accepted. In addition, insurance does not bear the costs of all transferred risk. This means that some risk remains with other parties, including the customer.

Insurance can support economic development by providing disaster insurance to support the security of households, businesses and livelihoods and thus local economic recovery following disasters (Commonwealth of Australia, 2011b). Insurance as policy mechanism can encourage more accurate identification of risk ownership and supports the equitable allocation of risk; this is an example of shared responsibility. Inadequate valuation of risk is tied to an inability to identify and ascribe ownership of the assets that are subject to that risk (Young *et al.*, 2016; Young and Jones, 2018;). This may lead to a situation where assets that are damaged or lost in a natural disaster cannot be recovered. This increases economic insecurity and hardship experienced in communities impacted by natural disasters. The insurance industry has a role in improving disaster risk management which can include building more transparency into its methods for valuing risk and how this affects the cost of insurance premiums this situation. On the other hand, the insurance industry has developed innovative insurance products that could be harnessed, in Australia, to increase investment funding for disaster risk mitigation (Hunt and Eburn, 2018).

Insurance and risk is a complex field as is establishing what constitutes equitable allocation of risk. In this thesis, the meaning that is attached to the concept of 'equity of risk allocation' is that the nature of a risk is identified and assessed insofar as possible; the cost of managing or reducing that risk is calculated; and the person/s or entity with responsibility for bearing that cost is established and the various parties share the cost proportionally. The cost of managing a disaster risk can involve the cost of mitigation that is undertaken to reduce the risk or it can involve purchasing insurance or reinsurance, should the owner or asset user decide not to carry the full cost of the risk themselves. Those who are responsible for bearing the costs may include the owner or owners of the asset or those who enjoy a benefit or amenity from the asset. Purchasing insurance means that part of the risk is transferred to a third party, that of the insurance company. The purchase of insurance coverage is encouraged by proponents of disaster resilience policy because it has the potential to reduce loss and damage and to support recovery should the person be impacted by a disaster.

Problems may be encountered in identifying those who are accountable to manage disaster risk and in deciding how to allocate or share the risk fairly across all parties. These difficulties are due to a range of factors including reluctance by insurers to reveal how disaster risk is costed; reluctance or inability of all or any of the parties to pay for risk treatments; concerns around possible legal ramifications of acknowledging ownership of the risk; a lack of knowledge and skills about the risks and how to manage them; and disincentives (perceived or otherwise) relating to concerns about reduced property values and the possibility of increases in insurance premiums. Insurers may also be disadvantaged by a lack of information about the risks in respect of the insurance coverage they are selling. This reduces the effectiveness of the price signal which is

perhaps the single most valuable lever for disaster risk reduction and prevention (Boyer and Porrini, 2008).

Insurance not only has a critical role in allowing asset owners to transfer risk, which would otherwise be unaffordable, but has value as a lever for risk reduction and prevention (Surminski *et al.*, 2015). An obstacle to the equitable sharing of risk is moral hazard that can manifest in insurers having different goals to their customers. Moral hazard is: 'a distortion of the market due to the presence of incentives for individuals to act in ways that incur costs that they do not have to bear' (Bannock, 1998 pp. 284-285). Perceptions of moral hazard may result in judgements following disasters that the insured party did not adequately put preventive measures in place or inaccurately presented information about its preventive safety regimes (Boyer and Porrini, 2008). Moral hazard can also be an unintended consequence of government disaster relief and recovery assistance where the government becomes the insurer of last resort (Commonwealth of Australia, 2011b). The revised Natural Disaster Relief and Recovery Arrangements have gone some way toward preventing moral hazard by building in incentives for the state and territory governments to reinvest a portion of relief and recovery funding into disaster mitigation (Australian Government, 2018a).

1.29.3   Economic diversity

Economic diversity as a policy objective is linked to the other policy objectives of equity of risk allocation, equity of resource distribution, and security of livelihood. A more diverse economy, in general, provides more opportunities and options for sharing risk by providing different choices and opportunities for business investment and employment. An exception to this was illustrated in regional Australia where it was found that diversity did not always increase competitiveness in the market place, so was 'not enough on its own for promoting economic development'. (Pricewaterhouse Coopers, 2011:2). Diversification reduces risk by increasing redundancy within a system. However, there are trade-offs between diversification and efficiencies that can result from specialisation, as mentioned previously. This there is some evidence that this trade-off is less pronounced when insurance coverage for possible shocks can be obtained (Ramcharan, 2005).

Economic diversity 'encourages growth and reduces the impact of external events' (Pricewaterhouse Coopers, 2011). Pricewaterhouse Coopers also makes the claim that 'advanced economies are often less diversified than developing economies' pointing to the collapse of Ireland's export industry during the Global Financial Crisis (Pricewaterhouse Coopers, 2011:4). Economic diversity has been shown to apply at various scales, for example many farmers who traditionally relied on a single product such as wheat, sheep or cattle are increasingly learning to diversify by incorporating other activities such as aquaculture and new crops. This provides redundancy by building in capacity to substitute more lucrative farming activities for others that may be suffering a downturn and allows them to adjust their production for fluctuating climatic

conditions and market preferences. While farmers may adapt by diversifying their farming practices over the longer term in response to changing conditions, including slow onset disasters such as drought, diversity will also enhance resilience to sudden onset shocks whether they are as a direct result of economic events or a natural disaster. For example, Cyclone Yasi in 2010–11 destroyed a large proportion of the North Queensland banana crop which supplies 90% of the Australian market and which in 2009–10, provided 13.6% of total business turnover and supported 14.6% of total jobs in the region (Banana Growers' Council and Horticulture Australia, 2013:21).

The need to diversify economies in some regional areas is becoming more acute. For example, in the La Trobe valley, Victoria, the closure of its brown coal fired power station was predicted to put its economy under considerable pressure (Asher, 2016). Similarly, South Australia experienced a prolonged period of structural adjustment while it diversified its economy in preparation for the closure of its Holden automobile parts manufacturing industry in 2017. The government responded by awarding grants to existing manufacturing firms dependent on the car industry (Australian Broadcasting Corporation News, 2014).

At a national level, the need for diversification of industries is often expressed amid concerns about Australia's increasing dependence on China as a trading partner. Indeed Australia's economy is more dependent on China than any other in the world, with export to China comprising 8.5% of total exports in 2003-14, rising to 32.5% in 2013-14 and continuing to grow (The Conversation: Business and Economy, 2014). At the household level, in addition to income, asset diversity has been shown to be protective and to provide a buffer to disaster loss and damage (Vatsa, 2004).

1.29.4   Security of livelihood

Security and stability of livelihood was grouped with economic growth and equitable distribution of income and assets drawn from a community's resource base were seen as essential for resilience (Adger, 2000; Richardson, 2014; Aldrich and Meyer, 2015). While security of livelihood is interrelated with the other policy implementation objectives it is important in its own right: it implies a feeling of emotional, physical and financial safety that brings confidence in the ability to provide for oneself and one's family; and it supports self-reliance, which is a cornerstone of disaster resilience. At a larger scale it manifests as economic confidence, which is fundamental to the ongoing healthy functioning of economies. Conversely, a loss of confidence in the economy can have a negative influence. For example, the stock market is highly sensitive to tangible and intangible changes in social and economic circumstances.

The significance of livelihood security to Australia's economic health and development is demonstrated by the inclusion of national employment statistics in the suite of economic datasets collected and released monthly by the Australian Bureau of Statistics (2020). Economic development and growth create confidence throughout the Australian economic system. The

economic confidence of individuals revolves around a sense of optimism for the future, a belief that they will be able to meet their physical daily living needs and achieve their aspirations to improve their quality of life and that of their families. A capacity to do this relies on having an income derived from employment. The same principle applies to groups of people, communities, organisations, businesses and government. The quantum of this activity, *ceteris parabus*[4], contributes to economic growth and prosperity that can be shared. If employment and income are uncertain or sporadic, a person's sense of security is undermined and it has a negative effect on their confidence to engage in the sorts of activities that allow them to envisage a future where income and assets will be obtainable. In turn, this inhibits activity that contributes to the economy. In practical terms this will deter spending, particularly discretional spending. Livelihood security is also impinged upon by the erosion of the value of income and assets in real terms by inflation.

The way this impacts disaster resilience is that people are less likely to spend money or time on volunteering, household readiness and disaster preparation, business continuity planning, disaster mitigation (for example some local councils sell flood maps and information to boost council income), purchasing and learning about disaster resilient building design and materials, raising floor levels etc. Changes in the nature of the workforce and employment patterns in Australia has the capacity to undermine market-based and individual economic confidence: While earlier concerns about casualisation of the workforce have recently been assuaged (Ai Group Economics Research, 2018; Australian Bureau of Statistics, 2019) a trend toward the loss of full-time jobs without an equivalent increase in part-time jobs (Janda, 2016) and other factors including under-employment, youth unemployment, slowing wages growth and growing unemployment within the ageing population remain a problem. All of the above suggests that income prospects are tending to become more dynamic and uncertain which can not only constrain people's capacity to devote resources to disaster preparedness and risk mitigation but it may also contribute to poor physical and mental health and therefore, their ability to build personal resilience (Beer *et al.*, 2016). This also applies at the federal and, to a lesser extent, state and local government levels where predictions of a decreasing tax base due to reduced future revenue are causing some concern regarding future economic growth and prosperity loss of economic confidence (Commonwealth of Australia, 2015a).

In 6.3 I have discussed how the policy objectives for economic development operate generally, and how this has implications for the implementation of disaster resilience policy. The main focus has been on the significance of the policy objectives for individuals, households and communities; and the issues this raises for government policy.

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[4] Ceteris Paribus is the assumption of "other things being equal", meaning that with the exception of the variable being studied, all other variables are constant (Jackson, 2005 p.38).

1.30 Economic Development in the Case studies

1.30.1   National Flood Risk Information Project

Examining the implementation of the National Flood Risk Information Project (NFRIP) revealed some lessons about economic development for disaster resilience in the area of equitable risk allocation. The National Flood Risk Information Initiative had the backing of the insurance industry, all levels of the Commonwealth Government and politicians alike (Commonwealth of Australia, 2012a; Trowbridge, 2011). In-principle, the aim of remediating knowledge asymmetries in the community concerning flood risk is sound. Ensuring citizens' access to quality and consistent information about flooding allows flood risk to be appropriately allocated and informs action to mitigate that risk. This can translate into more widespread flood risk mitigation. However, some of the NFRIP outcomes were unanticipated. In particular, the NFRIP demonstrated that a sound concept with high levels of support for a course of action is not a guarantee of policy success.

The three NFRIP components are delivering benefits that are assisting research and practice to predict flooding and develop flood mitigation measures. The National Flood Risk Information Portal is up-and-running after the resolution by Geoscience Australia of some of the copyright matters that had previously prevented its full utilisation. This experience, has been discussed in the two previous chapters through the lens of social capital and community competence previous has provided some valuable policy implementation lessons that have ongoing relevance in the area of equitable risk allocation for disaster resilience. These lessons are also related to good practice principles of information and communication that are discussed in Chapter 7. While the NFRIP project was formally completed in June 2016, Geoscience Australia remains involved because the issues that were highlighted by the NFRIP are systemic and of ongoing relevance to its work program, Community Safety (Interview GA45, 2 May 1996, Geoscience Australia, 2019).

Implementation of the NFRIP identified inconsistencies in the application of copyright law as a significant barrier to open access to information and the sharing of responsibility for disaster resilience. Flood maps can cost many hundreds of thousands, if not millions of dollars, depending on the area to be mapped, the specifications and whether or not associated flood risk assessments and flood risk management plans are included. Most are publicly funded with many commissioned by local government, due to delegated state government responsibility for flood management.

Many local governments do not have the in-house resources or skills to undertake flood mapping and must purchase this expertise from the flood consultancy industry. While it could be assumed that the information produced would be treated as a public good and made publicly available, this is often not the case. Copyright over the information produced in flood studies is very inconsistent and there may be multiple ownership arrangements within the one flood study.

For example, while the original contract between the client and the consultant may attribute copyright to the client (or provide the commissioning organisation with a continuous and irrevocable licence to use the information), the actual published document may state "All Rights Reserved" thereby vesting copyright in the consultant. In these circumstances, a local government could breach copyright law by publishing a flood map on its public website. While this may be an administrative oversight due to the use of a contract template rather than a deliberate restriction, the outcome is the same (Interview GA42, 2 May 2016). If the federal government obtains flood maps with dubious and or unclear ownership provisions, it is exposed to an unacceptably high chance of behaving illegally. This severely limits its capacity to operate in this environment.

Consequently, Geoscience Australia, with the support of other federal government agencies is seeking to rectify this by identifying the scale of the problem on a case by case basis and engaging the help of the various stakeholders, including engineering consultancy firms and state governments. It is campaigning for them to audit their flood maps and reclassify them so they are available in the public domain (Hazelwood, 2016a). While the reinstatement of the portal, is evidence of progress, some data custodians remain reluctant to openly share flood information. This is in spite of the dissemination by GA of evidence that there is a low chance of legal liability attached to the sharing of flood data that may not be 100% accurate (Eburn, 2008; Eburn and Handmer, 2012). The persistence of beliefs and attitudes that are resistant to change, even in the face of robust scientific evidence is a phenomenon that well known in psychology. Psychological and behavioural barriers can lead to people being unwilling to share information. In Section 6.2.1 it was emphasised that according to innovation theory, economic productivity and prosperity rely on the exchange of knowledge and ideas. How to balance the need for privacy and security against the benefits of more open access to information is currently being taken forward by the Federal Government.

Barriers to sharing information can adversely impact disaster resilience. The promotion by Geoscience Australia (GA) of a new narrative to replace habitual reluctance to share the information draws on the theory of the virtuous circle of continuous quality improvement. This notion is central to innovation and entrepreneurship (Zahra, 2008): 'if flood information is re-used and models are applied repeatedly for various locations and requirements, the original model and material improves in quality and versatility' (Hunt and Eburn, 2018:487). GA's approach is to promote the potential for a win-win situation by changing the default copyright of all flood maps and flood risk assessment and management plans to Creative Commons 4.0 Attribution, even for commercially generated reports. Their economic rationale is that if flood risk information is a commodity, then the current lack of consistency and incomplete availability constitutes market failure. Measures to rectify this will create a more efficient (and competitive) market where benefits will accrue to all parties, commercial and non-commercial. This compares to the current situation where transaction costs are very high for engineering and flood

consultancy firms. Producing a flood map often involves duplication of effort. The quantum of resources needed to tailor a flood map (which usually involves building on existing information) for a specific client may be a small proportion of the total cost, compared with the effort needed to recreate the foundational information, models, (could be topographical, elevation data etc). Much of this base information is likely to be in existence but inaccessible due to copyright limitations (Hazelwood, 2015; Geoscience Australia, 2016). Ensuring this information is in the public domain for everyone to use, including commercial entities, will result in lower overheads that can be passed on to the client.

The GA strategy can be implemented with relative ease and at minimal cost and is thus 'low-hanging fruit' (Hazelwood, 2016). The proposition has been being well-received in the engineering and flood risk consultancy sectors and key opinion leaders have indicated their support (Interview, Hazelwood, 2016). In this way, gains in disaster resilience can potentially be achieved by gaining industry acceptance for the take-up of more efficient copyright administrative 060516practices in the short term. In the longer term, further research is needed around intellectual property and copyright law that might include investigating options to mandate Creative Commons 4.0 Attribution in certain cases and/or allowing exemptions for information generated to serve a public good, particularly when it is publicly funded.

If government and business work together to adjust copyright practice and procedures, there is the potential to provide early gains by encouraging all sectors of the community to learn about their disaster risk and to take appropriate action to mitigate that risk. Promotion of the 'virtual circle' model with stakeholders also offers an alternative business model for companies and investors. Both of these strategies offer economic benefits that are theoretically consistent with economic growth and development.

There are, however, other challenges associated with providing better access to disaster risk information to support equitable financial risk allocation that remain unaddressed. These relate to the insurance industry and are discussed in Section 6.4.4: The Australian Business Roundtable for Disaster Resilience and Safer Communities.

1.30.2   NSW Natural Disaster Resilience Program

Comments about the policy objectives at work in this case study centre around the National Partnership Agreement – Natural Disaster Resilience and its characteristics as a funding mechanism. The overlay to this is the consistent message throughout this thesis that Government should correct the disparity between the amount of funding provided to relief and recovery compared with disaster prevention, preparedness and mitigation. This could include developing more or better policy levers to encourage disaster resilience noting that the NPA-NDR while offering a degree of flexibility to the states and territories, is administratively cumbersome (OEMW 64, 060516 Interview).

The relatively low level of government funding provided for disaster mitigation through the NPA-DRP, compared with relief and recovery is an example of unequal, possibly irrational, decision making about resource allocation (approximately ten times more funding is allocated to relief and recovery) rather than inequitable resource allocation. It is irrational because the disparity persists in spite of evidence that mitigation is more cost-effective in terms of reducing future damage and loss from natural disasters. This does not mean the reasons for these choices are invalid and indeed most would not want funds to be diverted from disaster relief and recovery assistance if people are deprived of the help they need in the aftermath of a disaster. There are also strong political incentives for governments continue to promote the provision of funding assistance in times of disaster. A solution to this problem lies in the field of behavioural economics. Indeed, there is some evidence of the application of behavioural economics in the most recent changes to the Natural Disaster Relief and Recovery Arrangements. In 2018 the NDRRA was amended to build in incentives for state and territory governments to direct savings on reconstruction costs into mitigation (Australian Government, 2018).

In a direct reference to economic development, the Community Resilience Innovation Program, funded under the NSW NPA-DRP seeks to operationalise the principles of innovation. In addition to the CRIP, there is another component of the NSW NPA-NDR that aligns with equitable risk allocation: The former National Emergency Management Program (NEMP) (See Appendix 1) has been incorporated into a new National Partnership agreement whereby funding is allocated to the states and territories based on their respective disaster risk profiles (reference).

1.30.3 Lake Macquarie City Council Local Adaptation Plan for Flooding including due to sea level rise (Marks Point and Belmont South)

The Lake Macquarie City Council (LMCC) used funding provided by the NSW Government, via the National Partnership Agreement- Disaster Resilience Program, to undertake the Local Adaptation Plan for Flooding for Marks Point and Belmont South (LAP). Funding came from the same program to support the development of the second LAP for the Pelican Blacksmiths area, which is also part of the Lake Macquarie Local Government area. Unfortunately, this funding stream is not ongoing, nor is it guaranteed because it is subject to a grant application process. In addition, LMCC must match the amount provided by the state government.

In terms of security (of livelihood) the Lake Macquarie City Council area has an unemployment rate of 5.3% which is 1.1% higher than the NSW average. In the Lake Macquarie City area, 20.6% of the population is aged sixty-five years and over, compared with the NSW average of 16.3% It does, however, rank relatively high among Australian Local government areas on the Socio-Economic Index For Areas (SEIFA) at 355 out of 544. (Lake Macquarie City Council, 2019). Lake Macquarie's high proportion of older people and unemployed may impact their security of livelihood. As mentioned in the case study information in Chapter 3 many older

residents of Lake Macquarie have invested in lakeside blocks that they plan to subdivide to fund their retirements. Their sense of security was thus closely connected to the maintenance of their land values. When LMCC first consulted with residents about a plan to manage sea level rise people directly associated this issue with rises in insurance costs. At a consultation meeting with residents, a representative from the insurance industry attributed the cost increases to the flow-on effects of the severe disasters in QLD in 2010–11, not the publication of the Lake Macquarie flood information. Unfortunately, many people did not feel reassured and this added to the strength of feeling among resident that proved to be a significant barrier to the development of the LAP.

Firstly, at the local scale, resources available to LMCC residents for matters associated with implementation of the LAP are largely non-monetary and mainly consist of guidance about making properties more flood-proof. Some of these resources are available from LMCC and its website, while others are made available through the Insurance Council of Australia which provides a building risk assessment tool (Insurance Council of Australia, 2019b). In this way resource distribution is equal because the same products are theoretically available to all, but it may or may not be equitable. Other factors can come into play that may impact equitable access including computer literacy given that older people tend to have lower levels of computer literacy (reference), and the LMCC area has a high proportion of residents aged over 65 years (reference).

An additional rates levy was authorised by the NSW government for LMCC that will assist in implementation of elements of the LAP. This is applied to all rate payers regardless of whether or not their properties are predicted to be affected. This could be seen as inequitable on a household level but on a larger scale it provides a level of equity for the whole LMCC community because the extra funding contributes to a range of LMCC programs, not just the LAP. Perhaps the most prominent question about equity of resource allocation goes to the quantum of funding resources available to LMCC and local government. Not only have the responsibilities of local government increased in recent years but the additional cost to implement disaster resilience policies will place an even greater strain on their resources. 'Local Government in NSW is already struggling to remain financially viable, suffering from decades of rate-capping and Government cost-shifting' (Giles and Stevens, 2011:13). This issue is a recurrent theme in submissions from the Australian Local Government Association to the federal government and specific mention is made of the need for more funding support for disaster mitigation (Australian Local Government Association, 2020). In relation to the implementation of the LAP for Marks Point and Belmont South extra costs will accrue to local governments for adaptation works that will include upgrades to public infrastructure, and restoration works. Even before the LAP could be produced, LMCC undertook numerous preparatory studies to ensure it had the best available local flooding data which adds to the cost. This will be the first of many LAPs for the Lake Macquarie local government area and while the costs of adaptation measures will not begin to impact until after 2020 for the Marks Point and Belmont South area, new financing models will need to be

developed. These will ensure local government has the ongoing capacity to conduct this program and to implement adaptation programs in other areas covered by the Lake Macquarie local government (Giles and Stevens, 2011). Other costs of implementation of the LAP will be borne by rate payers which raises issues of affordability, given the high percentage of older people in the area and the relatively higher levels of unemployment (Lake Macquarie City Council, 2019).

The federal government provides funding to local governments, through the states, under the Financial Assistance Grants. Indexation of these grants had been suspended until 2018 which may go some way toward rectifying this situation. Equitable resourcing also applies to the equity of allocation of resources for mitigating hazards. Future costs are discounted and this was reflected in community preferences to address the current issues that form part of the total picture of flood mitigation programs in LMCC, particularly the need for infrastructure upgrades, such as drains and pipes (see case study).

The issue of equitable risk allocation is complex and plays out in this case study in a number of ways. In relation to disaster resilience it theoretically means that whoever owns the asset, (be it natural or built) and who benefits, from the asset should bear the risk of loss or damage to that asset. The purchase of insurance is a way of 'outsourcing' some of that risk to a third party for the price of an insurance premium. In reality, the situation may be far less clear because the risk must first be identified and quantified as must the owners of that risk, and by extension there must be agreement about who should bear the cost of mitigating that risk. The risk that remains after all mitigation efforts have been made is referred to as 'residual risk' which is uninsurable. In Lake Macquarie there is a community expectation that the costs of adaptation will largely be covered by public funding even though privately-owned property is also at risk of flooding, particularly in the longer term. The LMCC experience was that residents discounted the future financial benefits of private adaptation measures (Lake Macquarie City Council, 2016a, 2016b). Residents focused on the need for more immediate adjustments and upgrades to infrastructure that are within the bailiwick of LMCC rather than longer term mitigation measures involving the community as a whole. It was believed that this was related to the increasing degree of scientific uncertainty around flood level predictions further into the future. This infrastructure is expensive to build and maintain. The forecast costs would challenge the capacity of local government to achieve equitable risk allocation to implement the LAP, particularly in established communities. In 2016 LMCC received $30,000 per home for three homes per year for three years from the NSW government for a trial of house raising. The results may provide information which will assist in the implementation of future programs to encourage more widespread uptake of this practice among home owners. Another equity concern is that the insurance industry does not have well-developed policies to allow property owners who conduct mitigation works to pay less for insurance, commensurate with their lowered disaster risk. LMCC has included this as a goal in its LAP implementation plan.

Localised or 'place-based' disaster risk information is a resilience-based approach to disaster risk management that can contribute to economic development through more accurate identification, ownership and risk valuation. For this reason, in Chapter 3, I included local disaster risk awareness as a policy objective in the Provisional framework for the community competence policy domain. Flooding risks, in particular, are highly localised and current responsibility to manage these is devolved to local government (albeit with some funding support from other levels of government). The issues of equitable resource allocation and equitable risk allocation go hand in hand. LMCC identified that the future cost of adaptation and mitigation measures to deal with increased flood risk due to sea level rise will disproportionately be borne by local government. While theoretically this may place the allocation of local risk with the appropriate local authorities it is inequitable on two fronts. First it occurs against the backdrop of existing resource constraints on local government and will exacerbate them. Secondly it undervalues local communities in an economic sense and the aggregate contribution they make to national economic prosperity. A more equitable approach would involve state and federal government providing a more equitable share of resources to build capacity within local government to enable it to satisfactorily meet its local responsibilities.

1.30.4 Australian Business Roundtable for Disaster Resilience and Safer Communities

The measures advocated by the ABRDR in its reports, if implemented, would have major significance for economic growth and development, most obviously in relation to support for innovation, sharing or redistribution of the economic risk of disasters and a recalibration of resource allocation toward disaster mitigation and risk reduction (Deloitte Access Economics, 2013, 2014, 2016a, 2016b, 2017). It is, however, unlikely that change of such magnitude will eventuate, at least in the short or even medium term. The ABRDR reports are valuable resources, at the very least insofar they contribute to a far greater understanding of the contemporary issues relating to disaster management in Australia. This is a unique contribution given that the disaster management discourse is generally dominated by government, and research, perhaps to a lesser extent. In terms of this case study and the policy domain of economic development, ABRDR's publications and reports collectively highlight matters related to the economic aspects of disasters and link disaster risk reduction and mitigation into 'a broader fiscal, economic and social debate …. it is not just an insurance issue. Insurance is at the end of the chain. It has got to start up and you've got to do the preparedness, land use planning etc, whereas insurance only kicks in when the disaster happens. Out of all the policy objectives for economic development, shared (equitable) risk allocation was the only policy objective directly relevant to the area where its insurance industry representatives ABRDR could potentially make inroads. could do this by building more transparency

1.30.5   Rivers and Ranges Community Leadership Program

The Rivers and Ranges Community Leadership program case study indicated that it appreciates the role of economic development in disaster resilience policy implementation. It has given activities that emphasise economic growth and development a high priority in its program.

The emphasis placed by the RRCLP on economic development as a means of creating resilience to disasters was an unexpected outcome of this case study. As a community based organisation it was expected that the RRCLP would have a comparative advantage in terms of building social capital and community competence. RRCLP did indeed demonstrate well developed knowledge and skills about how to grow social capital and empower communities. Surprisingly, it was also able to apply these attributes to partner with business and expand into programs aimed at building economic development within its catchment area.

1.31 Discussion

Issues relating to the federal system emerged prominently in this chapter when considering the 'Policy Objectives in Action' Section 6.3 and in the application of the Provisional framework to the case studies. The economy and how it functions is a core concern for government and civil society who have a role to play in actioning the four policy objectives, be it to achieve economic development generally or to enhance disaster resilience. The federal government has economic policy mechanisms available to it to raise tax revenue, undertake resource redistribution, and to influence employment and inflation to name a few, but these are relatively blunt instruments when it comes to creating disaster resilience. It does have some mechanisms to develop funding policy and to target the provision of funding to achieve specific disaster resilience outcomes but these are limited. By comparison, the state and territory governments have a narrower funding base but they have the authority and more economic policy levers to enact resilience programs that can reach into a range of metro, regional and local areas. Business, particularly the insurance industry, has capacity to operate in ways that can make a difference to the level of disaster resilience across Australia. In short, economic activity across all sectors can result in growth that can provide people with the financial and personal resources that will enable them to participate in society in ways that can encourage shared responsibility to build national disaster resilience. For example, to encourage collaboration and investment to create economic conditions conducive to disaster resilience and to provide incentives for disaster prevention, preparedness and risk mitigation that can reach into and deliver benefits at the local level. However, and perhaps most importantly, this chapter has shown that whilst economic growth is important, it must not be at the expense of the environment nor reduce the resources available for future generations. Thus, the policy objectives for economic development for disaster resilience need to incorporate principles of sustainability to be compatible with disaster resilience. This test for economic development for disaster resilience will become more salient as the impacts of climate change are felt and extreme weather events become more frequent and severe.

The case studies highlighted some of the limitations and opportunities available through existing federal disaster resilience funding mechanisms, predominantly the National Partnership Agreement – Disaster Resilience Program and more recently the National Partnership Agreement – National Emergency Management Program. The Lake Macquarie City Council case study provided an example of how the capacity for local government to be responsible for flood mapping and management in the face of sea level rise due to climate change is likely to be severely challenged into the future. It will almost certainly require the development of new funding models in partnership with other levels of the system.

A greater awareness of behavioural factors is indicated when implementing economic measures for disaster resilience. This recommendation is based on the theoretical relevance of behavioural economics to disaster resilience. I refer to Section 6.2.2 and its description of behavioural economics and the example that is given of behavioural disincentives created by the Natural Disaster Relief and Recovery Arrangements (NDRRA). In this case, behavioural factors were found to render the policy objectives of equitable resource allocation and equitable risk allocation contradictory due to the potential for moral hazard, a concept that was introduced in Section 2.4.3 and later discussed in Section 6.3.2.

The theoretical and practical issues explored in Chapter 6 and their links to the federal system once again lend themselves to the proposition that many of the successes, the problems and their solutions can be traced to subsidiarity

Rather than subscribing to the narrative of a dysfunctional Australian federation, it actually points to it as a remedy for these issues. The existing federal system provides the scaffolding within which the principle of subsidiarity can be applied or re-applied, given its original connection to federalism. Competition between the states and territories delivers better outcomes for the community and each may be able to capitalise on their differences to deliver benefits through comparative advantage.

The imperative to implement measures with subsidiarity as a guiding principle is also compatible with models of sustainable development. Top-down approaches for climate change adaptation, which was shown to be closely aligned with disaster resilience, are less effective than nested models based on subsidiarity (Marshall, 2008). This is because, in terms of disaster risk assessment and risk management, there is substantial variation between localities. An example, as discussed earlier, is the need for the development of the Local Adaptation Plans for Flooding. While Subsidiarity underlies the rationale for locating responsibility for flood management to local government, it must be accompanied by capacity building if it is to successfully implement disaster resilience policy. Coordination between stakeholders and open access to information are two other qualities associated with subsidiarity that were identified as impacting the implementation of the National Flood Risk Information Project. Open access to information, in particular, is a contributor to economic development. Conversely, information asymmetry in the market for insurance and disaster risk mitigation was shown to hinder the equitable allocation of

disaster risk, a policy objective for economic development. The ABRDR, however, has advocated a more widespread use of cost-benefit analysis to better assign a monetary value to disaster risk and to encourage effective risk allocation.

This chapter established a theoretical context for economic development with relevance to disaster resilience. Conceptualised within these theories was a selection of four policy objectives that were borrowed from the work of Norris *et al* (2008) and modified by the addition of sustainable economic development. The operation of these policy objectives within the five case studies was observed and reported.

Chapter 6 has reinforced the claim that subsidiarity provides a model for working on 'wicked problems' (Brown *et al.*, 2012) and is synonymous with approaches for building disaster resilience. In Chapter 7 the policy domain of information and communication is explored in theory and its policy objectives of narrative, trusted information, skills and infrastructure, and multi-directional information flow are applied to the five case studies.

Chapter 7: INFORMATION AND COMMUNICATION

1.32 Introduction

Provisional Disaster Resilience Policy Implementation Framework				
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	Trust	Collective-efficacy	Sustainability	Behaviour change	Power-sharing
Policy Objectives	1. Networks	1.Political partnerships	1. Security	1.Resilience narratives	1. Capacity-building
	2.Place-based attachment	2. Stakeholder engagement	2.Economic diversity	2.Trusted information	2. Open access to information
	3. Community engagement	3.External Leadership	3.Equitable resource distribution	3.Skills and infrastructure	3. Negotiated roles and responsibilities
	4.Internal leadership	4. Local disaster risk awareness	4.Shared (equitable) risk allocation	4. Multi-directional information flow	4. Coordination
		5. Community participation			5.Stakeholder engagement

Figure 0-1 Provisional Disaster Resilience Policy Implementation Framework

The shaded area in the Provisional framework (Figure 7.1) indicates the information and communication policy domain and its policy objectives that are the subject of this chapter.

In Chapter 7, I use the Provisional framework to explore the implementation of information and communication policy to build disaster resilience. (Figure 7.1). As in Chapters 4, 5 and 6, I start by examining aspects of the theory underlying information and communication and its

disaster resilience policy objectives. In Chapter 2, the theoretical link was made between policy implementation and behaviour change. The role of information and communication and how it can support behaviour change is central to the suggestions that are made in this thesis about good practice in disaster resilience policy implementation. Thus, in Chapter 3, behaviour change was nominated as the universal theme for information and communication in the Provisional framework. The need for behaviour change is frequently referred to as a key goal of disaster resilience policy (Australian Institute for Disaster Resilience, 2010; Commonwealth of Australia, 2011, Commonwealth of Australia, 2012).

Sherrieb argued that social capital and economic development are 'structural capacities'; whereas, information and communication, and community competence are concerned with processes. (Sherrieb *et al.*, 2010). The view that information and communication is essentially about a process that has resilient behaviour as its end goal, is reflected in this chapter. An awareness of behaviour change theory is therefore necessary for us to understand how it can inform information and communication processes to support good practice in disaster resilience policy implementation. Similar to the format of Chapters 4-6, each of the case studies are then discussed to ascertain the presence or absence of information and communication approaches consistent with the Provisional framework. Lastly, the proposition that subsidiarity provides an additional set of parameters for good practice is checked against the case studies.

1.33 Theoretical background

Information and communication is a critical tool with the potential to assist in reducing the impact of natural disasters on people and the environment. We are reminded from Chapter 2 that successful policy implementation requires effective communication. Thus, communication failure contributes to implementation failure (Bridgman and Davis, 2004).

Information is defined as 'Facts provided or learned about something or someone', and 'What is conveyed or represented or presented by a particular arrangement or sequence of things' (Oxford University Press, 2002, p.727). Communication is defined as 'The imparting or exchange of information by speaking, writing or using some other medium' and 'The successful conveying or sharing of ideas and feelings.' (Oxford University Press, 2002, p.289). Alternatively, information and communication are the 'creation of common meanings and understandings and the provision of opportunities for members to articulate needs, views and attitudes' (Norris *et al*., 2008:140). Norris *et al*. (2008) provided a useful review of the literature that contributes to our understanding of the significance of information and communication to disaster resilience, albeit, one that mainly considers information and communication during the acute phase of a disaster.

As discussed in Chapter 2, the primary goal of policy is to influence behaviour, usually to persuade people to choose one behaviour over another (Bridgman and Davis, 2004, p.5). By extension, behaviour change plays a role in successful policy implementation. This is associated with other studies which suggest that policy implementation influences behaviour or delivers

behavioural outcomes (Dolan *et al.*, 2010). 'All (policy) instruments are forms of information aimed at changing individual or collective behaviour' (Handmer and Dovers, 2013, p.125).

To appreciate the role of information and communication for disaster resilience we need to understand and incorporate approaches grounded in human psychology and motivation at both individual and group levels. However, the aim of this section is not to provide an exhaustive review of the literature on behavioural and educational psychology. Instead it is to explain the theoretical framework for my inquiry. Thus, it touches on the theoretical pathways that inform approaches that enable people and their organisations to make the shift to a disaster resilient culture. Cultural change implies more than simple provision of information. It suggests learning that occurs through information and communication strategies to enhance knowledge and skills, and to influence attitudes and beliefs. These activities are associated with broader behavioural goals. Therefore, approaches that are guided by evidence drawn from behavioural psychology and learning theories will build success as well as those that are consistent with the policy objectives for information and communication in the Provisional framework.

Learning is a concept that is located within the field of knowledge theory or epistemology (Siemens, 2005). Most learning theorists associate learning with behaviour, seeing it as an antecedent to behaviour change (Olson, 2015). People learn in different ways. Individual learning styles were traditionally categorised as behaviourism, cognitivism and constructivism and a fourth, connectivism was proposed by Siemens (Siemens, 2005; Siemens and Conole, 2011). Learning from a behaviourist perspective can be summarised as a function of observed behaviour, responses to specific stimuli and behaviour change (Gredler, 1992). The science of behaviour change is located within the fields of both human psychology and sociology. This reflects the relationship between thinking or cognition, and behaviour.

Behavioural and learning theory was pioneered by Pavlov who linked behaviour to an external stimulus (Pavlov, 1927). A proposal that behaviour could be encouraged and reinforced or, alternatively, discouraged and extinguished in relation to external stimuli, strengthened the association between external stimuli and behaviour (Skinner, 1974). This idea that individuals are merely receptacles shaped by external experience, was countered by French psychologist Piaget who was able to link behaviour to internal factors, through cognition or thinking (Olson, 2015). Piaget, through the fields of behaviourism and cognitivism provided a foundation for learning theory, which is central to education practice (Millwood, 2013).

Ideas for developing information and communication strategies can be found within learning theory, including in the education literature. Constructivism, the third element of learning theory described previously explains that people, while learning, filter the information received through their own personal, cultural and sociological filters (Bodner, 1986). Thus, individuals create their own cognitive context for the acquisition of knowledge and attribution of its meaning: Knowledge is constructed in the mind of the learner' (Bodner, 1986:873). Although considered by some as a 'world view' rather than a theory (Millwood, 2013), it is useful for understanding the complexity

and diversity of the population and the seemingly counter-intuitive relationship between the acquisition of knowledge, attitudes and beliefs and desired behavioural outcomes. This is an important concept for good practice in disaster resilience policy implementation. The same study demonstrated that constructivism, at a systems level, includes a branch relating to organisations where both personal and environmental experiences can stimulate organisational changes or adaptations (Millwood, 2013).

Learning organisation theory explains how feedback loops (introduced in relation to systems theory in Chapter 2) can occur when an organisation interacts with its environment. As a result, organisations can become agents of change that enable adaptation to changing circumstances and new technologies as part of a disaster resilience system. Organisations that are guided by principles that are supportive of learning and adaptation have a greater potential to contribute to the development of disaster resilience (Argyris and Schön, 1996; Nonaka *et al.*, 1996). Theories about learning organisations may offer useful models for disaster resilience in relation to organisations in the disaster management system and the mechanisms they use to implement disaster resilience policy. For example, they may provide insights into how organisations perceive evaluation, which could be used to inform approaches to encourage the uptake of evaluation. There is some similarity between organisational learning and experiential learning. Experiential learning has constructivist origins and describes both personal and environmental influences on the development of adaptive organisations (Kolb, 2014). Connectivism takes account of the emergence of information technology (ICT) as a communication mechanism and the social impacts of ICT on learning and communication. Learning theory therefore encompasses a range of theories that can explain pathways for policy implementation to influence thoughts, knowledge, attitudes and beliefs to ultimately achieve behaviour change.

Innovation theory (introduced in Chapter 6) warrants mention in relation to information and communication. Information and the generation and diffusion of knowledge are critical for innovation (Johannessen *et al.*, 1999). A culture of innovation, where policy implementation is guided by principles of open government, access to 'big data' and other forms of information exchange is compatible with disaster resilience.

Cognitive dissonance theory bridges cognition or thinking, and behaviour. It is based on the idea that internal inconsistency at the cognitive level is hard to sustain within individuals. Inconsistent cognitions lead to a drive that culminates in a change in thinking or behaviour to relieve the tension between these inconsistent values and thoughts (Festinger, 1962). Festinger later described how cognitive dissonance theory expanded the idea of individual health behaviours to community and population health behaviours as part of an overall system. The system provides the context and other determinants of change (Festinger, 2000). Population health or public health, has a well-established tradition in the use of information and communication strategies to achieve behaviour change. Many health conditions are linked to behaviours or conditions that increase the probability of developing a disease, or an increased chance that a

person will experience negative outcomes associated with having that disease, referred to as health risk factors. Advocates for health promotion and disease prevention encourage behaviours that directly reduce the risk of disease and its sequelae or to promote factors that protect against acquiring the disease or developing adverse symptoms of a disease (Turnock B.J., 2004). Prochaska and DiClemente (1986) explored behaviour change in relation to health when they proposed five different stages of change in people who presented for smoking cessation help. The stages are pre-contemplation, contemplation, action, maintenance and relapse. They argued that smoking cessation programs can be more successful if they are tailored to the subject's stage of change. They expanded their ideas to develop a transtheoretical model of behaviour change that added a maintenance stage and replaced the relapse stage with a termination stage (Prochaska *et al.*, 1992; Prochaska and Velicer, 1997). Contributions to research on health behaviours, such as those described above could be applied to the development of information and communication strategies for disaster resilience.

As discussed in Chapters 1 and 2, climate change adaptation science has much to teach us about disaster resilience. Possibilities are opening up in climate adaptation research for the application of social change theory and its place within the practice of communication (Maibach *et al.*, 2008). Again, these approaches have parallels with concepts that have been used for a number of years in the population health field (Ockwell *et al.*, 2009; Whitmarsh, 2009; Whitmarsh *et al.*, 2012). Thus, it is helpful to bring the social and behavioural understandings of climate change adaptation policy into disaster resilience. Attribution science is responsible for recent advances in the ability to directly link climate change to extreme weather events (Lewis and Karoly, 2013; Otto, 2017). Hassol observed that many people, including other scientists, are unaware of this research. She also discovered that scientists who know about these achievements may be reluctant to speak about them publicly (Hassol *et al.*, 2016). Hassol and her colleagues argue that this needs to be addressed by adopting more effective information and communication approaches. Methods could be adopted that are used in population health to discuss the contribution of health risk factors and behaviours to illness and disease (Hassol *et al*., 2016).

Chapter 2 described how resilience means different things to different people and how discipline specific definitions and understandings of resilience exist. Longstaff *et al*. developed a framework to communicate resilience across different disciplines. This could be applied to disaster resilience communication in accordance with the need to promote understanding across the whole community (Longstaff *et al*., 2015).

At another level, theories relating to information and communication for disaster resilience policy implementation are closely bound to notions of uncertainty and risk and the communication of disaster risk. Risk communication is a key example of disaster resilience policy implementation. Norris *et al*. touched on this when considering how resilience relates to attitudes toward risk: 'Plan for not having a plan' (Norris et al., 2008:145). Mileti *et al*. developed risk communication theories (Mileti and Fitzpatrick, 1992; Mileti and O'Brien, 1992). Rohrmann,

located risk communication in social psychological theory. He theorised how information is linked to behaviour in the following steps: 'exposure (actually getting it), attention (attending and reading it), comprehension (understanding the message), confirmation (possibly searching for complementary information), acceptance (adopting message as personally relevant), retention (memorising content and eliciting information/material when needed), and realisation (implementing advised action or behaviour change)' (Rohrmann, 2000:15). Rohrmann also advocates for evaluation of risk communication in acute disaster situations and for all phases in the prevention, preparedness, response and recovery (PPRR) cycle (Rohrmann, 1992, 1998). Handmer proposed three risk communication themes to evaluate its effectiveness:

'to achieve an immediate aim in a crisis (eg warnings of floods, toxic spills etc); to promote long term care and mitigation (eg emergency preparedness, hazard education for prevention, healthy living, smog reduction; and to build consensus over controversial issues (eg restrictive land-use regulations. location of toxic waste tips, quarantine proposals)' (Handmer, 2000:2)

Risk communication could support disaster resilience by developing messages consistent with the mitigation themes cited in the list above. Risk communication strategies could also be developed to incorporate methods for achieving desired behavioural outcomes and to support the construction of narratives that align with disaster resilience principles.

The matter of uncertainty and its implications for communication is considered by Longstaff who admits that striking the right balance between the need for local communication about local hazards and the advantages of more aggregated communication approaches is difficult. One of the main concerns is that local strategies may not be cost effective. On the other hand, more centralised communication may not be able to meet local information requirements or be appropriate to 'local perception of the risk' (Longstaff, 2005:56). Information and communication practices need to consider how conditions of uncertainty can affect decision-making and action. Sword-Daniels *et al*., 2018 emphasised that what people know subjectively about uncertainty is distinct from what people feel about uncertainty, or 'embodied uncertainty' and that this has relevance for decision-making and therefore, information and communication approaches for disaster resilience. Contrary to earlier beliefs it is now thought that incomplete knowledge or information does not prevent people from making decisions and taking positive action in a disaster. However, for this to happen, information and communication strategies need to be developed in advance with all stakeholders, using participatory approaches. Importantly, the key is to identify and include specific information and data on decision-relevant uncertainties (Hudson-Doyle et al., 2018.

Many strategic information and communication programs for disaster resilience adhere to a knowledge-attitude-behaviour model (K-A-B model). The K-A-B model presumes a direct relationship between information provision about disaster risks and action that can be taken to mitigate the risk or prepare for a disaster; the belief that disaster preparation is important and

achievable; and actual preparedness behaviours (Australian Institute for Disaster Resilience, 2010:65). This is spite of a lack of robust evidence to support direct links between information provision and preparedness (Paton, 2008, 2013, 2019; Baranowski *et al.*, 2003, cited in Australian Institute for Disaster Resilience, 2010:65). This raises the real possibility that one-dimensional risk communication mechanisms and tools may be oversubscribed in Australia's disaster resilience policy. Without rejecting the use of risk communication outright for disaster risk reduction, it would be worthwhile investigating and testing different models to incorporate behavioural strategies. A shift away from disaster response, relief and recovery to one where disaster prevention and risk mitigation has equal if not greater prominence will not occur without information, but information alone will not have an impact unless it is communicated in a way that influences thinking or takes cognitive processes into account. Paton (2003) proposed different steps toward behaviour change with each step using different strategies: motivating people to prepare, facilitating the formation of intentions and promoting the conversion of intentions to action. Even here, risk communication is only one strategy of many that may influence perceptions and outcomes of risk. However, it may be less effective at increasing the likelihood of people acting on their intentions, once formed.

Paton argued that the K-A-B model should be replaced with staged approaches that include prerequisite education components designed to address and harness psychological factors, such as anxiety, to stimulate disaster preparedness behaviour. Dufty (2008) followed up across the response, relief and recovery phases with strategies to promote mitigation behaviour, adaptive capability and post-disaster learning. Better results may be achieved by: focusing on the longer-term impacts and increasing prevalence of natural disasters that emphasise the 'occurrence rather than the non-occurrence of an event' (Newell *et al.*, 2016); and psychological techniques for building the antecedents of behaviour and behaviour change. For example, trust and individual agency or self-efficacy, and behavioural intentions: (Ajzen, 2002).

The implication is that information and communication strategies that aim to produce behaviour change need to incorporate methods that have been proven to support behaviour change. Having said this, not all information and communication activities may be devised with behaviour change in mind. This reminds us of the importance of establishing the goals and objectives of disaster resilience programs so that interventions can be tailored to the desired outcome (See Chapter 2). What follows is an examination of the policy objectives and how they operate in relation to information and communication for disaster resilience policy implementation

1.34 Policy Objectives in action

The reader will note that there are connections between each of the four policy objectives. Interconnectedness is a function of the systemic nature of disaster resilience policy implementation. For example, issues around information technology relate to both infrastructure

and the flow of information between sectors. Similarly, education is a key element of infrastructure and is important for developing appropriate and effective narratives to support learning for behaviour change. Clear, consistent and appropriately targeted public information about disaster resilience that communicates realistic perceptions of disaster risk and the management of those risks builds trust and self-efficacy which ultimately supports changes in behaviour. Equally important is that trusted sources play a role in the exchange of information. This is particularly relevant to risk communication.

1.34.1 Resilience narratives

A narrative is a 'spoken or written account of a connected event; a story' or, 'a representation of a particular situation or process in such a way as to reflect or conform to an overarching set of aims or values' (Oxford University Press, 2002, p.948). Narratives can counter or be consistent with the principles of disaster resilience. For example, public and personal safety and disaster resilience may be perceived as being incompatible. The causes of this are complex and outside the scope of this thesis, however, they relate to our understanding of the concept of self-reliance and the sharing of responsibility for reducing one's disaster risks. This also confronts us about the extent to which, as a society, we are willing to accept a degree of risk as part of exercising personal freedoms. The intersection of public safety and natural disasters drives another entrenched and counter- resilient narrative. This is the narrative of blame common in legal commissions of inquiry that are frequently conducted following the most severe natural disasters (Eburn and Dovers, 2015).

It is not surprising therefore, that efforts to weave a disaster resilience narrative can come up against entrenched and powerful counter-narratives that are difficult to change. From a social perspective, a lack of trust can be a barrier to changing the attitudes that tend to frame narratives and strengthen their persistence. Indeed, the pre-eminence of trust as both an antecedent and a product of Social capital was highlighted in Chapter Four. This goes some way to explaining why the current lack of trust in government and the media (as described in Section 7.3.2) are so problematic when it comes to changing narratives around aspects of disasters, including causation and the role of, and necessity for shared responsibility. Climate change presents a very high-profile example of this tendency. For example, those opposed to the Gillard Government's Clean Energy Bill (2011) which gave rise to plans for an Emissions Trading Scheme created a narrative around this policy. It was characterised as a 'Carbon Tax' that would damage the economy and lead to job losses and an increased cost of living. Ironically, it is climate change communication that offers approaches that may be useful for developing more appropriate disaster resilience narratives. It is possible that the scepticism surrounding the contribution of climate change to natural disasters caused by extreme weather can be reduced by the scientific field of 'event attribution' that was introduced in Section 7.2. Event attribution or attribution science has developed markedly during the past decade to the extent that some specific heat events can now

be attributed to climate change (King *et al.*, 2015; Lewis, 2013). Extreme heatwave is known to have cost more lives in Australia over the past 200 years than any other weather-related hazard (Coates, 1996). Other research proposes the application of well-established public health communication principles (Hassol *et al.*, 2016) to communicate with the public about how to influence behaviour to prepare for extreme events. At the same time, this work is strengthening the links between research and policy for climate change adaptation, disaster resilience and population health (Maibach *et al.*, 2008). At the centre of public health communication is the need to influence individual and organisational (group) behaviours to address the determinants of risk. This is done with a focus on addressing structural and policy barriers while empowering people to make personal choices for positive health outcomes. Although governments remain averse to linking natural disaster events to climate change, advances in attribution science over the next decade may allow climate change causation to be established for all hazards. If this happens it may shift the current natural disaster narrative, with its emphasis on rescue, to a more active narrative centred on human agency, knowledge and the acquisition of skills and ecological literacy. This is a communication style that is far more consistent with the principles of disaster resilience.

Meanwhile, what I refer to as the 'staunch' narrative of man pitting himself against the environment persists and crowds out stories that would be more in keeping with an authentic disaster resilience narrative. We would do better to weave a narrative that conveys the role and responsibility of human actors including in relation to our encroachment into areas that place people at higher risk of loss and damage; or the idea that humans co-exist with other players within a shared ecosystem.

It is important to include consideration of the narrative when developing and communicating messages to Australians about disaster resilience. Regardless of the content or validity of the information one is seeking to have understood and accepted, it has to be afforded legitimacy by the people and the organisation at which it is directed. In addition to the technical aspect of communication of information, people need to be able to understand and absorb the information within a personal and social framework which is meaningful to them. This will normalise disaster resilient behaviours and engender a sense of ownership and commitment to disaster resilience principles amongst the population.

The power of constructing a narrative to support learning and behaviour change has theoretical links to learning theory of behaviourism, cognitivism and constructivism (Siemens, 2005, 2011). Although Millwood questioned the status of constructivism as a theory (Millwood, 2013) he suggested that it may have the most to offer in terms of allowing us to understand the need for the creation of a narrative for disaster resilience.

These theories suggest that messages about disaster resilience must be designed to include a narrative (or to take account of an existing narrative). This narrative should have regard for the

experiences of the target audience, as well as the influence of the existing networks and delivery mechanisms in the formulation and uptake of knowledge and attitudes.

The importance of narrative can be underestimated when designing policy and its implementation. For example, Indigenous Australians continue to experience significant disparities in well-being compared with non-Indigenous Australians across indicators such as infant mortality, life expectancy, education retention and percentage of people in custody (Productivity Commission, 2016). Without trivializing the complexity of these ongoing problems and their solutions, the narrative of intergenerational trauma caused by dispossession of land and loss of culture, and what many see as the lack of acknowledgement of invasion and genocide by European colonists, is the overwhelmingly important story that can be missed by interventions.

Developing and communicating an appropriate policy narrative relies on knowledge of the target audience, its understanding of the problem and its views on the potential solutions. The aim of community engagement is to develop a narrative that effectively articulates the story for the target audience in terms of the problem and proposes solutions through policy. A shared meaning and understanding of events and experiences is more likely to be generated from a combination of top-down and bottom-up approaches, which is also consistent with community engagement goals (Australian Institute for Disaster Resilience, 2013; Eversole, 2011; Head, 2007b).

Community consultations and community stakeholder engagement enable individuals and groups who need to articulate and share their unique narrative as a prerequisite to being fully present and participating in a policy consultation. This needs to be taken into account when planning and conducting consultations and other community engagement activities as well as when considering and interpreting peoples' responses

Narratives don't necessarily arise from conscious motivation and can be embedded in complex social, economic and cultural factors that have developed organically over many years. Public messaging, media reporting and campaigns are some mechanisms that can be deliberately employed to shape public narratives. For example, national branding and messaging (Box 7.1) was developed for the National Strategy for Disaster Resilience (NSDR) and provided to all federal members of parliament in September 2011. They were then adopted by all the states and territories, in November 2012, to adapt as required. The slogan 'Get Ready' was used with the messages (Standing Council for Police and Emergency Management, 2012).

Box 7.1 National Strategy for Disaster Resilience (NSDR) Communication Plan (Standing Council for Police and Emergency Management, 2012)

Disasters will happen – natural disasters are inevitable, unpredictable and significantly impact communities and the economy

Connected communities are resilient communities – connected communities are ready to look after each other in times of crisis when immediate assistance may not be available

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> **Know your risk** – every Australian should know how to prepare for any natural disasters
>
> **Get ready, then act** – reduce the effects of future disasters by knowing what to do
>
> **Learn from experience** – we reduce the effects of future disasters by learning from past experience

Marketing of these disaster resilience messages appears to have been relatively low key and it is not possible to comment authoritatively on how effective they have been because an evaluation of the communication strategy was not done. A number of other initiatives established around this time complemented the NSDR communications strategy, including the development of a web-based 'Knowledge Hub' by the then, Australian Emergency Management Institute (AEMI) to serve as a clearing house for emergency management and disaster resilience research. The Australian Institute for Disaster Resilience (AIDR) replaced AEMI in November, 2015 (Bushfire and Natural Hazards Cooperative Research Centre, 2015). Since it was established AIDR has focused on reviewing and updating emergency management resources, developing its website and repository of information. It provides training and skills development in disaster management and disaster resilience related topics and has established a network to promote knowledge and awareness of disaster resilience amongst primary school aged children (Bushfire and Natural Hazards Cooperative Research Centre, 2019).

Messages that have an explicit goal or understanding that is unifying have been shown to contribute to successful outcomes for national strategies (Pittock *et al.*, 2015). A clear and consistent narrative for communicating disaster resilience is important. Achieving this may be challenging due to the uncertainty surrounding the choice of a definition for disaster resilience and flexible interpretations of its meaning, across many and varied settings. From a positive perspective, the plurality of disaster resilience allows it to taken up by people at any level of society and from any walk of life. On the down side its ubiquitousness may produce ambiguous or confused messages, or messages that are not tailored appropriately to the target audience. This may result in the idea or information being rejected, consciously or unconsciously. Another negative consequence of a lack of attention to a clear narrative is that it may make it difficult to engage leaders to champion disaster resilience within their communities.

In the context of this thesis there are different versions of the disaster resilience narrative. While these are nuanced, small variations can be significant. This relates back to the different interpretations of disaster resilience that were discussed in Chapter 2, and how these may require very different implementation approaches. We are reminded that this thesis subscribes to an understanding of resilience that is systems and strengths-based, acknowledges uncertainty, and is anchored to ideas of 'bouncing forward' following a shock or disturbance (Manyena *et al.*, 2011; Manyena, 2006; Longstaff, 2015;) .

References in the media to disaster mitigation by government and politicians in general (and I use the terms interchangeably) are relatively uncommon save for the purpose of political

announcements that include little detail. The dominant disaster resilience narrative is of resistance to disasters and of heroic volunteers and helpless, despairing victims struggling with loss and grief. Another variation on this theme is seen when leaders publicly attribute resilience to a specific community for no other reason than that it is experiencing or has experienced a disaster. While most disaster-affected communities are likely to have a degree of resilience, the implication is that resilience is unique to people in the disaster affected area insofar as it signifies strength of character and resistance to overwhelming natural forces: resilience is often mentioned in the context of resisting and facing disasters in a stoic and fatalistic sense. I refer to this as a 'staunch' narrative. Less apparent in the disaster narrative is one that is more consistent with disaster resilience. This is the narrative of people confronting natural disaster risks and making choices associated with those risks, being empowered by their experiences and learning to deal with the conditions that culminated in disaster, all of which will help them to reduce the impacts should a similar situation occur in the future. Clearly, it may be unrealistic to expect politicians and other commentators to take a more measured approach in the heightened emotional environment at the scene of a disaster. However, it is possible to encourage them to give a more nuanced message which conveys a more realistic and accurate impression consistent with disaster resilience behaviour and aspirations. For example, disaster resilience principles have informed the development of guidance for managing donated goods. This includes suggestions on how to influence public messages delivered by politicians and other leaders to discourage donations of goods from the general public. These can cause problems relating to the costs of storage and management that diverts resources away from other tasks (Australian Government and Government of South Australia, 2010).

1.34.2 Information: the issue of trust

Effective implementation of information and communication policy for disaster resilience must support behaviour change. During an emergency when people are at risk of physical harm and decisions need to be made quickly to protect lives and property, it is essential that the public is able to trust those who are providing emergency assistance and advice on protective and defensive behaviours. First responders in these situations are often emergency services but can also be family members, neighbours and others in non-official roles. If the source of information is trusted, the information will have a greater chance of influencing people's behaviour to reduce their disaster risks (Hicks *et al.*, 2017). The following section examines the main sources of disaster resilience information, issues relating to trust of those sources, and ways of enhancing trust through policy implementation.

Media

Natural disasters, particularly those that are of sudden onset and result in adverse impacts to people and properties, are very newsworthy (Leitch and Bohensky, 2014). The nature of media reporting on disasters and their ability to influence the creation of a resilience narrative, or to

counter a resilience narrative, offers potential to improve the effectiveness of information and communication policy implementation. In Australia, people were asked to report their main source of news. Of the 2000 who responded, 37.6% replied TV; 27.4% replied online news; and 18.5% replied social network services / blogs (News and Media Research Centre, 2016). Similarly, the mass media, particularly news reports, are one of the main sources of information about natural disasters (Bohensky and Leitch, 2014).

The media tends to focus on the disaster as it happens, ignoring the warning systems and long-term implications. Decisions are made about which disasters to cover, and natural disasters, particularly when they happen suddenly, make more shocking news and therefore receive more coverage. Reporting natural disasters is difficult because there is an expectation that they will always be reported in apocalyptic terms which is often an inaccurate representation of the situation, including exaggeration of the extent and number of casualties This may result in key facts being overlooked, which can distort the humanitarian response (Cockburn, 2011). Competitive pressures may encourage sensationalist reporting that tends to highlight dramatic, extreme situations 'If it bleeds, it leads' (Westerman *et al.*, 2009:542). This can reduce trust in media disaster reporting. Furthermore, disaster response and relief tends to dominate media content compared with recovery, longer term prevention and preparedness, and risk reduction (Barnes *et al.*, 2008).

The 2016 survey cited above found that 43.4% of the people sampled trust the news (News and Media Research Centre, 2016:61). Trust in the media has the potential to translate into trust in information about disaster resilience. The degree of trust in an information source can influence the likelihood that the information will contribute to behavioural outcomes (Paton, 2003). Thus, trust in the media becomes critical in terms of ensuring information that is communicated about disasters is effective and will encourage appropriate help-seeking and self-help behaviours. On the flip side, the perception of media integrity and credibility can maintain and build trust. This includes ethical practices like impartiality of reporting and balanced information, accuracy, fairness, reliability presentation and trust in the editorial process (Fisher, 2016).

The successful implementation of other Australian national strategies could provide some lessons about how to conduct information and communication activities to support disaster resilience. When it became known that suicide contagion could result from publication in the media of suicide as a cause of death, evidence was invoked to develop and implement a policy of non-reporting of suicide. With funding provided by the federal government, media resources were developed by mental health clinicians and researchers in consultation with the media to support this approach (Everymind, 2018). This strategy has enjoyed longevity and success in terms of uptake by the media (Pirkis *et al.*, 2009).

A growing issue today, and one which has been foreshadowed by researchers in risk communication, is the rapid technological and sociological changes that have occurred over the past few decades and whether or not former approaches to risk communication still have validity

(Handmer, 2000). These changes have implications for trust that have recently been highlighted in the public discourse as 'fake news' which encompasses the explosion in on-line information sharing. This is confounded by professional expectations around the need to continue to provide relevant and timely content in an increasingly complex on-line news environment. We are repeatedly warned about trusting information and points of reference are becoming less well-defined (Fisher, 2016; Weisbrot, 2016). At the same time, the new on-line information environment has much to offer for disaster resilience. Social media played an important role in the emergence of a community-led volunteer workforce who came forward following the Victorian bushfires in 2009 and the 2010-11 Queensland floods. Among other assistance, these 'spontaneous volunteers' (Australian Institute for Disaster Resilience, 2017 p.2) established grass roots initiatives like 'Blaze aid' (Whittaker *et al.*, 2015) to help farmers repair their fences and the 'mud army' to help in the post-flood clean-up (George, 2013). These initiatives would not have been possible without social media. The Australian government has taken steps to embed forms of social media within its national disaster resilience policy as a tool to attract, manage and coordinate spontaneous volunteers (Commonwealth of Australia, 2015f). This is an important development that is underscored by concerns around the decline in numbers of people who want to commit to formal volunteer organisations (Barraket, 2013; Whittaker *et al.*, 2015).

Government

All levels of government are actors, in both the direct and non-direct sense, when it comes to information and communication for disaster resilience. In the former, government has resources and a leadership role that allows it to develop and disseminate information through its own channels and through other organisations and stakeholder networks. For example, the Australian Institute for Disaster Resilience manages and disseminates a series of on-line manuals and handbooks that provide guidance on a range of disaster management practice issues. This is done directly through the outreach education programs, social media platforms and sponsored internet sites and other on-line and physical education networks (Australian Institute for Disaster Resilience, 2019b). Government has mechanisms at its disposal to influence or regulate the behaviour of people and organisations through the provision of information. For example, policy statements, strategic plans, guidelines, discussion Papers, communiques, and resources; and through funding to individuals and organisations aimed at supporting the implementation of government policies.

The level of public trust in government has been the subject of much research and the results remain equivocal (Bean, 2001, 2005; Job, 2005; Blind, 2007; Evans *et al.*, 2016). In the context of this discussion, politicians or Members of the Australian Parliament, are categorised within 'government' regardless of whether they belong to the governing party. Politicians enjoy a special symbiotic relationship with the media. They rely on the media to promote their policies and their public profile, particularly during election campaigns. This relationship can be conflicted: it may be difficult for politicians to balance the need to share information as part of regular contact with

the media while fulfilling their responsibility to the parliament and the need to exercise discretion. From the media's perspective, retaining access to politicians may come with the experience of pressure to report in ways that could be seen as biased. Research on the latest international trends suggest that public trust in institutions, including government is low. In Australia, the percentage of people surveyed who say they trust government, non-government organisations, media and business, fell from 49% in 2016 to 42% in 2017 (news.com.au, 2017). Bean had earlier linked cycles of trust in government to perceptions of politicians and party politics more than to a lack of trust in the political system per se (Bean, 2001). A study by Maibach and his colleagues, however, did not make a distinction between government and politicians when it found that green products with government labelling were more trusted than those with industry identifiable labelling (Maibach *et al.*, 2008). Blind refuted the idea that trust in government is steadily declining and concurred with the idea that it is, instead, a cyclical phenomenon (Blind, 2007). Others argued whether social capital is related to the level of trust in government: Job (2005) contended that trust in government was declining in line with diminishing social capital while Bean found that that social capital was more closely related to social and interpersonal trust than to trust in government (Bean, 2005:15).

A survey of 1444 respondents in 2014 about aspects of Australian democracy found that there was little difference in the relatively low levels of trust citizens had for the different levels of government, although local government did marginally better than state governments that were perceived as slightly more trustworthy than the federal government (Evans *et al*., 2014).

Federal government policy can help build trust in the media in a number of areas. At a federal government level, media ownership laws have a role to play both in bolstering public trust in the independence and impartiality of the media and in the effective management of Australia's media infrastructure regarding the allocation of the spectrum or air waves. The Broadcasting Services Act 1992 derives its power from section 51(v) of the Australian Constitution and at a macro level is concerned with ensuring the ability of the media to represent a diverse range of views and maintain its independence. This is a cornerstone of democracy and there have been long-standing discussions in the public policy arena about the need to reform the Broadcasting Act 1992 (Productivity Commission, 2000). This centres around principles aimed at reducing regulation and increasing diversity of ownership and competition. It is also linked to the need to make more efficient use of the radio telecommunications spectrum as it is freed up by advances in digital communication technology. The fast pace of technological development and convergence of what have traditionally been separate forms of media in a small market place also form part of the complex issues included in the debate about media ownership and diversity (Gardiner-Garden and Chowns, 2016).

Local sources

There is evidence that people are more likely to trust information that they obtain directly from those in close proximity, including friends, neighbours and family. Similarly, people are

more likely to act on information that is relevant to their local area rather than events that are occurring long distances away (Longstaff, 2005). Implementation of disaster resilience information and communication policy needs to take this into account. The idea of tailoring information and its mode of delivery so that it is appropriate to the target population to increase the likelihood of action is established in population health, but is relatively new in disaster management. These information and communication methods are central to the 'community safety approach' which shares many of the characteristics of the National Strategy for Disaster Resilience: shared responsibility; risk reduction; partnerships across a range of sectors; and community empowerment and community-led action in common with resilience (Australian Institute for Disaster Resilience, 2010). The uptake of a community safety approach into disaster management has accompanied the shift in emphasis from response and recovery to anticipation and mitigation (Templeman, 2004).

The National Strategy for Disaster Resilience advocates shared responsibility, self-reliance and personal agency. These messages could be interpreted as government seeking to shift its responsibilities to individuals and communities. Given the existing low levels of trust in government, this perception could further undermine trust and create more uncertainty. This unwanted consequence is less likely to occur when disaster information integrates local content and is developed in conjunction with local people, local businesses and organisations. Being incorporated into a prevailing local narrative as mentioned previously, will also support take-up. It is thus more likely to be accepted and acted upon by individuals and groups at the local level. For this to happen, consultation and local participation needs to occur, all of which can take more time and resources. Different phases of a disaster will use different approaches and a crisis can require more didactic communication. This emphasises the importance of being proactive in planning and developing effective information and communication approaches which are based on evidence and community participation. While trust in government can be generally viewed as a positive factor, it can have connotations of passivity and dependence that need to be balanced against exhortations to take personal responsibility. On the other hand, rather than trust signalling fatalism, trust can be conducive to disaster resilience by empowering action and self-reliance. Thus, disaster related messaging must be developed and delivered in accordance with the principles of disaster resilience. It will be challenging to effectively incorporate approaches that will enhance self-efficacy while conveying the fundamental uncertainty surrounding natural disasters. Findings from existing research in climate change adaptation communication can offer some guidance.

The emergency services

The emergency services are a group of quasi government agencies that have a major existing role in communicating information on natural disasters to the community (See Appendix 1). Although the emergency services have traditionally engaged in disaster response they are increasingly becoming involved in a broader range of disaster prevention, preparedness and

mitigation activities. In fact, the peak body for the emergency services, the Australasian Fire and Emergency Services Authorities Council is advancing a national policy that puts the emergency services at the forefront of implementing disaster resilience in the community:

'….a shared vision and joint commitment to enhanced community resilience' (Australasian Fire and Emergency Services Authorities Council, 2016:1) 'AFAC agencies need to focus on risk reduction and preparedness, while remaining responsible for response to any residual risk, should an emergency still occur' (Australasian Fire and Emergency Services Authorities Council, 2016:5).

In 2014 Firefighters and rescue volunteers came second only to paramedics in the annual Reader's Digest survey of the most trusted professions (news.com.au, 2014). The involvement of the emergency services in risk communication and the confidence invested in them by the community makes them well placed to lead disaster resilience information and communication activities. As mentioned, effective communication of uncertainty is inherent in the theory and practice of risk communication. There is some evidence that the emergency services are endeavouring to incorporate concepts of uncertainty in their communication approaches. The National Strategy for Disaster Resilience advanced the prospect that people should not assume that the emergency services will be there to assist them in an emergency (Commonwealth of Australia, 2011a). This followed a national recommendation in 2006 that the emergency services adopt the warning 'Stay and defend or leave early' deliberately conveys the lack of absolute certainty about the best decision for people to take when facing an emergency and that individuals need to make a personal judgement based on their level of preparation (Australian Institute for Disaster Resilience, 2010:18).

The science community

Science communication' aims to 'enhance public scientific awareness, understanding, literacy and culture by building personal responses of awareness, enjoyment, interest, opinion-forming and understanding of science' (Burns *et al.*, 2003). Information and communication on climate change is a well-established field of research, some of which is instructive for disaster resilience and to which I have referred previously in this chapter (Maibach *et al.*, 2008; Whitmarsh, 2008, 2009; Ockwell *et al.*, 2009; Whitmarsh *et al.*, 2012; Hassol *et al.*, 2016).

Compared to government, the emergency services and the media, the scientific community is a less prominent source of public information on disaster resilience. There is potential for scientists to better translate scientific evidence into resilience policy and to make a greater contribution to the public discourse on disaster resilience in general. Translating research into policy is a key aim of the Bushfire and Natural Hazard Cooperative Research Centre (BNHCRC). The achievement of this outcome is being tested using a monitoring, evaluation and reporting framework developed jointly by the BNHCRC and the Victorian Department of Environment, Land, Water and Planning (DELWP) (Bosomworth, 2015).

1.34.3   Skills and Infrastructure

Appropriate skills and infrastructure will support a learning environment and ensure the adequacy of built assets and capability to enable effective information and communication for disaster resilience. This is related to the growth of the population and its increasing diversity, the expansion of human habitation into areas that were hitherto unpopulated, the explosion in information and the digital economy, and with it the growing dependence of modern society on all forms of information technology. Without the technical capability, hardware and facilities to gather, develop and manage information, and without the development of skills by individuals and organisations and educational institutions which operate in the information economy, people will be disadvantaged when it comes to learning and applying ways of becoming more disaster resilient.

The digital divide

One of the issues impacting this is the ongoing problem of inconsistencies in the quality of mobile phone reception and internet coverage across Australia. Without delving into an analysis of the National Broadband Network, problems with access to adequate telecommunications networks can impact the effectiveness of information and communication strategies to improve national disaster resilience. This can impede the development, sharing and coordination of information that is critical in emergencies but is also necessary to provide a platform and the connectivity to support knowledge acquisition, learning, and collaboration to undertake disaster prevention, preparedness and risk mitigation.

Two areas of information and communication infrastructure development have been a focus for federal and state governments for over a decade. These include: modifications conducted nationally to the systems that provide the public with emergency warnings (Emergency Alert) and to direct public calls for emergency assistance (Triple Zero) first done in 2011-12; and the development of Public Safety Mobile Broadband (PSMB) (Standing Council on Police and Emergency Management, 2011). The PSMB is a dedicated digital broadband network that will enable emergency personnel to communicate quickly and effectively using a range of media to improve coordination and situational awareness and information sharing for disaster and other forms of crises management. According to the Productivity Commission, a PSMB is the 'single most significant infrastructure enhancement that can be made for saving lives during emergencies' (Productivity Commission, 2015).

The National Fire Danger Rating System is currently being implemented nationally by NSW and Victoria is conducting capital upgrades to Emergency Alert with shared federal and state government funding provided under a National Partnership Agreement (NPA) that was agreed in mid-2019 (Council on Federal Financial Relations, 2019). The same NPA has allocated funding to NSW for a trial of PSMB capability that will include implementation in a number of locations. This aims eventually to overcome a long-standing barrier to effective communication and

interoperability between the systems of emergency services and public safety agencies. To date, government action to progress a PSMB has included: a PSMB National Implementation Plan (Standing Council for Police and Emergency Management, 2012); an Australian Productivity Commission Research Report and cost-benefit analysis; and two parliamentary inquiries that recommended proceeding with implementation of the PSMB initiative (Australian Government, 2014; Productivity Commission, 2015); and the establishment of a national Public Safety Mobile Broadband Steering Committee and development of a 'strategic roadmap' for development and implementation of a PSMB by the Council of Australian Governments (COAG) (2018).

Education and knowledge management

A discussion about infrastructure and skills, as essential policy implementation objectives for disaster resilience, requires consideration of education as an essential resource and driver of behaviour change. The Australian Institute for Disaster Resilience (AIDR) is the newest and most visible contribution to the education infrastructure for the National Strategy for Disaster Resilience (Australian Institute for Disaster Resilience, 2019b). It replaced the former Australian Emergency Management Institute (AEMI) which operated based on a model of providing written resources, face to face training, and professional skills development programs to the disaster management workforce. Residential programs for the disaster management sector were a focus of the former AEMI model. This provided an opportunity for inter-jurisdictional knowledge transfer and cross fertilization of ideas at the operational level. Consistent with the principles of disaster resilience, AEMI also AEMI provided outreach and in-house programs for other sectors, for example, health. The AIDR, although relatively newly established, appears to have taken an innovative approach which capitalises on modern technology and has established itself as a partner that is able to integrate aspects of the national DM system. AIDR has an ambitious agenda and its level of funding and funding arrangements will determine its capacity to exert influence over the resilience agenda. Furthermore, AIDR's has foreshadowed that it, in the future it will have expanded responsibilities that will include establishing relationships with regional partners as well as facilitating Australia's implementation of the Sendai Framework for Disaster Risk Reduction (Australian Institute for Disaster Resilience, 2018b).

Most major policy measures routinely include a communications strategy. For example, the National Flood Risk Information Project included the National Flood Risk Information Portal (Geoscience Australia, 2014); a mental health and suicide prevention National Communications Charter is titled Everymind (Everymind, 2018); and eating disorders policy has the Eating Disorders: A Strategic Communications Framework (Commonwealth of Australia, 2010).

Information and communication make a major contribution to disaster resilience. The emergency services rely heavily on effective information and communication during all phases of disaster management. The operational performance of emergency services personnel relies heavily on learning and behaviour, not only during the high stake disaster response phase but at other times by maintaining a commitment to ensuring skills and equipment are up-to-date and by

being able to adopt and utilise new technologies. On-the-job training and mentoring are complemented by the provision of information resources on government sponsored websites, such as the Australian Institute for Disaster Resilience and the Bushfire and Natural Hazards Co-operative Research Centre, in professional publications and journals, through attendance at formal training and education sessions, by sharing information via collegial and community networks, and attending conferences and seminars organised at local regional, state or national levels.

Most of these approaches are not targeted to the broader community although the emergency services do engage with them regarding natural disasters and disaster risks. The extent that this is occurring and how the emergency services are engaging with their communities varies significantly across different localities and may be under-reported and under-estimated. A lack of aggregated information about this issue prompted the NSW SES to conduct a state-wide project to measure and report on its community engagement work. The *Measuring Community Engagement Project* was funded in NSW under the National Partnership Agreement – Natural Disaster Resilience Program (NSW Government, 2016). Unfortunately, a report on the outcomes of the project is not publicly available.

Developing and disseminating effective and inclusive disaster resilience messages, in ways that are likely to be understood and adopted across the community, is at the heart of the National Strategy for Disaster Resilience. Encouraging involvement of the emergency services in local disaster resilience policy implementation is a theme that has gained greater attention in recent years. The VICSES Strategic Plan (Victorian State Emergency Service, 2016) is another example that sends a strong signal from government about the role of the emergency services in disaster resilience. This is an interesting and welcome development, because the traditional command and control focus, while it may be more appropriate in acute emergencies, can be less compatible with a resilience-based approach that encourages citizen empowerment and shared responsibility (Tierney, 2001; Whittaker *et al.*, 2015; McLennan *et al.*, 2016). Assisted by the increasing use of social media as a tool for the dissemination of situational awareness, updates and warnings, it appears that the boundaries between these traditional roles and community participation in disaster resilience are becoming more blurred.

The need for better awareness of disaster risk and risk mitigation includes meeting the information needs of different stakeholders, is documented as an area for increased focus in a 2015 implementation review of the NSDR (Commonwealth of Australia, 2015).

1.34.4   Multi-directional flow of information

At a time when top-down managerial approaches to policy implementation were the norm Adger championed the value of bottom-up programs in environmental management to deal with climate change. He argued their potential to enhance disaster resilience by building support for interventions at local levels to create greater acceptance and sustainability. Bottom-up approaches were seen to give practical meaning and support for the disaster resilience policy principle of

'shared responsibility'. Changing the perception of ownership of a problem (like climate change) can encourage people to share responsibility and become actively involved in mitigation (Adger, 2003:401).

Government's role is not only defined by the messages and means by which it communicates disaster resilience, but also by how and what it chooses to communicate, and how it manages and regulates the flow of information on disaster resilience. Information and communication is a critical instrument for whole-of-society policies like disaster resilience and need 'multi-directional information pathways to be created and used' (Handmer and Dovers, 2013 p.128). This is highlighted in the experience of the National Flood Risk Information Project, which has now concluded, but a major factor in this project was the perverse barrier to sharing information created by the coexisting copyright legislation.

Social media is an information and communication tool that is a relative newcomer to the disaster management field. Messaging, with disaster resilience objectives, is a significant mechanism for facilitating the flow of information between sectors. Social media is an egalitarian tool that dissolves barriers between different levels of the system. Governments have lagged behind most other actors in using this medium, but most levels of government now seem to have caught up.

In Chapter 6, I outlined how the value of knowledge and information, when shared, is maximised as a means of economic development. To be effective, information must be able to move vertically and horizontally between different actors and across different levels of government and society. Information and communication is a technical and a social matter. It occurs physically via conduits such as fibre optic cable, tweets, newsletters and it is a function of human networks. A vital element for successful communication of information is making information accessible in terms of ensuring it is tailored to the target audience and can reach, those in other sectors.

The federal government is encouraging states and territories to publish their state-wide risk assessments and priorities. To support these efforts it produced the National Emergency Risk Assessment Guidelines and arising from this was the National Flood Risk Information Project that was completed in June 2016 and is now being expanded to all-hazards.

To effect change toward disaster resilience it is essential that information and communication approaches facilitate the flow of information between sectors. The National Strategy for Disaster Resilience emphasises the importance of cross-, inter- and intra-sectoral coordination to share responsibility for disaster resilience. This appears to be well accepted in the disaster management sector. Post disaster reviews have repeatedly mentioned the need for better communication involving more effective exchange and coordination of information (McLeod, 2003; Teague *et al.*, 2010; Holmes, 2012). This is particularly prominent in relation to disaster response and recovery, and recommendations for new technology aimed at information and

communication is an ongoing concern for government and the emergency services. The Australian Incident Management System is an example of a key piece of information technology designed for this purpose. However, there is no high-level strategic effort to address information sharing regarding disaster resilience. Information sharing is done measure by measure and can lack transparency.

The National Guidelines for Flood Risk Information Part 1 say:

> There is an ongoing role for all agencies involved in flood planning, mitigation, response and recovery to ensure that initiatives work to:…enhance the level of knowledge and understanding of the causes and consequences of floods …and improved measures to communicate the risks of associated flood hazards, …. Create public trust that governments and their agencies are open and accountable and will release all information possible within the confines of operational and legal considerations (Commonwealth of Australia, 2012b:11).

The same document makes very brief reference to the challenges that sharing flood risk information may pose in terms of behaviour change. The processes set out in the guidelines may amount to a significant change in past practice that may not be achievable in the short or even medium term. To facilitate their implementation will require an ongoing commitment by all levels of government and professional bodies to the provision of education and training that incorporates approaches that support behaviour change.

I have outlined the key players who provide information and communication for disaster resilience, and in doing so, I have also commented on the extent that they are trusted by the general public. It is problematic that trust in the media and in all levels of government is relatively low when, to be effective, disaster resilience information and communication requires trusted sources. This section explored how trust can be enhanced by employing various policy implementation mechanisms, and how building public trust in the government and the media can be mutually reinforcing. It also introduces the sources of science communication and family, friends and local opinion leaders as sources of information that have high existing levels of trust and whose roles need inclusion in disaster resilience information and communication policy implementation.

1.35 Information and Communication in the Case studies

1.35.1   National Flood Risk Information Project

The disaster resilience narrative around the NFRIP Flood Portal is centred around the high value of information about flood risk and risk management. It was assumed that better quality, better coordination and better access to this information would encourage uptake, and result in more widespread flood risk mitigation and thus reduced adverse impacts from flooding. Another assumption was that there was consensus among stakeholders that flood information should and

would be shared. The project proceeded along these lines and did not foresee the obstacles to sharing data that would arise. This demonstrates how a disaster resilience narrative may contribute, if indirectly, to implementation problems. Approval of the project at the highest level of government contributed to an assumption that the owners or custodians of flood information would comply with the project requirements to share the data. This did not occur. Upon reflecting on this, the project manager observed:

one of the key challenges of the way governments do things is that the government decided that a portal was the best way to do this problem. 'There's a problem, portal is gonna fix it.' GA build the portal. When really we should have said 'What's the problem? What is the problem here and what problem are we trying to solve? Is building a portal going to solve that problem?' Well no, in actual fact, building this portal has actually identified or highlighted the problem. So that's the real problem that we are addressing. (Interview GA44 020516)

Clearly the NFRIP experienced impediments in the area of the policy objective, that is 'free flow of information between sectors'. This implementation threatened to compromise the success of the project. This shows that free flow of information is indeed a feature of good practice in disaster resilience policy implementation. It has already been mentioned that there was some concern that the accuracy and efficacy of the flood information and risk management approaches to be made available, via the portal, could not be 100% guaranteed. This was the other factor that contributed to the reluctance of some to share the information. Therefore, a lack of trust was a barrier to the success of implementation on more than one front. Geoscience Australia addressed this by demonstrating to stakeholders that there was negligible chance of litigation and that there was more legal risk attached to non-disclosure of this information (Eburn and Handmer, 2012). The upshot of this example is that education supported by good quality academic evidence can alleviate concerns and overcome resistance based on erroneous information. More positively, trust can and should be built up around information and communication for successful implementation. Again, the point is made that as a federal government agency, Geoscience Australia has access to personnel with appropriate skills to meet the requirements of this project. These were utilised in the series of workshops, forums and briefings to data custodians and other project stakeholders. Geoscience Australia also has the capacity, in terms of infrastructure, to conduct a project of this magnitude. The extensive investment of resources (including human resources) into the strategic management and planning that went into the implementation of the NFRIP highlights the extent of the application of the policy objective, skills and infrastructure. However, whether the precise manner in which agency capabilities were brought to bear in the implementation of the NFRIP provides an example of good practice requires further consideration. Identifying areas where implementation practices were judged as less than perfect, or having detracted from good practice, has equal value for our learning about normative good practice.

The NFRIP experienced obstacles in terms of restrictions related to copyright and reluctance by some local and state governments to publish flood maps and associated flood risk management plans. The underlying reasons were technical, for example, the wording of procurement agreements and contracts; or intangible, including attitudes that manifest as a reluctance by data custodians to share disaster risk information. Concerns about litigation should disaster risk information prove to be incomplete or inaccurate (Eburn, 2008; Eburn and Handmer, 2012), unclear copyright arrangements and some financial disincentives for local councils that earn revenue by charging a fee for access to some flood maps and flood risk management plans (Interview GA44 2 May 2016).

1.35.2   NSW Disaster Resilience Program

There are two aspects to the NSW National Partnership Agreement – Natural Disaster Resilience Program (NPA-NDR) case study: They are the National Partnership Agreement funding mechanism itself and the Community Resilience Innovation Program, a component of the NSW NPA-NDR. Information and communication was not identified as a policy objective that plays a significant role in implementation of disaster resilience policy in this case study. The possible exception to this is the explicit priority of the program to 'effectively communicate across the emergency management sector and with the community' (NSW Government, 2019 #1284). Information about the NSW Disaster Resilience Program (NSW DRP) is not all accessible from the NSW Department of Justice and Emergency Management website. The Floodplain Grants Scheme and its information is managed by the NSW Office of Environment and Heritage, and the Rural Fire Service must be contacted to provide information about the Bushfire Risk Management Grants Scheme. The remainder, including the CRIP, are published on the NSW Government Department of Justice Government and Office of Emergency Management website. It includes notification of funding rounds, application procedures and details of past and current projects. The NSW DRP, as outlined in Chapter 2, is well established and the NSW based disaster mitigation programs that flow from it tend to be disbursed to local governments, emergency service organisations and other government agencies, in a pattern that is similar for each federal government funding round. The exception to this is that the wholly federally funded National Emergency Management Program Grants were bundled into this package under a new National Partnership Agreement between the federal government and state and territory governments. The CRIP program, is unique in being the only state and territory government funded program dedicated to community resilience that seeks to reach out more broadly to non-government, as well as government organisations, with the aim of creating partnerships and collaboration across sectors. In Chapter 6 the role of access to information in innovation theory was described. This idea informs an assessment of the NSW CRIP and other NPA projects in relation to the policy objective of information and communication. There is little evaluation information publicly available about any of the projects even though the guidelines stipulate this as a requirement:

'embedded quality evaluation from project inception to completion including consideration of one or more of the following - process, outcome and impact evaluations and effective strategies for communicating project findings and lessons learnt' (NSW Government, 2019:3; NSW Government Department of Justice and Office of Emergency Management, 2019).

This effectively limits the effectiveness of information and communication measures across all of its policy objectives.

1.35.3   Lake Macquarie City Council Local Adaptation Plan for flooding including due to sea level rise (Marks Point and Belmont South)

The significance of narrative and its impact on the success of implementation was prominent in this case study. Planning to address flood risk is a local government responsibility in NSW, and local councils are required to incorporate sea level rise into this process. In accordance with this, the Lake Macquarie Waterway Flood Risk Management Plan was developed and adopted by the LMCC in 2012 (Lake Macquarie City Council, 2012). The community backlash that followed was caused by anger about the predictions of sea level rise that many residents related to large increases in their property insurance premium costs and a belief that as a result their property values were being adversely affected. It became clear to LMCC that this reaction was based on a narrative of scepticism around sea level rise associated with climate change (Interview LMCG50 3 May 2016). The early consultations conducted by LMCC about this and the proposal to develop locally-based plans to adapt to future flood risks were highly charged, and at times LMCC employees were the target of severe verbal abuse (notes from community meeting 3 May 2016). How LMCC reacted to this is discussed more in relation to the policy domains of social capital and community competence, but it also illustrated examples of good practice in information and communication by LMCC in some technical and strategic ways. LMCC made sure that they presented flood information that was highly localised to the household level to make it relevant for their audience. They also used colour and design to prevent misinterpretation and to avoid being alarmist:

'So, we did think carefully about how we communicated and illustrated some things to people. So for example, simply presenting the maps, we did a whole exercise of mapping so that the building envelopes were shown clearly and were still above water and the mapping was done on gradations of depth so it was clear to people whether their property was going to be severely affected, or right on the margins, or only slightly affected. You know, you don't use colours like red because they sort of sound alarm bells.. all sorts of… so thinking through some of those things about how people are going to respond was important'. (Interview, LMCG51 030516)

Later, when it seemed that progress was not being made, LMCC reviewed its practice and identified that the discussions had become locked into a debate about the reality of climate change rather than the generation of useful suggestions to make a local adaptation plan for flooding,

regardless of the cause. LMCC changed the design of the next round of consultations to ensure a more instrumental approach. The tone of the discussions was steered away from climate change and instead towards various practical situations that could arise from higher water levels, including the identification of trigger points for action and options for remediation. This proved more productive and shows that behaviour change was achieved by adjusting the information and communication elements in the community engagement process. When certain issues became obstacles or distractions from the central purpose, LMCC organised for external experts to speak directly to these issues at community consultations. Importantly this was done in a way that speakers were introduced at the request of the community. The factors that contributed to the success of this approach were seen by LMCC as related to perceptions of the legitimacy and impartiality of the outside speakers and the sense that the community's learning needs remained self-directed rather than prescribed by the LMCC (Interview LMCG51 030516). In addition, a number of industry sectors were invited to be involved (even though there was limited uptake of this invitation) (Interview LMCG52 030516) which signalled that activities were designed to facilitate the exchange of information, between sectors, in accordance with Policy Objective #4. Despite the tensions referred to earlier, there was a view that the information provided to the community was well received and trusted, including in the more unpopular early meetings (Interview LMCJ57 030516). Information dissemination was achieved through community meetings and workshops, public information booths and displays, guided visits to a number of flood adaptation sites, regular updates via a mailed and on-line newsletter, and publication of other relevant reports and documents on the LMCC website (Lake Macquarie City Council, 2016a Appendix 5:1-3). At one of the November 2013 consultation meetings, a survey was conducted on how well the LMCC had communicated the flood-related issues. Out of a total of 37 responses, 24 felt that this had been done 'poorly' and only 2 felt it had been done 'well' {ibid, p.6). The views of those interviewed for this case study varied regarding the level of trust the community had in the consultation meetings. One person asserted that the meeting he attended appeared to be geared to outcomes that were predetermined by the LMCC ; and another felt that LMCC had engendered trust from the start because the full details of the consultation were communicated up-front so that people knew what to expect (Interview LMCG 030516). Another interviewee compared two different styles of consultation, used by LMCC for the Local Adaptation Plan, and pointed out that their design had a bearing on community trust in the LMCC. The second round involved free ranging discussion that allowed for expression and exploration of different views 'it was probably more free form. But it matured and became quite cohesive so I think there was a significant change*'* (InterviewLMCJ57 030516). This was combined with low key involvement from LMCC; whereas, the first round involved a more directive style of facilitation with a conspicuous LMCC presence at every table:

I think there was a two-stage consultation and the initial consultation seemed structured and corralled to those who were involved, which I think was to its detriment. They were well

orchestrated but they felt orchestrated. I think anyone with any awareness felt constrained. Within each of those tables was a council person of some form which I think was regarded as a 'plant' in some way and so the process was diluted. (Interview LMCJ56 030516).

The influence on the LAP of factors related to the skills and infrastructure policy objective was not prominent in the relevant documentation. Community engagement is a high priority across the organisation and is considered core business; therefore, the material organisational capacity and infrastructure was in place on site. The skills required for the LAP, including its information and communication activities were found from within LMCC, whose employees have a range of expertise (LMCC, Annual Report 2013-14 p.), from community members and from a part-time project officer employed with funding provided under the National Partnership Agreement for Natural Disaster Resilience (described in Chapter 2) via the NSW State Government Estuary Management Program and Flood Plain Management Program. This grant, which covered the overall cost of the LAP project, has been critical for the success of the project (Interview, LMCG55 030519) but is not guaranteed in the future. Even though the Belmont South and Marks Point LAP is currently in its implementation phase and draws its funding from other sources within the LMCC, future funding uncertainty may inhibit the development of local adaptation plans for other parts of Lake Macquarie. Financial constraints on local government is an issue that is well recognised (Dollery and Crase, 2004; Measham *et al.*,2011; Preston and Scott, 2012) and LMCC had a total operating budget deficit of $2.5 million in 2013–14, forecast to remain until 2016–17 (Lake Macquarie City Council Annual Report 2013-14:160). However, even though the process to develop and adopt the LAP was a complex task that took several years and is considered an exemplar of community engagement, this extra time and effort was not reflected in an increased cost. This experience demonstrates that better outcomes do not necessarily result from bigger budgets for community engagement (Lindquist et al., 2013). This is useful information for organisations concerned about the cost of good practice community engagement.

An unintended consequence of the LAP was raised by a councillor: This centred around interpretation of the LAP by council, which created some ambiguity that impacted councillors' decisions on building and development approval applications. Some councillors interpreted the plan literally which caused a confusion and ill-will. For example, a key principle of the plan was 'no land use intensification' which seemed theoretically sound, but in practice meant that many applications were being rejected on illogical and inconsistent grounds. This was brought into focus by one of the councillors who argued for more practical operationalisation of the principle. Thus, more could have been done to educate and raise awareness of how the new LAP would translate into practice to aid decision making to ensure it was 'workable at a basic level'.

1.35.4   Australian Business Roundtable for Disaster Resilience and Safer Communities

Each of the case studies demonstrated a narrative that was consistent with disaster resilience, albeit with emphases that varied according to project differences. This was expressed by the Australian Business Roundtable for Disaster Resilience and Safer Communities, particularly in its earlier publications and on its website, as a commitment to addressing the discrepancy between investment in 'pre-disaster resilience' (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2014) or disaster risk mitigation, and disaster relief and recovery. 'More work needs to be done particularly in the areas of funding for disaster resilience and mitigation' (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019). 'Since it was formed the Roundtable has issued several reports outlining the need for greater mitigation funding and coordination between all levels of government to help protect communities from the impacts of natural disasters.' Australian Business Roundtable for Disaster Resilience and Safer Communities. This message is woven through all of its published material with the sub-narrative of the importance of robust data as evidence to persuade stakeholders, particularly government, and the need to share this information (Deloitte Access Economics, 2013). Another angle taken by the ABRDR is about raising awareness of the full cost of disasters by including the tangible and intangible costs, which link its largely financially-based arguments to the humanitarian side of disaster resilience. This is also reflected in the inclusion in its membership of the Australian Red Cross shortly after it was established in 2012. The addition of material on the ABRDR website targeting the general community with messages about individual resilience measures has shifted the balance toward a broader audience and communicates a slightly different version of the disaster resilience narrative. 'Many Australians know only too well the devastating consequences of natural disasters.' 'Pre and post disaster funding should better reflect long term social impacts.' 'Government, business and the community need to further invest in community resilience programs that drive behavioural change.' (Australian Business Roundtable for Disaster Resilience and Safer Communities, 2016a).

In terms of trustworthy information, the ABRDR has invested substantial funding into the production of its reports (quote about the cost of approximately $100,000 each). These were developed by professional researchers and provide robust evidence-based information to persuade public policy change. They are sponsored by firms with a reputational stake in their quality. Furthermore, ABRDR has achieved international recognition in the Australian Parliament (Senator Milne, 2015, Journals of the Senate, *Environment-Climate Change – Extreme Weather Events*) and it has a role alongside other sectors to enhance disaster resilience. Taken together, this could well be seen as evidence that the ABRDR and its information resources are trusted. One area where the ABRDR has been hesitant to comment publicly is on the potential benefits to the industry sectors it represents that would accrue from disaster resilience (Interview ABRD32 210416). While this may not reduce the public's sense of trust in the ABRDR, factoring this in to

ABRDR's public information, could increase confidence in their resources and their advocacy. This relates to calls for the insurance industry to provide more detailed and transparent information about how it calculates its premiums (Productivity Commission, 2014). Inability to access this information can discourage policy holders from carrying out mitigation works on their properties. This is pertinent to the policy objective of free flow of information and is a gap that could be alleviated by more research on how the insurance industry can communicate disaster risk and encourage its mitigation (Hunt and Eburn, 2018). On the other hand, the ABRDR indicated that government could share information better than at present. It has lobbied for centralisation of data holdings to inform disaster risk mitigation that could be accessed by all sectors, including industry.

As an insurance company, we price for risk so we obviously need access to data. Unfortunately, in a lot of cases in Australia, the organisation that holds the more comprehensive data are government. … All of this information (elevation data) is held by the Department of Defence. OK there are security reasons but it would be more efficient is there was one data source and then everyone could use that data. (Interview ABRD33 210416)

This and the broader issues and benefits of open access to information was the subject of an ABRDR submission to the Productivity Commission Inquiry on Data Availability and Use (Productivity Commission, 2016) and the ABRDR's second research report, 'Building an open platform for disaster resilience decisions' (Deloitte Access Economics, 2014). Indeed, as indicated in Chapter 3, the ABRDR sought to negotiate with the federal government to collaborate and share resources, expertise and information, conditional on the federal government's acceptance of its recommendations (personal communication, Anna Killmartin, ABRDR). There have been some changes to the implementation of the disaster resilience policy by government, since the ABRDR was established, which are strengthening incentives for investment in disaster mitigation, for example, the formation of the National Disaster Resilience Taskforce {Barnes, 2018 #1215; Australian Business Roundtable for Disaster Resilience and Safer Communities, 2018 #1273} and changes to the Natural Disaster Relief and Recovery Arrangements (Australian Government, 2017). While these align in some respects with advice received from the community as a whole (Productivity Commission, 2014), they cannot be attributed directly to the efforts of the ABRDR. Notwithstanding this, the ABRDR continues to make a worthwhile contribution to a greater level of awareness and understanding of some of the issues surrounding the importance of information and communication strategies for disaster resilience. The skills and infrastructure policy objective warrants a brief mention with the assessment that the ABRDR's arrangements more than adequately meet the needs in this area. ABRDR members are chief executive officers of large multi-national companies in industries that are all key private sector stakeholders in disaster resilience. CEOs are well placed to leverage access to a broad range of expertise and considerable financial resources for the establishment and ongoing operation of the group. Insurance Australia Group initiated the group and hosts a secretariat with dedicated staff and in-

kind support. Funding is obtained from contributions made by each of the member organisations with in-kind support from other relatively senior employees of each organisation who participate in a working group to progress the ABRDR work program.

1.35.5   Rivers and Ranges Community Leadership Program

The significance of information and communication to disaster resilience is clearly reflected in the way the Rivers and Rangers Community Leadership Program is being implemented. This consists not only of the lectures, workshops and forums that form components ('Program Days') of the ten-month training program offered to develop community leaders, but it also applies to various other activities organised by RRCLP to support and stimulate learning about a wide range of issues relevant to disaster resilience. These are provided via a range of learning modalities. Some take the format of didactic education sessions presented by subject-matter experts, others are interactive or semi-interactive, while still others involve experiential learning that can happen in a classroom setting or through visits or excursions. For example, the community leader's program includes a visit to Parliament House to enable the students to experience democracy at work and to have conversations with their local parliamentary representatives. These are combined with practical leadership skills training in areas such as public speaking, mentoring, negotiation ethics and program management, to name a few. Training to instil leadership skills runs the risk of being either too prescriptive or too ephemeral, but RRCLP's ongoing relevance and popularity suggests that it has a formula that is successful in its broader narrative and messaging while meeting a variety of individual needs. For example, those who participate come from wide ranging backgrounds with different needs but RRCLP's capability appears to have expanded far in excess of the growth in its funded resources. Its website is a good source of information and is easy to read, well presented with liberal use of images that convey a people-centred organisation. It uses plain English and it interprets resilience in terms of practical concepts that would be relevant for a range of community stakeholders. The word 'resilience' is not conspicuous in RRCLP's information resources but messages about its determinants are pervasive. The resilience narrative conveyed by RRCLP is strength-based and holistic with a peppering of references to the innovation and transformation, in line with the understanding of resilience adopted in this thesis. The education and training and skills development sessions are thematic and cover a range of topics. For example, community resilience and disaster resilience are included but do not dominate the program, which also deals with education and training, the economy, tourism sustainability and government, arts and culture, health and wellbeing etc. I note that the program intrinsically distinguishes between 'management' and 'leadership'. It points to the results of an evaluation conducted by the Victorian Regional Community Leadership Program where 23% of program participants felt that their participation in a Victorian community leadership program allowed them to move from a management role into an executive role (Victorian Regional Community Leadership Programs, 2014). The report indicates that

participants gained knowledge of regional issues combined with increased personal skills that gave them an ability to communicate with influence and to act as 'agents of change'. This demonstrates an understanding of the importance of behaviour change, the universal theme for information and communication in the Provisional framework. The RRCLP's Stakeholder Engagement Strategy demonstrates the value afforded to information and communication. It was noted that the program manager, even as the sole employee of RRCLP, prioritised the dissemination of information and regular communication, often ensuring contact with stakeholders was done face to face. She also took up a position on the Board of the Victorian Regional Community Leadership Program to assist in linkages with leadership programs in other parts of Victoria and in the cross fertilisation of ideas. The challenges involved in creating and maintaining the RRCLP networks, in light of the long distances involved, cannot be underestimated. Many of the facilitators of RRCLP events are based in the local community. This underscores RRCLP's efforts to ensure the information is imbued with credibility and is trusted by recipients. This aligns with theoretical evidence that people tend to trust sources closest to them for example, friends and family members (reference). The importance of trust, not just in the sources but also to ensure confidence that personal information, and the sometimes sensitive content that can arise amongst program participants, is not more widely shared is highlighted by the inclusion of this in the RRCLP Code of Conduct (RRCLP, 2016).

In many ways the RRCLP exemplifies commitment to the implementation of activities that ensure its information and communication approaches have the best chance of producing disaster resilience outcomes. This view is reinforced by examination of RRCLP's information resources and the mechanisms. These show an alignment between the policy objectives of information and communication in the way RRCLP designs and delivers its leadership program, as well as a concern to comply with these from an organisational perspective.

Local media, which it enjoys a relatively high level of trust among the population compared with major daily newspapers and media outlets, is used regularly (Blood and Lee, 2016). Also, RRCLP, by virtue of its networks, has access to skills and infrastructure that belies its level of funding or physical and material assets. Its increased capacity to develop information and communication activities has been due to additional staff. This access is facilitated not just by the network of alumni that has grown from year to year and been actively maintained, but also by the broader connections it has established in the community across various sectors. Perhaps the one area where value could be added would be for an evaluation of the program to be conducted at some time in the future.

1.36 Discussion

In Chapter 2, I indicated that subsidiarity is compatible with multi-directional and coordinated styles of information. It has also been linked to unimpeded or open forms of access to information, which in turn is required to support innovation. This being the case it could be

assumed that the Rivers and Ranges Community Leadership Program's information and communication policies are being implemented consistent with subsidiarity. Indeed, they are seen as successful if only because the organisation has continued to grow since it was established in 2013. This success, may, in part be related to the value RRCLP places on effective information and communication. To judge the extent that subsidiarity is evident could include assessing whether the RRCLP has sufficient capacity to continue to operate with the same level of autonomy or whether in order to grow it needs to reach up and out to other levels of governance. RRCLP which has a very deliberate strategy of connecting with government and its institutions and making sure program participants are empowered to do so.

An accompaniment to the predominantly top-down governance style of a number of the case studies is a top-down, one directional style of communication. However, it needs to be remembered that the case studies are not static snapshots of disaster resilience activities and some changes were observed over time that moderate this view. The ABRDR, when first established, focused on communicating with other levels of the community through government and had a top-down style with some mention of dissemination through its industry associations and corporate networks. By 2019 it had expanded its project goals to 'engage the community' and developed fact sheets based on its reports that are more likely to be understood and used by other sections of the community. Its media resources also indicate an information and communication approach that considers different audiences. A more devolved style is apparent in the report, *Building resilience to natural disasters in our states and territories* (Deloitte Access Economics, 2017). In all case studies evaluation was an element deserving higher priority. This would allow lessons to be derived that would guide the development, review and improvement of practices.

Learning for behaviour change is a fundamental goal of disaster resilience information and communication policy at all levels of government and civil society. It is routine in the development of major policy initiatives to include a corresponding communications strategy. This, however, says little about the efficacy of the approaches being used to support the implementation of disaster resilience policy. Indeed, the design of most of our information and communication programs is based on the premise that imparting information will result in behaviour change, particularly when the information is accurate and the source of that information is authoritative. Unfortunately, there is convincing evidence drawn from learning theory and behavioural and cognitive psychology that any link between information and behaviour change is tenuous at best. In addition to the broad goal of behaviour change, operational policy objectives for information and communication activities include: the need for trusted sources; adequate and appropriate skills and infrastructure; a narrative that is consistent with disaster resilience; facilitates the flow of information between and within sectors in both horizontal and vertical directions. Information and communication as a choice of policy domain is, when compared to the other three, operationally focused. Thus, an end-goal is not implicit in the information and

communication policy domain as it is in the other three. This requires an understanding of information and communication mechanisms and of individual activities.

A narrative that provides meaning and common understanding of disaster resilience is evident, to varying degrees, at different levels of the system. Initiatives that are developed and, to a lesser extent, implemented with regard to engagement and participation of all stakeholders tend to demonstrate a narrative that supports commitment to the principles embodied in the Provisional Framework.

The role of information and communication in disaster resilience is a critical instrumental capability and one that is well-established and integrated into disaster relief and recovery. The emergency services sector is key to building and sustaining a national capability in this area and it exercises a leadership role in implementation of information and communication policy, at every level of the federal disaster management system. The implementation of the national policy on the Public Safety Mobile Broadband has been in progress for more than a decade and as such is worthy of special mention. The reasons for its protracted implementation are complex and are instructive for highlighting those that relate to Australian federalism, noting that telecommunications policy is included among the enumerated powers in S.51 of the Australian Constitution. The problems include a lack of agreement about the suitability of the transmission frequency of the spectrum that the federal government has agreed to allocate; costs of constructing the network and how these will be calculated, funded and shared; and uncertainty about the extent that the telecommunications market can efficiently and effectively provide the capability and set pricing, and develop national standards. Summarised in terms of subsidiarity, the barriers to implementation of the Public Safety Mobile Broadband initiative revolve around the negotiation of the roles of the various stakeholders and how they will share responsibilities.

To create a more disaster resilient Australia our information and communication activities and systems must emphasise disaster preparation, preparedness and risk mitigation. They also need to expand the relevance and influence of disaster resilience information beyond the emergency services to reach out to the broader community. Progress towards this aim is reflected in evolving government policy and organisations such as the Australasian Fire and Emergency Service Authorities Council (AFAC) have been recognised as a disaster resilience partner with government at the highest and intermediate levels, in conjunction with other national education and research agencies.

Overall a more considered approach to the development and implementation of information and communication policy for disaster resilience will increase the chances of success. This will also help to avoid the tendency for initiatives, particularly those that are narrowly targeted, to be implemented in isolation from other elements within the system. This limits the synergies that can be facilitated by effective coordination.

Chapter 8: THE VALUE OF THE DISASTER RESILIENCE POLICY IMPLEMENTATION FRAMEWORK AND SUBSIDIARITY

1.37 Introduction

This thesis developed a Provisional framework for good practice in disaster resilience policy implementation that was used to investigate the research question: *Does the implementation of national disaster resilience policy in Australia reflect good practice and how is this shaped by the characteristics of the Australian federal (multi-level) governance system*? The Provisional framework was then evaluated and given a revised title, the Disaster Resilience Policy Implementation (DRPI) Framework.

This chapter completes the thesis and provides an overview of the findings and a discussion of their implications for future research and practice. The DRPI Framework is the primary finding arising from this research. In Sections 8.2.2, I outline the key good practice principles for disaster resilience policy implementation which I have gleaned from the application of the DRPI Framework to the case studies. A summary of the findings in relation to the application of the DRPI Framework to each of the policy domains of social capital, community competence, economic development, and information and communication is provided in Sections 8.2.3 to 8.2.6. Section 8.2.7 discusses the findings in terms of the subsidiarity principle. In Section 8.3, I reflect on the use of a framework method, and comment on specific aspects of the DRPI Framework and its utility. I answer the thesis research question in Section 8.4 and identify some outstanding issues in Section 8.4.1. These are taken up in a discussion about areas for future research in Section 8.4.2.

1.38 Findings

Disaster Resilience Policy Implementation Framework

Disaster resilience policy implementation needs to be informed by evidence of good practice in accordance with the Disaster Resilience Policy Implementation (DRPI) Framework in Figure 8.1. The DRPI Framework provides a matrix of the determinants of disaster resilience. It consists of five policy domains, each with a set of factors that operationalise these determinants. Importantly, the fifth policy domain of subsidiarity operates in the area of governance. This represents a significant area of new learning not included in previously existing models of disaster resilience.

Disaster Resilience Policy Implementation Framework				
Policy Domain	**Social Capital**	**Community Competence**	**Economic Development**	**Information & communication**	**Subsidiarity**
Theme	**Trust**	**Collective-efficacy**	**Sustainability**	**Behaviour change**	**Power-sharing**
Policy Objectives	**1. Networks**	**1.Political partnerships**	**1. Security**	**1.Resilience narratives**	**1.Capacity-building**
	2. Place-based attachment	**2. Stakeholder engagement**	**2.Economic diversity**	**2.Trusted information**	**2. Open access to information**
	3. Community engagement	**3.External Leadership**	**3.Equitable resource distribution**	**3. Skills and infrastructure**	**3.Negotiated roles and responsibilities**
	4.Internal leadership	**4. Local disaster risk awareness**	**4.Shared (equitable) risk allocation**	**4.Multi-directional information flow**	**4. Coordination**
		5. Community participation			**5.Stakeholder engagement**

Figure 8.1 DISASTER RESILIENCE POLICY IMPLEMENTATION FRAMEWORK

1.38.1   Principles for good practice

Disaster resilience activities operate within a system and disaster resilience policy implementation must have regard for embedding good practice across the system as a whole. At the planning stage the desired policy objectives need to be identified and decisions can then be made about what policy mechanisms are the most appropriate to achieve these outcomes. Suitable policy mechanisms may be available and may need to be adjusted or new policy mechanisms may need to be developed. Next, practitioners will need to think about the various actors involved and the roles they will play in implementation. Actors will include those directly associated with the

activity, plus those at work within the wider Australian context. They may be individuals, organisations, sectors or jurisdictions. Roles need to be defined in terms of how they align with the policy objectives and whether there is sufficient capacity and the necessary authority to exercise the responsibilities inherent in the role.

Learning strategies that are designed to achieve behavioural outcomes are key to effective disaster resilience policy implementation. These need to targ*et al*l sectors and could be achieved by the delivery of cross-training to build reciprocal knowledge and skills. To start with, programs could be conducted for government and community service organisations to enable them to share information, knowledge and skills in community development, government administration and policy development. This approach forms part of a broader requirement for the development of multi-directional information and communication channels for disaster resilience implementation. This approach will support disaster resilience by contributing toward a more coordinated and cohesive disaster resilience system. Behavioural change theory and practice must not only be incorporated into education programs but also into other information and communication activities, particularly disaster risk communication. Another way that people can be supported to understand disaster risk and to encourage its mitigation is to reduce the actual and perceived legal and administrative barriers that restrict access to, and use of, hazard information.

Trust should be promoted as a system-wide principle that needs to guide activity at all times. Working relationships based on trust and mutual respect need to be built and nurtured between actors across and between the different levels of government, and with the non-government and business sectors. Enhanced trust will contribute to better outcomes in general and is highlighted as a key attribute for sharing power and responsibility, engaging with communities and stakeholders, building networks, and ensuring better connectivity and free flow of ideas and information.

The idea that disaster resilience requires a whole-of-community approach must be better adopted into practice. There are opportunities for a broader range of stakeholders, including business, to participate in disaster resilience that are currently not being fully realised. To open up new possibilities and opportunities for inter-sectoral cooperation and collaboration, those who seek to implement disaster resilience policy must be committed to authentic community and stakeholder engagement. At the centre of this commitment is a willingness to learn together and, perhaps most importantly, to anticipate and engage with conflict as part of this process.

One of the lessons learned in this thesis was that there are a number of similarities and differences between the policy domains of social capital and community competence that impact on implementation. Chapter 3 showed that the two are closely connected but that researchers disagree whether social capital creates community competence or visa-versa (Ostrom, 1998; Lochner *et al.*, 1999; Ahn, 2002; Adger, 2003; Ostrom and Ahn, 2003; Norris *et al.*, 2008; Kulig *et al.*, 2013). My interpretation of the relationship between them is reflected in the DRPI Framework. The policy objectives relate across both domains because they occur along a

continuum. However, they are retained as separate policy domains because it is important to emphasise the difference between building capacity for action (through social capital) and the achievement of action; a function of community competence.

The Provisional framework was applied in Chapters 4, 5, 6 and 7 and the chapter titles correspond to the policy domains in the DRPI Framework. At the beginning of each of these chapters I provided an overview of the theoretical linkages between disaster resilience and the relevant policy domain, followed by a discussion about its presentation in the five case studies. This analysis drew attention to ways that successful implementation of disaster resilience policy is supported by the policy objectives for each policy domain.

1.38.2   Social capital

In Chapter 4 it was concluded that the generation of social capital across and between different sectors is a determinant of disaster resilience. The value of social capital and how it can be created and encouraged needs to be appreciated by all disaster resilience practitioners; it is matter for government as well as for community stakeholders. Education may be needed to help raise awareness about social capital and its importance in disaster resilience. In particular, it may be helpful for practitioners to understand the relevance to their work of the different types of social capital, for example, Bridging, Bonding and Linking (Productivity Commission, 2003:18)**.**

In the case studies, it was observed that the NSW Community Resilience Innovation Program (CRIP) has project guidelines that explicitly state that the aim of the CRIP is to build social capital (NSW Government, 2019). This was taken as evidence that this area of the NSW state government is aware of social capital and its connection with disaster resilience. This case study also demonstrated that bureaucrats had exercised external leadership skills by managing upwards to influence senior managers to support the establishment of the CRIP (Interview OEMW63, 6 May 2016).

The Lake Macquarie City Council case study conducted a successful community engagement strategy for the Local Adaptation Plan with limited financial resources. In contrast the National Flood Risk Information Project (NFRIP) had substantial funding and Geoscience Australia (GA) was able to conduct travelling roadshows and workshops to promote the Australian Flood Risk Information Portal and to develop its technical specifications. While these individual activities may have been successful, more comprehensive community engagement and stakeholder engagement strategies at the beginning of the project may have reduced the barriers to sharing flood information that were later encountered (Interviews GA44, GA46, 2 May 2016). Thus, funding levels appeared not to be related to the degree of success although having dedicated human resources remained important. Effective community engagement was more related to its planning and design having regard for the broader goals and objectives of the project. Trust between levels of management within GA translated into autonomy within lower levels of management. This empowered them to take action to overcome barriers related to gaps in the

consultation strategy. There was a demarcation of roles and responsibilities for the NFRIP whereby the federal Attorney-General's Department (AGD) retained policy oversight and GA managed the operational aspects. While a split in responsibilities between policy and practice is not uncommon, in this situation it may have constrained GA's capacity to strategically manage the NFRIP.

The Rivers and Ranges Community Leadership Program (RRCLP) established a support network of potential local leaders by creating trust between the individuals through intensive personal and leadership capacity development training (Interview RTM24, 16 April 2016). It was also the only case study that had participated in a formal evaluation, which was conducted by the state-wide Victorian Regional Community Leadership Program. The findings, while not specific to the RRCLP, indicated gains to participants and their communities in (but not limited to) the social capital policy objectives of internal leadership, and network development (Victorian Regional Community Leadership Programs, 2014).

1.38.3   Community competence

In Chapter 5, I reflected on the discussions and findings in Chapter 4 and concluded that capacity building must be coupled with measures that move capacity for change toward action for change. Evidence was found in each of the case studies of strategies aimed at empowering organisations and individuals to participate in disaster resilience. These examples were consistent with the idea that empowerment goes hand in hand with self-efficacy, that, when translated into collective efficacy, determines community competence.

The Lake Macquarie City Council (LMCC) Local Adaptation Plan (LAP) is an exemplar of good practice for community engagement and stakeholder engagement in this thesis. This view is judged on its flexibility; its successful inclusion of top-down approaches into a predominantly bottom-up style; its persistence in the face of barriers; and its willingness to acknowledge and deal with difficult realities. In so doing its engagement strategies were seen to conform to a social leadership model which, in the research, was found to be consistent with authentic stakeholder engagement (Porteous, 2011; Porteous, 2013). This verified that the LMCC LAP is an example of good practice.

The Rivers and Ranges Community Leadership Program's (RRCLP) approach to fostering community-based leadership centres around the personal transformation of individuals. This includes skills development to enable them to connect with, and influence government from the bottom up. The strength that RRCLP participants draw from its network gives them added personal and professional capacity that can be multiplied within their own communities. This demonstrates internal and external leadership styles and how they are complementary across community competence and social capital.

The outwardly focused leadership of the NSW Government in establishing the Community Resilience Innovation Program (CRIP) leveraged change despite being governed by the relatively

immutable National Partnership Agreement – Natural Disaster Resilience Program (NPA-DRP) arrangements. This showed that, where there is a barrier at one scale, effective change is possible at another. Since it was established in 2014, the Australian Business Roundtable on Disaster Resilience (ABRDR) has taken a top-down approach to stakeholder engagement and largely focused on the federal government to influence change. More recently, the ABRDR has reached out to other levels of government and shown an awareness of the need to build relationships with other sectors (Deloitte Access Economics, 2017; Australian Business Roundtable for Disaster Resilience and Safer Communities, 2019).

The Federal National Flood Risk Information Project (NFRIP) set out to create change and the substantial investment of funds signalled the high value placed on this project by the federal government. However, technical information may have been overvalued in this process and in doing so, cognitive and behavioural elements were overlooked or undervalued. This effect was raised in the literature by Tierney (2015).

1.38.4 Economic Development

It was concluded in Chapter 6 that the justification for equitable resource distribution is well established in terms of the links between social and economic well-being and the reduction of disaster risk and vulnerability. Even so, in the area of economic development for disaster resilience, more attention needs to be given to applying the principle of sustainability. Sustainable economic development has been a goal for disaster risk reduction and resilience in developing countries for some time. It could deliver benefits by being incorporated into disaster resilience policy implementation approaches in a developed country like Australia (Handmer and Dovers, 2013).

Various economic theories including classical or neoliberal economics, innovation theory and behavioural economics were described in Chapter 6. All of these make a case for open access to information. Similarly, unimpeded information access and sharing in all directions will promote disaster resilience. It will do this primarily by improving the quality and reducing the cost of data for risk reduction and by supporting better coordination of national disaster resilience effort.

The National Flood Risk Information Project (NFRIP) demonstrated an awareness of risk information as a commodity that can contribute to economic development. The NFRIP aimed to make flood maps, flood risk assessment and management plans universally available. This was based on the premise that access to this information helps people to learn how to take appropriate action to identify and address their flood risk. In turn, this will produce more equitable allocation of flood risk, a policy objective for economic development. Even though the NFRIP was well resourced and thoughtfully planned, barriers to its success were experienced in terms of copyright law and procurement policy. These have their basis in an approach that preserves economic benefit with those who created the knowledge, even when this information was publicly funded.

Geoscience Australia (GA) applied lessons that were drawn from theories of economic development to reduce barriers to disaster resilience. It presented the concept of 'virtuous circle' and lobbied stakeholder to facilitate open access for this reason (Interview GA41, 2 May 2016). GA argued that the remediation of the market for flood information to achieve better competition will accrue economic benefits for all (Hazelwood, 2016a). This idea was well received and offers the potential for better outcomes for flood risk management. These lessons can, in the future, be applied to information about risk management for other natural disaster hazards and to improve disaster resilience (Hazelwood, 2016b).

The Rivers and Ranges Community Leadership Program is partnering with environmental agencies to sponsor participants in its program as well as convening local economic summits. Their aim is to bring together local government, business and other sectors to acknowledge the role of economic development in the ongoing recovery of the region following the 2009 Victorian fires.

Up until 2018, when it was updated by Handmer *et al*. the last comprehensive investigation by government of the economic costs of natural disasters in Australia was done in 2001 by the Bureau of Transport Economics (Commonwealth of Australia, 2001a). Prior to this, the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR), a private sector group, reported on the cost of natural disasters and forecast an escalation of costs into the future (Deloitte Access Economics, 2013). This data was used in a number of submissions to the Productivity Commission Inquiry on Natural Disaster Funding and underpinned many of its key recommendations to government (Productivity Commission, 2014). ABRDR followed up with several more reports that have made a valuable contribution to the evidence base about the social and economic costs of natural disasters in Australia and how resilience-based policies can alleviate these costs. In particular, the ABRDR is judged in this thesis as having made a substantial investment to strengthen the policy argument for more disaster mitigation funding. This argument relies broadly on the DRPI Framework policy objectives of equitable resource distribution and risk allocation, and in this way, it aligns with good practice in disaster resilience policy implementation. On the other hand, the ABRDR could take the idea of equitable risk allocation further by exploring ways for the insurance industry to build more transparency into its methods for calculating the cost to consumers of risk premiums. Another area where ABRDR could strengthen its credentials and potentially its influence in the case for reorienting investment toward disaster mitigation would be for it to commission further cost-benefit studies regarding disaster mitigation and risk reduction relevant to each of its member industry sectors.

The National Partnership Agreement: Natural Disaster Resilience Program (NPA-DRP), the federal funding mechanism for disaster mitigation and the NSW Community Resilience Innovation Program (CRIP), may, in fact, constrain disaster mitigation, and therefore its economic benefits. This is due to the persistence of proportionally low levels of funding provided for disaster mitigation. In addition, the mechanism itself, is somewhat cumbersome in administrative

terms (Interview OEMA65, 3 September 2016; Interview OEMW61, 6 May 2016). It takes a formulaic approach to the allocation of funds and tends to support the status quo rather than system change (Interview OEMB61 060516). This public policy approach is at odds with the acceptance of the clear economic benefits of disaster mitigation reflected in recent high level government policy documents. It can be speculated that the reasons for this are likely related to a lack of political will rather than having any justification in the theory and practice of economics. Having said that, the CRIP is an exception in that it was conceived as a combined top-down bottom-up approach. Even though projects must be able to demonstrate that they are partnered with established NSW Government emergency service organisations, the CRIP is novel and enables a broader range of organisations to generate local disaster resilience. As such the CRIP, broadly speaking, provides an example of good practice disaster resilience policy implementation consistent with decentralised economic development policy objectives.

1.38.5   Information and Communication

Similar to the pairing between social capital and community competence described in 8.2.2, links were found in Chapter 7 between the policy domains of information and communication and economic development, which were touched upon in Chapter 6. Chapter 7 also concluded that in the National Flood Risk Information Project (NFRIP) the flow of information was a factor in both its successes and in its problems. One of the NFRIP components, the Australian Flood Risk Information Portal, was technically effective in terms of achieving standardisation of platforms for the provision of the information; however, this was offset by a lack of willingness by some to share flood information via the portal. Based on this and the other case studies, it appeared that each of the information and communication policy objectives must be included in the process of implementation. This aligns with the view that information and communication is a process indicator (Sherrieb *et al.*, 2010). However, that information and communication is essentially about processes does not reduce its significance; rather, the opposite applies and is supported by the status afforded to communication by Handmer and Dovers as a 'universal policy mechanism' (Handmer and Dovers, 2013 pp.127-128). This, combined with behaviour change being the normative goal of information and communication, provided the rationale for it to be included as a stand-alone policy domain in the DRPI Framework.

In Chapters 7 and in Section 5.2.1 it was shown that access to information and knowledge helps to empower individuals and groups. Accordingly, the provision of information and the development of communication skills is an element in the leadership training conducted by the Rivers and Ranges Community Leadership Program (RRCLP). At the same time some participants in the RRCLP felt that information from higher levels did not flow downwards and was therefore, not sufficiently accessible (Interview, RSP1718, 15 April 2016; RTM27, 16 April 2016).

The NSW Community Resilience Innovation Program (CRIP) case study points to a more general gap in the area of information and communication. Reports on the outcomes and evaluations from all CRIP projects are either not routinely required as a condition of funding or are not routinely publicly available. For example, the 'Community Involvement in Planning' pilot project was conducted by the NSW State Emergency Service with funding provided under the NSW Disaster Resilience Program. It was completed in June 2016 but a report on the project outcomes has not been published. When information about project outcomes is not shared it limits the extent to which lessons can be learned from existing work and may hinder the spread of good practice. It could also be argued that when activities are publicly funded, particularly for evaluating a certain approach, there is a responsibility to publicly release that information. A less than optimal flow of information is also evident in other predominantly government managed and funded disaster resilience activities. For example, the National Emergency Management Program project reports do not appear to be collected, collated and published and there is generally a lack of up-to-date and publicly available information about disaster resilience policy initiatives funded under the National Partnership Agreement – Natural Disaster Resilience Program.

1.38.6 Subsidiarity

Subsidiarity was identified in Chapter 2 as integral to federalism. At a minimum, subsidiarity provides Australia with an organising principle to configure power-sharing arrangements within multiple levels of government in accordance with the Australian Constitution. Australia's disaster management arrangements are shared between levels of government and civil society yet we cannot look to the Australian Constitution to define the detail about how these roles and responsibilities work in practice. This has its advantages and its disadvantages. Natural disasters are not confined by state or even national borders. The Australian Constitution is broad enough that it preserves the flexibility we need to develop and coordinate our federal arrangements to meet the emerging challenges we face around developing resilience to natural disasters. The disadvantage is that we lack guidance for devising the best structures to enable people to work together to share information, skills and experience; to innovate; and to create synergies between disaster policies and programs across Australia as a whole. Subsidiarity, when interpreted and applied authentically, provides this and more: it guides a discussion and decisions about governance, the apparatus for implementing policy. This is an application of subsidiarity that has hitherto been under-utilised.

Consideration of subsidiarity is important to ensure national disaster resilience policy is implemented effectively at every level of the system. It also has a direct role in the implementation of the determinants of disaster resilience in accordance with the other four policy domains in the DRPI framework. This was demonstrated when the Provisional framework was applied to the disaster management system in the five case studies: many of the activities that were implemented in line with the Provisional framework were also consistent with subsidiarity. For example, in

terms of actions that aligned with social capital and community competence, the development by the Lake Macquarie City Council (LMCC) of the Local Adaptation Plan for Flooding (LAP) enabled community members to become involved to the point that they were empowered to take control of the process. This ultimately resulted in positive outcomes for both residents and the LMCC. LMCC staff nurtured leadership potential within the community to develop the LAP and ensure its acceptance by the broader group of residents. LMCC was responsive to community requests for information to assist in decision making and showed regard for the importance of providing highly localised flood risk information. This case study lends supports to the argument that local government is the most appropriate and competent level of governance to conduct adaptation measures for flood risk due to climate change (Measham *et al.*, 2011). This aligns with the subsidiarity principle.

Where there was little or no indication in the case studies that implementation was being done with regard to the Provisional framework, the application of subsidiarity could have provided checks and balances to improve implementation. In the National Flood Risk Information Project, the prevention of access to flood data due to copyright restrictions jeopardised the success of the Australian Flood Risk Information Portal. This, and other barriers could have been anticipated and overcome by better consultation with stakeholders. Ideally, consultation would have occurred prior to project approval and throughout planning and implementation. This would have clarified stakeholder roles and responsibilities, and increased the likelihood that authority to share flood data was devolved to the appropriate level.

This thesis has shown that subsidiarity is useful for signposting the way to effective national disaster resilience policy implementation. The National Strategy for Disaster Resilience (NSDR) and policies and programs that flow from the NSDR emphasise the devolution of responsibility for disaster prevention, preparation, and planning to sectors beyond government and the emergency services. It exhorts individuals, households, communities, businesses and non-government organisations to get involved to understand and reduce their disaster risks. Significantly, this does not mean that government and the emergency services should, and nor would they, abrogate their existing responsibilities to protect citizens' lives and property. It means that, in order to become resilient to natural disasters, and in the name of subsidiarity, people will increasingly be expected to develop their competencies and exercise agency to make choices and to take action in the interests of protecting and strengthening their own well-being and that of their community. Government will also be expected to reciprocate by partnering with communities to undertake capacity building to develop social capital and community competence; to implement, insofar as possible, economic policies with regard for sustainability; to learn; and to facilitate learning in others through information and communication practices that have the best chance of changing behaviour. To apply subsidiarity authentically it is critical that communities and key stakeholders engage with government in an environment where they are empowered; relationships need to established and managed based on trust. Trust is a pre-requisite for

effectively negotiating and agreeing roles and responsibilities, including areas of joint and shared responsibility. Information must be readily available and accessible to all stakeholders and it must be communicated freely: top-down, bottom-up and horizontally. Models of governance for disaster resilience with regard for subsidiarity could also provide the flexibility that will be needed to respond to the increasing cultural diversity that characterises Australian society (|Australian Bureau of Statistics, 2020). A commitment by government to community-driven and locally devolved approaches must encompass communities of place and communities of interest. The appearance of stakeholder engagement and decentralisation of functions is not sufficient on its own. Adequate resources, training and authority must accompany these functions, and forms of governance must be fit-for-purpose to oversee the provision of these outcomes. This thesis has shown how these elements contribute to disaster resilience. This provides the rationale for their inclusion in the DRPI framework and for the addition of subsidiarity in accordance with its description in Chapter 2.

1.39 Framework Evaluation

As an outcome of this thesis, the DRPI Framework has the potential to raise awareness about the importance of implementation in ensuring policy effectiveness. More specifically, it promotes disaster resilience by providing a practical interpretation of the elements of good practice. For example, the interconnection and differences between social capital and community competence, and, in terms of governance, that the principle of subsidiarity, reaches across all of the Policy Domains.

Where an issue associated with implementation was identified in the case studies, be it a problem or a success, its links to the DRPI Framework were highlighted. This assists us to understand the conditions surrounding success so that these can be replicated. Where problems have been experienced, it helps us diagnose a cause and devise possible solutions.

Questions may remain about the relative importance of each policy domain: about which, how many, and what configuration of policy objectives need to be focused upon to suffice as good practice. The answers will likely need to be determined by practitioners on a case by case basis. Meanwhile, this thesis acknowledges these gaps. This, in itself, is valuable for reinforcing the holistic nature of disaster resilience, and reminds us that disaster resilience policy implementation occurs within a system where the whole is greater than the sum of the parts. A single disaster resilience activity is one of these parts.

A more detailed discussion of the issues encountered in the development and application of the DRPI Framework follows in Sections 8.3.1 and 8.3.2.

1.39.1   Framework development

One of the main challenges in the development of the DRPI Framework was to rationalise the multitude of variables that contribute to disaster resilience. As a starting point, the conceptual

framework for disaster resilience policy implementation was developed in Chapter 3, Section 3.2.2. It provided a heuristic to understand the broad normative context for disaster resilience policy implementation in Australia. It was portrayed as a system supported by the four cross-cutting elements of social capital, community competence, economic development, and information and communication.

Disasters are a 'wicked' problem which makes public policy solutions inherently complex. Added to this, disaster resilience is dynamic and operates in an interconnected system. Thus, the complexity of constructing a disaster resilience policy implementation framework was compounded because it required the mapping of disaster management against resilience in order to create a framework that could be applied in a practical sense.

It should be noted that as part of the process of this research, the Provisional framework was developed, reviewed and updated. The Disaster Resilience Policy Implementation (DRPI) Framework is the end-product. The model proposed by Norris *et al.* (2008) provided a sound foundation from which the Provisional framework was developed. This was borne out in the process of its development as presented in Chapter 3 and in the literature reviews and application of the Provisional framework to the case studies in Chapters 4, 5, 6 & 7. Cross references were found between the various terms that reinforced decisions about their inclusion and categorisation in the Provisional framework. For example, the policy objectives for social capital were confirmed as pathways to the achievement of social capital in Chapter 4.2. This reinforced the view that social capital is a determinant of disaster resilience and added weight to the decision to include it as a policy domain in the Provisional framework. While developing the Provisional framework, I also identified a theme for each of the policy domains. This provided a useful check on the internal consistency of the categories which added to my confidence in the Provisional framework, and in the final DRPI Framework.

The process unearthed new information about the disaster resilience variables that will assist our current thinking about implementation. For example, the distinction that is made in the DRPI Framework between the policy domains of social capital and community competence is important in terms of implementation and can be explained, in part, by the difference between the capacity to change and the achievement of change. Interconnections within and between the sets of policy objectives were also demonstrated. For example, at the thematic level there were links between collective efficacy and behaviour change. Across the policy objectives, community engagement and stakeholder engagement were shown to be connected (but still distinct) as were the two nuanced, but different forms of leadership (internal and external) for disaster resilience.

The practice of applying the Provisional framework to the case studies highlighted its strengths, its limitations and some areas for future work. Some of its limitations were remediated as part of the evaluative process to develop the final DRPI Framework; whereas, others are beyond the scope of this project and are indicated for future research. The Norris model, while generally suitable, aims to enhance readiness for disaster response. This setting may not be fully

consistent with national disaster resilience policy which has a broader and longer-term context that spans prevention, preparedness, relief and recovery and disaster risk reduction.

The DRPI Framework, in its current form, is not intended for use as a checklist, nor can or should it be used to make comparisons in performance between the five case study activities. Many of the case study implementation activities demonstrated characteristics unevenly across one or more of the policy domains when applied to the Provisional framework. Similarly, none of the case studies demonstrated activity for every policy objective and there were areas of overlap between the policy domains and some of the policy objectives.

The use of a two-dimensional framework to depict a multi-dimensional environment may create the impression that an activity needs to demonstrate features from every policy domain in order to be considered good practice. Further, its two-dimensional design could be seen as having limitations for our understanding and investigation of a system. This was offset by applying it to case studies. These were selected because they met the minimum criteria for success in terms of promoting disaster resilience outlined in Chapter 3, and because they varied in scale and operated at different levels of the system. Some of the activities were discrete projects, while some were nested within a wider policy or program initiative. For example, the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR) produced a number of different reports and the NSW Community Resilience Innovation Program consists, at last count, of at least 14 funded projects (NSW Government Department of Justice and Office of Emergency Management, 2019) and is but one component of the NSW Natural Disaster Resilience Program, which, in turn, is a part of the, now expired, Federal Government's National Partnership Agreement - Natural Disaster Resilience Program (Council on Federal Financial Arrangements, 2019; NSW Government Department of Justice and Office of Emergency Management, 2019).

1.39.2   Framework utility

In this thesis, the use of a framework was found to be a useful qualitative method of policy analysis. Most existing indicators treat resilience and disaster resilience as an end-point; however, resilience is a process, not an outcome (see Section 2.3.1); this is an important distinction. The DRPI Framework provides indicators that can be used to design and evaluate the process of disaster resilience policy implementation.

The DRPI Framework would not be used by practitioners in the same way as it has been used in this thesis. The case studies were proposed as examples of good practice and the framework variables were overlaid onto these examples. In so doing, I was able to demonstrate relationships between the policy domains, themes, policy objectives and case studies. In practice, the framework would be used to align with and complement fundamental policy implementation principles and project management models (Bridgman and Davis, 2004). Planning needs to commence with identification of objectives and goals of a given disaster resilience activity. In other words, first develop a sense of where you want to go, then use the DRPI Framework as a

guide to how you are going to get there. This will depend on what is being targeted for change, and the available policy instruments. It is important to remember that the framework does not, in and of itself, differentiate between the various scales of implementation. It could also be used, not just at the beginning, but at various steps in the process to check back on whether the design adheres to the approaches expressed in the framework elements.

The utility of the framework was also tested by its application to the case studies. Aspects of the case studies were identified that were conducive to good practice. Conversely, areas were highlighted where there is room for improvement. For example, the National Flood Risk Information Project highlighted barriers to the sharing of flood risk information, including concerns relating to legal liability, sub-optimal levels of trust and an incomplete understanding of the significance of community and stakeholder engagement, related to its predominantly top-down style of governance. Similarly, the framework analysis identified the professional mutual trust within Geoscience Australia (GA) and the ability of the organisation to create partnerships with professional technical stakeholders, such as Engineers Australia, not to mention the autonomy afforded to GA managers from senior managers. This contrasted with what was seen as a lack of trust between actors in other settings, for example, with some of the state-based custodians of flood maps. This is an example of how the same issue manifested differently at different parts of the system. These simultaneous gains and drawbacks collectively highlighted the importance of governance, and how this is coloured by the federal power-sharing arrangements.

The universal themes in the DRPI Framework went some way toward integrating the other elements. Trust, collective efficacy, sustainable economic development, and behaviour change are woven throughout the theory that provides the basis for the framework. They are also seen in its practical application within the case studies.

Both the NFRIP and the ABRDR revealed scope for better partnerships between business and government. Issues and problems related to information and communication, some of which were manifested in the scarcity of evaluation in the case study activities. The Rivers and Ranges Community Leadership Program is an exception because it was included in surveys to evaluate the Victorian Regional Community Leadership Program in 2014. The success of the Lake Macquarie City Council community and stakeholder engagement served to highlight areas for improvement in some of the other case studies, for example, in the ABRDR and the NFRIP. Indeed, the need for more effective stakeholder and community engagement, consultation, and participation in decision making were the most common themes to emerge. Changes could be made to shift the mode of implementation away from top-down or centralised management toward a more devolved model of decision-making. An appropriate model would feature: negotiated roles and responsibilities throughout the various levels of the system supported by unimpeded information flow; combination of top-down, bottom-up styles; authentic stakeholder engagement; more resources for capacity building including for mitigation; a social leadership style (present

in Rivers and Ranges Community Leadership Program and seen in the creation of the NSW Community Resilience Innovation Program), and recognition that local government is the appropriate level for climate change adaptation policy implementation. All of the above have the effect of sharing power between and across the different levels of the system. Therefore, my conclusion is that these are all ingredients underpinning the principle that the smallest competent scale should be given the responsibility and authority to respond to a given challenge (Measham *et al.*, 2011:892) ie the subsidiarity principle of multi-level governance. Accordingly, this outcome meant that a governance policy domain, that could be applied at every level of the system was needed in the Provisional framework. The Provisional framework was revised to include subsidiarity as the fifth policy domain, thereby becoming the Disaster Resilience Policy Implementation Framework (DRPI).

1.40 Conclusion

1.40.1   The research question revisited

Ultimately, a discussion of thesis outcomes must return to the original research question and reflect on the answer to that question as derived in this thesis.

Does the implementation of national disaster resilience policy in Australia reflect good practice and how is this shaped by the characteristics of the Australian (multi-level) governance system?

The answer to the first part of the question is in the affirmative, albeit with some qualification. At the very least, each of the five initiatives was developed in accordance with the principles of Australia's National Strategy for Disaster Resilience (this was a criterion for selection as a case study). Further, I used the DRPI Framework and found evidence of good practice in disaster resilience policy implementation in the snapshot provided by the five cases. At the same time, there was variation across the case studies to the extent that their implementation aligned with good practice and the theory underlying the DRPI Framework.

Among the more prominent examples of good practice were the community engagement and stakeholder engagement strategies managed by the Lake Macquarie City Council (LMCC) to develop and implement its Local Adaptation Plan for Flooding including due to Sea Level Rise (LAP). These strategies were combined with a good grasp of effective leadership, both internal and external, and information and communication activities that were conducted to develop and facilitate community acceptance and ownership of the LAP. Noteworthy features of implementation were: LMCC's deep organisational commitment to authentic community engagement and participation that prevailed in the face of significant conflict and resistance from the community; and LMCC's flexible, non-directive and responsive approach and the way it balanced the provision of technical information and education with opportunities for residents to direct the consultations in accordance with their own narratives and concerns. This demonstrated

similarities to experimental approaches to policy implementation (de Búrca *et al.*, 2014; Sabel and Zeitlin, 2012) and it also provided an example of how authority and decision-making could be shared, with aspects devolved by council to local residents.

The Rivers and Ranges Community Leadership Program (RRCLP) took a progressive approach to selection and capacity building of leaders. Its response to the unmet need for a local leadership network was an exercise in good practice because it employed a social leadership model which is associated with the enhancement of community competence (Chapter 5). Added to this, RRCLP promotes the values of sustainable economic development and has incorporated this into its practice. It challenges a top-down approach by engaging with all levels of politics. Meanwhile the federal initiative, the National Flood Risk Information Project (NFRIP), demonstrated good practice in its internal management practices which encouraged autonomy and creative problem solving. This was an example of how social capital, which relies on trust, can and should be factored into policy implementation in federal agencies. NFRIP demonstrated good practice in information and communication when it implemented policy to improve access to flood information by promoting free access creative commons copyright licensing. In addition, it recommended the reform of procurement practices to clarify ownership of publicly funded hazard information studies.

Consideration of the response to the primary research question in this thesis requires the acknowledgement that, as well as areas where good practice is in evidence, there is room for improvement. In the first instance, policy practitioners could be encouraged to practice more reflexively in the disaster management field. This would include building a greater awareness around the concept of good practice in policy implementation by applying good practice principles on a day to day basis in public policy and public administration. The DRPI Framework, at the very least, provides a vehicle for the initiation of a conversation about good practice, including what it is and why it is important. This will support a more consistent narrative across all sectors and levels of government about how to translate disaster resilience policy into reality. It goes hand-in-hand with a commitment to knowledge management which provides a platform for sharing information about disaster resilience activity. Knowledge management also works to overcome barriers to sharing project outcomes and to promote an evaluation culture to build disaster resilience. An example would be a requirement for the routine evaluation of disaster resilience activities and to establish a repository or clearing house for information and evaluation of project outcomes. This would include projects formerly funded under the National Partnership Agreement - Natural Disaster Resilience Program (NPA) and the National Emergency Management Program, now the National Partnership on Disaster Risk Reduction. The Australian Institute for Disaster Resilience could be provided with additional resources (Commonwealth of Australia, 2020) to do this. The DRPI Framework is an early but unique contribution to research on Australian disaster resilience policy implementation. There is an existing shortage in this field

so opportunities remain for future refinement. Complementary studies will expand the evidence base and availability of practical tools for propagating good practice in this field.

The second part of the research question asks about the relationship between good practice, in the disaster resilience system, and the characteristics of the federal system. At a macro level the quality of implementation practice is linked to the federal system via a national strategic policy mechanism (Samnakay, 2017) in the form of the National Strategy for Disaster Resilience. The choice of a national strategic policy mechanism as the vehicle for resilience policy implementation is a comment on how various elements of the Australian federation function and interact. Second, the nature of a national strategic or meta policy (Dror, 1970; cited in Samnakay, 2017 p.108) describes, and in many ways, prescribes its implementation. As such, the Australian governance system shapes the policy instrument which in turn, shapes the implementation of the policy. This constitutes a feedback loop that is, in and of itself, one of the defining characteristics of a system. The nature of the Australian strategic disaster resilience policy mechanism provides opportunities and limitations for embedding good practice into this system.

In Chapter 3, we saw how Australian federation has some contradictory characteristics. It was established in the spirit of a cooperative style. We are reminded that a cooperative model emphasises the preservation of differences between the jurisdictions; whereas, a coordinating model places a priority on ensuring harmonisation of arrangements across jurisdictions. At the same time, since the inception of federation, in 1901, Australia has tended toward centralisation rather than devolution of power. Centralisation is generally associated with a top-down style of governance. The net result of this situation is that the federal government regularly takes a leadership role when dealing with problems of national significance, but has a relatively narrow choice of policy levers at its disposal. Furthermore, a top-down style does not generally correlate with building resilience.

Disasters pose a 'wicked' policy issue: they are a problem of national concern; are complex with multiple causation and contributing factors; they have a strong social element that reaches into areas beyond the control of government; and they require inter and intra-sectoral cooperation and commitment over the long term. If the federal government seeks to develop and implement solutions for such problems national strategic policy is an appropriate approach; however, there are concomitant risks. These arise, in part due to the need for coordination of effort across multiple fronts, on multiple levels and with it the tendency for overlap and uncertainty about roles and responsibilities. This can result in policy fragmentation that can undermine successful implementation consistent with the pitfalls of joined-up government (Ling, 2002; Hunt, 2005).

The case studies presented in this thesis have highlighted some of the governance issues that constrain or advance their likelihood of success in achieving disaster resilience. A national strategic policy such as the National Strategy for Disaster Resilience provides a national leadership platform which can serve to coordinate, focus and facilitate national capacity to build national disaster resilience. On the other hand, federal issues such as vertical fiscal imbalance,

centralisation, or the tendency to employ exclusively top-down approaches may undermine the abilities of those at various levels within the system to exercise appropriate functional responsibility for implementing disaster resilience. For example, resourcing constraints on local government and its lack of recognition in the Australian Constitution can be a disadvantage when it comes to dealing with emerging issues associated with disaster resilience and climate change (Measham *et al.*, 2011). Federal governance structures like the Council of Australian Governments (COAG), while normatively an institution that upholds power-sharing and principles of equitable resource allocation, is often criticised for being in practice overly centrist (Brumby and Galligan, 2015; Fenna, 2012). This is contrary to the principle of subsidiarity which has been shown in this thesis, to be compatible with resilience outcomes. In this way, subsidiarity provides guidance for the governance of disaster resilience policy implementation, a policy domain that has hitherto not been integrated with other determinants of disaster resilience, but one that cannot be excluded in public policy, particularly in nations that have a federal system.

1.40.2   Future policy and research

This thesis has implications for future policy and research in a number of ways. It has highlighted gaps where further work may require a research-based approach. Some of these issues were identified by the application of the Provisional framework to the case studies, and some were identified as part of the process for developing the framework. Governments that have applied a national strategic coordinating policy approach, like the National Strategy for Disaster Resilience, to serious contemporary problems must design implementation to take account of the complexity of many of these issues. Importantly in seeking change, governments need to grapple with the social dimensions of the problem and tailor solutions that have the chance of achieving that change. This thesis has begun to explore these solutions by unravelling the myriad factors that influence the successful implementation of disaster resilience policy.

This thesis has identified subsidiarity as a principle of governance that is compatible with successful disaster resilience policy implementation. However, the number of research studies that contemplate the potential for more active and authentic adoption of subsidiarity in this field remains small. There is considerable scope to expand on this body of research, especially now that Australia has adopted a disaster risk reduction approach to improve disaster resilience. The Disaster Risk Reduction Framework seeks to incorporate sustainability and climate change goals and has identified governance as an area for attention (Australian Government, 2018, 2020). One area that could benefit local disaster resilience would be examine how the application of subsidiarity, including in the form of devolved programs and support for community-led resilience plans and activities can effectively reach different cultures and communities-of-interest. This would be useful in the context of the increasing cultural diversity of Australia (Australian Bureau of Statistics, 2020) and some of the challenges and opportunities this presents for reducing vulnerability and enhancing the protective effect of resilience.

More needs to be done to reach out to mainstream practitioners which means focusing on applied research and ensuring the results of projects are promulgated effectively. This is fundamental to the notion of translating research into policy and nowhere is applied research more important than in the field of disaster resilience. Disaster resilience is primarily a social phenomenon with behaviour change at its core. Further research will need to bridge the gap between the social sciences and technical expertise that has dominated the field. Ideas borrowed from population health have been suggested as a way to gain more widespread public acceptance and understanding of the relevance of climate change (Hassol *et al.*, 2016). The growing area of attribution science has found causal links between climate change and specific extreme heat events (Lewis, 2013). This offers hope that population health principles could also be used to embed strategies that support behaviour change into natural disaster risk communication and disaster resilience campaigns and education programs more broadly. It would be worthwhile for future research in disaster resilience to reach out to other disciplines where there is a well-established record of research on issues that intersect with disaster resilience. Again, population health and health promotion have much to teach us about the risk and protective factors that impact on health and well-being and social resilience. The challenges involved in influencing human behaviour to modify health risk factors and strengthen protective factors operate within similarly wicked policy settings to that of disaster resilience policy.

Opportunities for more and better ways for business and government to work together to enhance disaster resilience is another area that could be improved (Hunt and Eburn, 2018). In addition, more consideration needs to be given to the adoption of experimental policy approaches. Experimental program design lends itself to action research and allows evaluation and adjustment to be incorporated into the program cycle. Experimental and innovative approaches enable the involvement in disaster resilience of a broader range of stakeholders. This begs the question about the sorts of skills that will be needed to do this. For example, evaluation as part of the policy development cycle is widely promoted but seldom occurs in practice. Although not advocating for unnecessary change when things are working well, I do advocate for a stronger culture of evaluation to empower those in policy and program development roles to question and review performance and to make adjustments that will improve implementation. This would be at the centre of an approach that incorporates knowledge on good practice into policy implementation.

A starting point could be for government and academia to collaborate to evaluate the National Strategy for Disaster Resilience. This could include a combination of pure research using longitudinal studies and randomised controlled trials; meta-analysis; studies that use national indicators such as those developed by the University of New England (Parsons, 2016; Parsons *et al.*, 2016); or less exacting and expensive methods that could be readily used to evaluate the process and impacts of smaller projects by all practitioners. For example, all funded projects and activities could be required to undertake some form of evaluation and these reports would be fed into a national evaluation. Resources and training to help incorporate evaluation into everyday

project activities could be developed while larger projects and programs, including state-wide and national initiatives could collect, collate and meta-analyse these reports, not only to discern resilience outcomes but to inform future thinking on good practice. Perhaps the Australian Institute for Disaster Resilience which currently manages the National Emergency Management Manual and Handbook Series could develop and distribute evaluation guidance.

In conclusion, significant progress has been made in the past decade to implement Australia's national disaster resilience policy: Advances have been made in the development and adoption of locally based disaster resilience initiatives and studies to understand and measure resilience have proliferated. Risk communication and other measures designed to raise awareness and encourage action on disaster risk occupy much of the current policy agenda for disaster resilience. At the global governance level, the Sendai Framework can be seen to be leading this charge. The implementation by the federal government of domestic disaster resilience policy, in accordance with the Sendai Framework, is opening up opportunities on a number of fronts. One of these may be to encourage the development in Australia of disaster risk communication strategies that employ behaviour change approaches. Perhaps even more significantly, Australia's participation in the implementation of the Sendai Framework promises to facilitate the integration of the goals for sustainable development into our ongoing implementation of disaster resilience policy. Indeed, the inclusion of sustainability in the National Disaster Risk Reduction Framework is a welcome sign that sustainability is gaining policy traction. Successful implementation of the concept of sustainability in a developed nation like Australia is sure to present many new challenges. Sabatier maintained that the effectiveness of a strategic policy cannot be determined for at least a decade (1986). As the National Strategy for Disaster Resilience approaches its second decade and we look for tangible outcomes, more rigorous approaches to implementation have an important role to play. This thesis goes some way toward contributing to this critical unmet need.

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Appendix 1: Disaster management in Australia

History

Australia's disaster management arrangements have their origins in the experience of wartime and Australia's policy responses to other external threats to its sovereignty and security. Emergency management policy was first referred to as 'civil defence'. Civil defence organisations were set up during World War 2 within Australia's defence arrangements and these were retained afterwards, both here and in the United States, Canada and the United Kingdom because of concerns around communist expansion and proliferation of nuclear weapons. In Australia, this civil defence capability was directed toward the provision of assistance in the aftermath of natural disasters with the first most notable example being Cyclone Tracy in December 1974. This marked a formal shift in corporate focus to emergency management rather than an emphasis on a war-related function (Handmer and Dovers, 2013).

As traditionally also occurred with defence forces during wartime, civil defence organisations teamed with non-government and established welfare organisations such as the Australian Red Cross and the Salvation Army to deliver disaster relief and recovery functions at home. Much later State Emergency Services replaced civil defence organisations. Cyclone Tracy was a catalyst for the development of government policy to provide disaster assistance although these arrangements remained relatively ad hoc until 2002 when the Natural Disaster Relief and Recovery Assistance Guidelines were developed, followed by the first Natural Disaster Relief and Recovery Arrangements in 2007 {(https://search.proquest.com/docview/1497243761?pq-origsite=gscholar.

During this time, little attention was given in Australia to disaster risk reduction and prevention, {Handmer and Dovers, 2013 p.12} with the possible exception of the Prevention, Preparedness, Response and Recovery (PPRR) model for disaster management. While helpful this had limitations in that it provided a conceptual framework to understand the stages of disasters but this was not something that translated into identifiable or significant government policy and programs (Linnenluecke and Griffiths, 2013).

Contemporary Australian disaster management arrangements

Each Australian state and territory play the main role in disaster response within their jurisdictions and have their own state-based emergency laws and related policy and administrative arrangements. While there is variation across jurisdictions these include state and regional disaster/emergency coordination functions and facilities and personnel collectively known as the 'emergency services' consisting of Police, Fire and Emergency Services). Apart from the

Australian Federal Police and some national agencies[5] with national incident response capability the emergency services are largely state-run entities with some functions devolved to local government. The emergency services' workforces mainly consist of a mix of volunteers and a smaller number of professional employees such as firefighters, ambulance and police. They have historically focused on acute disaster response, and the more immediate relief and recovery activities. All the jurisdictions conduct disaster resilience activities that may or may not be labelled as such and mostly they are integrated with mainstream disaster management activities in states' systems. For example, the role of the emergency services has become more varied over time and now extends to hazard monitoring, predicting the impacts of extreme weather events, and communicating hazard information and warnings to the community. They also manage and participate in a range of hazard risk reduction activities.

The role of the Federal Government in a disaster can generally be described as the provision of national disaster management policy leadership and coordination, the development and management of national disaster plans and of programs of funding assistance for disaster relief and recovery. In a serious or complex domestic disaster or an international disaster the Federal government, may work directly with the states to provide national coordination of relief and recovery or of Australia's contribution to an international disaster.

The Federal Government provides support and policy leadership for disaster management via a number of national high-level committees within the Council of Australian Governments (COAG) structure, including the Ministerial Council for Police and Emergency Management (MCPEM) and the Australian and New Zealand Emergency Management (ANZEMC) Committee. MCPEM's members are federal, state and territory and New Zealand government ministers with portfolio responsibilities in policing and emergency management. The MCPEM has a representative of the Australian Local Government Association. The ANZEMC is the corresponding senior officials' group. These high-level committees and a network of ANZEMC sub-committees provide the policy platform for national disaster policy development and coordination. If a disaster of any form is of significant severity or magnitude the National Crisis Coordination Arrangements can be activated (reference diagram of ANZEMC}.

Non-government organisations, Non-government, welfare, charitable organisations and business also play an important role in disaster management, particularly recovery. such as the Australian Red Cross, work alongside governments and the emergency services to provide welfare services and support during and in the aftermath of a natural disaster. These organisations often provide medium to longer-term recovery assistance in the affected area, usually in partnership with state, local government and existing non-government welfare agencies and service providers. The Australian Red Cross is also involved in disaster preparedness. Its

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[5] AMSA, EMA, ADF noting that emergency relief and recovery is not a formal function of the ADF and will only occur in special circumstances.

RediPlan (Australian Red Cross, 2009), adheres closely to disaster resilience principles to support communities and households to develop personalised emergency preparedness plans.

Non-traditional or informal forms of volunteering are an emergent area of capability in the Australian disaster management system. A growing trend in recent years indicates that fewer people, especially in younger age-groups, want to commit to an established volunteer organisation (Barraket *et al*, 2013; Whittaker *et al*, 2015; Volunteering Australia 2016), and prefer to volunteer in specific circumstances or events. This came to the fore after the 2009 Victorian Bushfires and the 2010-11 Queensland Floods, when Volunteering Queensland received around 100,000 offers of help from community members. Hundreds of citizens mobilised to join the "mud army" which formed to assist in the Queensland clean-up (George, 2013; Barraket *et al*, 2013) and to perform community led activities such as BlazeAid[6] in Victoria.

Business regularly donates to disaster relief and recovery appeals and provides other forms of one-off material assistance following a disaster although its role within Australia's disaster management system is relatively undefined, with some exceptions. One exception is the insurance industry that develops and sells insurance products that allow its customers, to outsource their risk of loss from various causes including disasters. Insurance coverage is encouraged as a resilient behaviour because it reduces risk for individuals, households and organisations. The insurance market, prices risk via the cost of its premiums. This plays an important role in the disaster management system by setting the price of insurance based on its assessment of risk trades develops, sells and purchases various insurance products that allows its customers to outsource risk buys and sells insurance products that within global and domestic markets. Some private businesses are members of the Trusted Information Sharing Network (TISN). The TISN is a platform for government and private owners and operators of critical infrastructure to share information to prevent, prepare and mitigate risks to the continued provision of essential services (Commonwealth of Australia) http://www.tisn.gov.au/Pages/default.aspx.). It is an initiative of the National Critical Infrastructure Resilience Strategy (NCIRS) and is primarily concerned with organisational resilience (Commonwealth of Australia, 2015a; Commonwealth of Australia, 2015b).

Funding

Funding for disaster management mainly consists of shared funding arrangements between the federal government and the state and territory governments. While the states fund and operate the greater part of their respective disaster management systems, they are reliant on the federal government for a large share of disaster management funding, especially for relief and recovery

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[6] BlazeAid was a community volunteer initiative established in response to calls for assistance from farmers to repair their fences following the Black Saturday fires in Victoria (Whittaker, J, McLennan, B, and Handmer, J 2015). 'A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges'. *International Journal of Disaster Risk Reduction*, vol. 13, pp. 358-368).

in the aftermath of a disaster. This is provided under the Natural Disaster Relief and Recovery Assistance Program (NDRRA).

Commonwealth NDRRA funding is provided (funding reimbursed to the states and territories in future financial years.) when state expenditure reaches an initial threshold. The percentage of Commonwealth funding as a proportion of the total increases as the cost of state losses climbs above further thresholds (Australian Government). Much of NDRRA expenditure goes to the repair and restoration of major infrastructure, particularly roads. Funding is provided under different categories including for individuals for personal hardship, for major public infrastructure reconstruction, such as roads and bridges, for community recovery projects and infrastructure, and or exceptional circumstances. An amended NDRRA was released in 2018 (Australian Government, 2018) that reformed the payments relating to rebuilding of assets and infrastructure (Category B). This will see a system whereby upfront costs of reconstruction are agreed between the states and the federal government and incentives for mitigation are built in whereby the states can invest any savings made through reconstruction efficiencies into rebuilding to a higher standard. Recovery assistance is provided to individuals as the Australian Government Disaster Recovery Payment and the Disaster Recovery Allowance. These are provided for under the *Social Security Act 1991* (Cth) ss 1061KA-1061KE.

Other funding is provided through an assortment of programs that provide education and skills development, research funding, and up until 2020 around $4 to 5 million per year was provided by the Federal government for national demonstration-type projects under the National Emergency Management Program. Shared federal and state/territory funding arrangements up provided approximately $26 million per year under the Natural Disaster Resilience Program (NDRP) to state and territory governments for disaster risk mitigation activities and emergency volunteer training. The NDRP was provided up under a National Partnership Agreement – Natural Disaster Resilience Program (NPA-NDR), an instrument of the federal financial management legal framework up it expired in June 2018 when it was replaced by interim arrangements until a new National Partnership Agreement – the National Partnership for Disaster Risk Reduction came into effect in 2020 that applies to the five years over 2019-2024. Total funding federal funding over this period, including funding allocated for projects of national significance is $130.5 million. The former National Emergency Management Program (NEMP) was rolled into the NPA-DRR and will continue to direct support to projects that have national applicability. The federal government takes advice from state and territory governments about their respective priorities and it then seeks expressions of interest from each jurisdiction for funding applications that align with the identified criteria. From early 2019 the former NEMP was funded under the Prepared Communities National Partnership Agreement to June 2020 (Commonwealth of Australia, 2019b). Additionally, project funding is being provided by the federal government to NSW and Victoria to conduct specific projects on behalf of all states and territories (Commonwealth of Australia, 2019c). NSW is upgrading the National Bushfire Danger Rating

system to trial sites for a dedicated public safety mobile broadband network that can be used by the emergency services and other public safety agencies in disasters; and Victoria is redeveloping the current version of 'Emergency Alert' our national emergency warning system. While the changes to the primary disaster mitigation funding mechanism in relation to the implementation of the National Disaster Risk Reduction Framework may improve accountability for outcomes and better targeting of activities toward disaster risk reduction goals, it will be some time before evaluation information becomes available and although the changes may deliver benefits the level of funding has not altered and it will be some time before evaluation information becomes available and an assessment can be made about the effectiveness of the new arrangements.

Australia's national security and disaster resilience policies are separate. This could explain why the focus of NSDR implementation has been confined to natural disaster management policy even though the NSDR document does not technically exclude other disasters and why Australia also has a National Critical Infrastructure Resilience Strategy, which has its origins in counter-terrorism. There are no formal policy linkages between the two strategies although the recently published National Action Plan to Implement the National Disaster Risk Reduction Framework incorporates the NCIRS and the Trusted Information Sharing Network.

Governance

There have been a number of adjustments to the national governance of disaster resilience policy since its first formal appearance as the National Disaster Resilience Statement and Framework in 2009 under the auspices of the then Australian Emergency Management Committee. At that time, the Australian Emergency Management Committee, which consisted of senior emergency management officials from the Commonwealth and each of the states and territories, reported to the Council of Australian Governments (COAG) Ministerial Council for Police and Emergency Management (Emergency Management) or MCPEM-EM. MCPEM-EM replaced the Australian Emergency Management Committee with the National Emergency Management Committee (NEMC). NEMC, reported directly to COAG, and was tasked with developing the National Strategy for Disaster Resilience (NSDR). The NSDR was agreed by all Australian states and territories in February 2011. That same year MCPEM-EM was superseded by the Standing Council on Policy and Emergency Management (SCPEM) whose job it was to oversee the implementation of the NSDR. The membership of SCPEM included New Zealand so, in order to bring it in to line with SCPEM, NEMC admitted New Zealand as a full member and become the Australian and New Zealand Emergency Management Committee (ANZEMC) later that year. During 2011-2013 the SCPEM released communiques that routinely reported on the progress of the NSDR until it was replaced by Law Crime and Community Safety Council (LCCSC), in December 2014. Interestingly, Communiques released by the LCCSC July 2014 - May 2017 made no reference to disaster resilience. Given the Commonwealth influence at COAG, this may have indicated the Commonwealth Government's heightened interest in promoting and

coordinating Australia's approach to building disaster resilience in the international context through Australia's participation in the Sendai Framework for Disaster Risk Reduction.

All of the COAG committees were again restructured in 2017 including the LCCSC which was split into two Ministerial Councils, the Council of Attorneys-General and a new Ministerial Council for Police and Emergency Management (MCPEM). Currently, MCPEM continues to oversee the implementation of the NSDR. An important recent development was the establishment of the National Resilience Taskforce in 2018 which delivered a five-year National Disaster Risk Reduction Framework based on the Sendai Framework for Disaster Risk Reduction to 'guide national, whole-of-society efforts to proactively reduce disaster risk in order to minimise the loss and suffering caused by disasters' (Commonwealth of Australia, 2018 p.6). The First National Action Plan to Implement the National Disaster Risk Reduction Framework was agreed by MCPEM on 22 May 2020 (Ministerial Council on Police and Emergency Management, 2020) which was published on 31 July 2020 (Australian Government, 2020). As was discussed in the previous section of this Appendix, the National Agreement on Disaster Risk Reduction provides the national funding mechanism for implementation of the National Disaster Risk Reduction Framework.

Appendix 2: Interview Participants Introductory e-mail

Good morning Anna (Emailed on 11 June 2015)
I am writing to re-connect after some early conversations last year about my interest in the work of the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR). You sent me a number of copies of the excellent ABRDR Report "Building our nation's resilience to natural disasters". I have been keeping up with ABRDR activities and achievements and, in particular congratulate you on the ABRDR being recognised by the international disaster risk reduction community at the Sendai conference earlier this year. Things have moved along for me too, such that I would like to discuss the possible inclusion of the Australian Business Roundtable for Disaster Resilience and Safer Communities in my PhD research project titled "Implementing policy for enabling disaster resilience in the Australian federation".

I have attached some information about my project and its methodology. Very briefly, I have identified from the literature, a number of policy implementation activities or outcomes that support four adaptive capacities that are needed for disaster resilience ie social capital, community competence, economic development and information and communication. I am then going to conduct four case studies (corresponding with each of these), looking at five disaster resilience initiatives at the three tiers of government, business and a not-for-profit organisation. The focus of my data collection will be implementation mechanisms, both formal and informal. It will involve detailed document study as a first step, followed up with structured interviews that will be conducted with key personnel within the organisation and possibly some observational data collection obtained by attending, say a management or board meeting.

I am currently at the stage of liaising with the various organisations and programs to seek their permission to undertake this work. This will feed into the ANU ethics approval process that I will need to undertake. Gaining access to as much documentation as possible will be useful to ensure I have a good understanding of the organisation and its work before I conduct the interviews. I think this will also be more efficient time-wise and better inform the final questions. I am mindful of not wanting to take up too much of your time and resources and expect that the structured interviews would be conducted with fewer than 5 people and would take around 30-60 mins per person. If possible, I would also be very grateful if it could be arranged for me to attend a board meeting, although understand entirely if this is not appropriate.

All things going well, I would be happy to present my findings to the ABRDR in the future. I am overseas throughout most of July so am trying to get preparations underway now with a view to conducting my data collection, including site visits, during August-December 2015. Happy to discuss and answer any questions.
regards
Sue
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PROJECT DESCRIPTION
Title
IMPLEMENTING POLICY FOR ENABLING DISASTER RESILIENCE IN THE AUSTRALIAN FEDERATION

Researcher
Susan Hunt, PhD Scholar, Fenner School of Environment and Society, ANU College of Medicine, Biology and the Environment, Australian National University, with support from the Bushfire and Natural Hazards Co-operative Research Centre.

Research question
How can policy implementation arrangements enable disaster resilience in a federal system of government?

Background
Natural disasters have always been a feature of life in Australia and experts predict that rising sea levels will contribute toward more frequent extreme weather conditions in coming years. The trend will be toward more severe storms and sea surges leading to flooding and inundation in coastal areas, coupled with generally hotter and wetter conditions in northern and western Australia and hotter and drier conditions over south-eastern Australia. This means that our capacity to prevent, prepare, respond and recover from natural disasters is becoming more important than ever.

Already, the past decade has been characterised by some of the worst natural disasters Australia has ever experienced. For example, Black Saturday in February 2009 was Australia's worst peace-time disaster causing 173 deaths and 414 injuries (Taylor and Goodman, 2015). The severe flooding across much of South Eastern Australia and Queensland followed by Cyclone Yasi in 2010-11 resulted in the loss of over thirty lives and an unprecedented damages bill, with over $6 Billion funded by the federal government (Australian Government Department of Regional Australia, 2012).

Acknowledging the need to refocus effort toward disaster prevention, preparedness and risk reduction rather than a predominant investment in relief and recovery, the Australian government adopted the National Strategy for Disaster Resilience (NSDR) in February 2011. A resilience-based approach to disaster management was also occurring in other countries including the UK and USA, plus within the international community with the adoption of the Hyogo Framework for Action by the United Nations International Strategy for Disaster Reduction (UNISDR) 2005-2015, which has recently been renewed as the Sendai Framework for Disaster Risk reduction 2015-2030.

Disaster resilience policy encourages a long term commitment by all levels of government and the community to sharing responsibility and working together to build more self-reliance in the face of disasters, particularly by developing the knowledge and skills for taking action to manage disaster risks. Attitudinal and behaviour change is at the heart of disaster resilience as is building capacity across the disaster management system that will translate into improved outcomes at the local level.

Why is this research important?
This research will contribute to the academic literature on disaster resilience and policy implementation. It will also provide information about operationalising disaster resilience policy that can potentially be applied in policy and program development settings.

Policy implementation research, which enjoyed attention as a discrete field for a relatively short time during the 1970s and 1980s has more recently become absorbed within specific disciplines. In spite of the widespread take-up of disaster resilience and disaster risk reduction policy in Australia and overseas, academic studies on disaster resilience policy implementation are relatively scarce, with what there is to be found mainly in ecological and environmental policy literature. Some information is also available in the grey

literature, including in various government and non-government reports (particularly relating to event-specific recovery initiatives).

While the disaster resilience message appears to be gaining policy traction in Australia, the extent of change is difficult to ascertain. Very little detail about overall progress is available and it is hard to judge the extent of penetration of the NSDR and whether government effort is translating to community disaster resilience. A little more than one year after adopting the NSDR, the then, Council of Australian Governments (COAG) Standing Council on Police and Emergency Management (SCPEM) reported achievements in implementing the National Strategy for Disaster Resilience (NSDR) across all seven NSDR priority areas (Commonwealth of Australia, 2012) . SCPEM, re-formed as the Law, Crime and Community Safety Council (LCCSC) announced its commitment to ongoing NSDR implementation on 4 July 2014 and at the same time, foreshadowed a review of the NSDR. This appeared to leave the door open for changes to the NSDR.

Again, there is little information about future direction, particularly how government priorities for community engagement and partnerships with private and not-for-profit sectors will be advanced.

There are signs that state and territory government have embraced the notion of disaster resilience. Some states have developed their own disaster resilience strategic policies and all have signed up to the 2013-15 National Partnership Agreement (NPA) on Natural Disaster Resilience (NDR) which is largely directed toward mitigation. Unlike previous versions, the latest NPA contains numerous references to disaster resilience, which is encouraging. Not so encouraging is that funding levels to the NDR Program remain unchanged at around $26 million per year. The persistent underfunding for disaster mitigation compared with disaster relief and recovery is a major theme of the Productivity Commission Natural Disaster Funding Inquiry Report, which was provided to the government on 1 May 2015.

A sound policy is a good start, but policy goals cannot be achieved without effective implementation. To date there has been insufficient emphasis on implementation of the NSDR. This is both in terms of ensuring that implementation is consistent with achieving disaster resilience outcomes and goals and the extent to which disaster resilience is driving developments in the disaster management system. Regarding the former, one impediment is a shortage of evidence-based information that could form the basis of practical guidance on operationalising disaster resilience.

Learning more about how disaster resilience policy implementation occurs within the different tiers of government and the community, including downstream impacts of federalism will be instructive for considering what's working and what isn't working in terms of strengthening Australia's Disaster resilience. *"Implementing policy for enabling disaster resilience in the Australian Federal system"* aims to investigate this issue. It is envisaged that the product of the research will contribute to the academic literature on disaster resilience as well as provide guidance for operationalising disaster resilience policy that can potentially be used by those engaged in policy and program development.

Methodology
The Norris model (2008) of adaptive capacities for resilience consisting of social capital, community competence, economic development and information and communication provides the main theoretical basis for this project. Norris made the transition to community resilience theory from individual resilience and was able to apply this to natural disasters, observing that each of the adaptive capacities have dynamic attributes of robustness (strength), redundancy (substitutability) and rapidity (timeliness). Norris also proposed a number of factors relevant to policy implementation for building capacity in these four areas. Kulig *et al* (2013) later expanded on Norris's work to provide additional sub-scales of leadership and empowerment, community engagement, and non-adverse geography.

Table 1
DISASTER RESILIENCE POLICY IMPLEMENTATION – ADAPTIVE
CAPACITIES

ADAPTIVE CAPACITY	Social Capital	Community Competence	Economic Development	Information & communication
Actions and outcomes	1.Networks 2.Non-adverse geography/place-based 3.Community engagement	1.Political partnerships 2.Stakeholder engagement 3.Leadership (externally	1.Security 2.Economic diversity 3.Equity of resource distribution	1.Narratives 2.Responsible media/access to trusted information

These and other factors for disaster resilience policy implementation have been adapted from various sources and are provided in Table 1. These will also the terms of analysis for this research project.

The actions and outcomes in Table 1 and the federal policy implementation mechanisms (listed on page 4 under the sub-heading "data analysis") have been adapted from several sources including:

- Norris *et al* and Kulig *et al* in relation to the four adaptive capacities for disaster resilience and sub-scales of community engagement, leadership and empowerment, and non-adverse geography;
- The Productivity Commission (2003) and Australian Bureau of Statistics (2004) on social capital ;
- Handmer and Dovers (2013), in relation to information and communication as a "universal" policy instrument and the role of community participation;
- Richardson (2014) in relation to security as a principle for economic development as an adaptive capacity for disaster resilience;
- Hussey el al (2013) regarding intra governmental and administrative policy mechanisms,
- The links between stakeholder engagement and leadership and empowerment (Porteous, 2013).
- Fenner and Hollander (2013), Jordan A (2013) and McAllister *et al.* (2003) on principles of co-operative federalism.

In developing the methodology, guidance has also been obtained from *Statutory frameworks, institutions and policy processes for climate adaptation: Final Report* (Hussey *et al.*, 2013)

Case study approach
Four case studies will be conducted corresponding to each of the four dynamic adaptive capacities for disaster resilience (social capital, community competence, economic development and information and communication). Data will be collected about implementation of five disaster resilience programs or initiatives. One has been chosen from each of the three levels of government and one each from the business and the not-for-profit sectors as detailed below. It should be noted that, discussions about participation in the research are currently in their early stages with each of five areas.

In-Principle agreement to participate will first be obtained through liaison with key personnel from the five disaster resilience programs. A full explanation of the research purpose and methodology will be provided and their approval to the interview format and questions will be obtained as part of the ANU Research Ethics Approval Application process. Liaison and data collection will require visits to each of the sites.
Data collection is planned to occur July-December 2015.

Data sources - disaster resilience programs/initiatives

1. National Flood Risk Information Program and project- federal government,

2. National Partnership Agreement on Natural Disaster Resilience 2013-15 NSW Implementation - state government,

3. SHOROC (Sydney Shore Regional Organisation of Councils) -Local Government,

4. Australian Business Roundtable on Disaster Resilience and Safer communities (ABRDR) – Business, and

5. Rivers and Ranges Community Leadership Program – Not-for-Profit.

Data will be obtained from
1. Program/project document study, and
2. Structured interviews with key project/program personnel (approximately 30 mins – 1 hour duration).

If relevant, observational data may also be obtained from attending board meetings or other forums, as agreed with organisations.

Document study
Material could include information relating to all or any of the following:
Governance, reporting arrangements, funding policy (ie amount of funding, how it is distributed, form of contractual agreement, performance indicators etc), strategic plan, data and data collection systems, communication, coordination strategies, stakeholder engagement activities planned and/or undertaken technical/scientific detail, for example, functionality and protocols for the NFRIP Portal, risk profiles, evaluation and research reports, minutes of management meetings, organisational managerial information eg constitution, operating procedures, relevant legal and regulatory frameworks, guidelines and standards.

Data analysis
The terms of analysis will be drawn from:
- Table 1, which lists desired policy implementation actions/outcomes for each of the four adaptive capacities.

These will be considered in relation to policy implementation arrangements for each of the five disaster resilience programs, with particular regard to whether or not, and how, these are a function of federalism. The direction of implementation (vertical, horizontal or multi-directional) will also be considered in the analysis.
Federal policy implementation arrangements include but are not limited to, political mechanisms, federal financial arrangements such as intergovernmental agreements, federal legal frameworks (such as the Australian Constitution), whole-of-government and national strategic policy implementation arrangements, both formal and informal, and intergovernmental institutions eg Council of Australian Governments (COAG).

Project indicative time-frame
Project proposal review: complete
Literature Review: complete

Development of methodology and analytical framework: in progress
Selection and negotiation of case study sites: May-August 2015
Ethics application and approval: July-September 2015
Case studies data collection: -September- December 2015
Case study analysis: January – March 2016
Project write up and presentation of results: April – October 2016
Project finalisation and editing: – November 2016 – January 2017
Project submission: February – March 2017

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Appendix 3: Supervisor Letter

Australian
National
University

25 August 2015

Mandy Moore
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CRICOS Provider No. 00120C

Dear Ms Moore

RE: PhD RESEARCH BY SUSAN HUNT

I write to introduce Ms Susan Hunt who is undertaking a PhD through the Fenner School of Environment and Society. I am Ms Hunt's principal supervisor. Ms Hunt's project is looking at the implementation of the disaster resilience policy across all levels of government as well as the business and NGO sectors.

Ms Hunt and the Australian National University would welcome the participation of the Ministry for Police and Emergency Services in this research. In particular, it is hoped that the Ministry would be willing to cooperate by agreeing to act as a case study to explore policy implementation at the state level. Information provided by the Ministry would be incorporated into Ms Hunt's thesis along with information obtained from a Federal and local government case study, as well as business and NGO case studies. Ms Hunt has previously provided a detailed statement of the research objectives and methodology.

On behalf of the Australian National University I thank you for considering this request. Should you have any questions or concerns about the research, either now or at any time in the future, please do not hesitate to contact me for further information.

Yours sincerely

Dr Michael Eburn
Associate Professor — ANU College of Law;
Visiting Fellow — Fenner School of Environment and Society;
The Australian National University.

Appendix 4: Interview Questions

CASE STUDY INTERVIEW QUESTIONS AND INTERVIEWEE IDENTIFIERS

A. <u>**National Flood Risk Information Project**</u>

Primary question

How is/will the National Flood Risk Information Project disseminate and embed knowledge and skills for mitigating flood risk across all levels of the community?

Number of interviewees

1

Interviews (2 May 2016)

GA41 020516, GA42 020516, GA44 020516, GA45 020516, GA46 020516, GA47 020516

Supplementary questions

1. To what extent are industry and business engaged with government in implementing the National Flood Risk Information Project (NFRIP) at both at a strategic and operational level? Please describe, with particular regard to your understanding of the barriers and opportunities for all stakeholders (ie government and non-government eg industry, business and professional organisations). Can you describe approaches that have been successful for managing stakeholder issues in the complex NFRIP environment?
2. Tell me about the balance between incentives and disincentives for stakeholders to share flood data and the net effect this has on NFRIP implementation.
3. The copyright problem has emerged as critical for the NFRIP. Can you outline the extent of this problem? I note that a resolution strategy is being implemented. Do you think the problem can be satisfactorily resolved during the lifetime of the project (ends June 2016) or will it be ongoing?
4. Do you believe that the NFRIP is bringing about behavioural change in terms of encouraging action to take shared responsibility for mitigating flood risks? Please explain why and how. Please comment on the significance of attitudes and behaviours in relation to the "need to share vs the need to know"?
5. The NFRIP was established and implemented as a project rather than a program. Please comment on the effect this has had. For example, in terms of NFRIP governance, resourcing, reporting, political issues, policy coherence, capacity to deliver outcomes, risks and benefits etc.
6. Reports indicate that an increasing NFRIP focus on the general public as the target audience is replacing an earlier emphasis on technical experts and the insurance industry. How is this change reflected in NFRIP implementation, particularly in terms of consideration of the need to establish relationships and networks within the community at a local/grass roots level?

7. Do you think that Australia's federal system provides opportunities or barriers to centralised coordination, sharing and availability of flood risk information? Please comment, with particular regard to a top-down model of implementation Vs more bottom-up, combined approaches.

B. National Partnership Agreement – Natural Disaster Resilience & NSW Community Resilience Innovation Program

Primary question

How is the federal NPA on Natural Disaster Resilience (NPA-NDR) being implemented in a state government jurisdiction, (in this case, NSW) and how do federal financial arrangements (including intergovernmental agreements) support or hinder this process?

Number of interviewees

3

Interviews (28 April 2015, 6 May 2015, 3 September 2016)

OEMM37 280416, OEMM38 280416, OEMM39 280416, OEMM40 280416

OEMW61 060516, OEMW62 060516, OEMW63 060516, OEMW64 060516

OEMA65 030916

Supplementary questions

1. When thinking about how the Natural Disaster Resilience Program is being implemented (and given it is subject to a National Partnership Agreement) would you describe its predominant implementation style as top-down, bottom-up, a combination of the two, vertical/horizontal, and why? Please elaborate on the advantages and disadvantages of these different implementation approaches.
2. The NPA-NDR has a number of different elements and I note that the Floodplain Risk Management Grants Scheme is managed by the NSW Office of Environment and Heritage and the Bushfire Risk Management Grants Program is managed by the NSW Rural Fire Service. Are the various elements integrated and/or what are the nature of the linkages between them assuming the importance of co-ordinating investment in priority risk areas as stated in the NSW NPA-NDR Implementation Plan 2013-2015?
3. How is stakeholder engagement being managed and conducted for the Community Resilience Innovation Program (CRIP)?
4. How will the outcomes and lessons from the implementation of the CRIP be evaluated, monitored and disseminated? To the community sector? To other sectors, levels of government?
5. Being able to demonstrate that the CRIP project outcomes and/or activities are sustainable is a key requirement of CRIP funding. Can you please tell me more about how to achieve this and the challenges that may need to be overcome in order to do so. Please provide examples.

C. <u>**Lake Macquarie City Council**</u>

Primary question

Local government is the interface between government and the community. How can it/does it manage the challenges it faces (for example, authority and resourcing) to capitalise on its local strategic advantage for building disaster resilience/adapting to climate change in local populations?

Number of interviewees

3

Interviews (3 May 2016, 4 May 2016)

LMCG49 030516, LMCG50 030516, LMCG51 030516, LMCG52 030516, LMCGA53 030516, LMCA54 030516, LMCA55 030516, LMCA59 040516, LMCA60 040516.

LMCJ56 030516, LMCJ57 030516

LMCF 060516 (written material)

Supplementary questions

1. The report on the community consultations on the development of the Marks Point and Belmont South Local Adaptation Plan (MPBS-LAP) indicates that some were highly critical of LMCC and its community engagement approach. There was also contention around incorporating predictions on sea level rise with planning for future flooding. In light of these strong reactions from sections of the community, describe whether you consider LMCC's approach to community engagement was successful and why?
2. The community consultations on the MPBS-LAP included an innovative approach where sessions were tailored for those with differing levels of support for sensitive concepts. Would you please tell me more about this and any other examples that demonstrate how the consultations were effectively designed and managed.
3. Please describe and comment on the contribution various stakeholder made to the ultimate success of the MPBS-LAP process. For example, LMCC staff, Mayor, councillors, state government, federal government etc. Were/are there champions or people who demonstrated key leadership and advocacy to make this happen ? Does LMCC and its community feel supported by other levels of government? Is this situation changing? Please comment.
4. Has the process for developing and adopting the MPBS-LAP changed beliefs, attitudes and behaviour amongst local people and to what extent have the relationships and connections made during the MPBS-LAP process provided a

platform for the successful development of other LAPs. Do you expect that each LAP and the process for developing them will be more similar or more different?

5. How can climate change adaptation/disaster risk management be balanced against managing the broader economic risks for local government and its consituents (for example, possible impact on property values).

6. How has the removal of sea level rise benchmarks in NSW legislation impacted on the implementation of LMCC's Local Adaptation Plan initiative?

7. The NSW Government has recently announced that LMCC will not be subject to amalgamation with other NSW Councils and will remain a "stand-alone" council. To what extent is this important, if at all, for the ongoing work of developing and obtaining community commitment to LAPs?

8. Thinking about the role of local government in developing disaster resilience, do you think there would be a benefit in recognising local government in the Australian Constitution? Why? How likely is this to happen and are there other reforms proceeding that will benefit local government in terms of ensuring its ongoing capacity to provide effective services to local communities, including in the areas of disaster management and climate change adaptation?

D. **The Australian Business Roundtable for Disaster Resilience and Safer Communities (ABRDR)**

Primary question

The ABRDR and its membership indicates a relationship/networks between the insurance industry and other industry sectors (including the non-government humanitarian sector) with a shared interest in reducing the impact of natural disasters in Australia.   The ABRDR has also established international networks.   How are the partnerships/networks that make up the ABRDR supported and maintained? Given that a major objective of the ABR is to partner with, and influence government, how is the ABR building a relationship with government and is it being effective? How do you know?

Number of interviewees (21 April 2016)

1

Interview indentifers

ABRD30 210416, ABRD31210416, ABRD32 210416, ABRD33 210416, ABRD34 210416, ABRD35 210416, ABRD36 210416

[NB Personal communication from ABRDAK]

Supplementary questions

1. Membership of the ABRDR is drawn predominantly from the senior executive management levels of a number of Australian-based global corporations. Given its high level leadership capacity and reach, how can/does the ABRDR influence the

Australian business community to support disaster resilience more broadly (at national, regional, local scales) to strengthen disaster resilience?

2. Does the ABRDR see itself as having a role in promoting the importance and uptake of insurance to strengthen disaster resilience? How is it exercising this role? For example, does it work with the Insurance Council of Australia, given the ICA is widely accepted as the major insurance industry advocate and conduit to government?

3. How is the business/corporate sector adapting to the changing (natural) hazard and risk profiles related to climate change predictions?

4. The ABRDR publications emphasise the potential for savings to government (and, by association, the Australian taxpayer) from increased investment in disaster mitigation and the application of cost-benefit analysis methodology to infrastructure development planning and funding. Presumably, increased investment in disaster mitigation will also translate into savings to the insurance industry in terms of reduced risks and insurance claims? This is not discussed in the ABRDR publications. Please comment.

5. There are several documented examples of insurance premiums being reduced in response to local areas making disaster risk information more readily available to the insurance industry. Indeed, more data sharing, consistency of information and transparency are key ABRDR platforms. However, different levels of government and local government groups continue to call on the insurance industry to be more transparent about how it calculates risk. Comment on this in terms of the tension between "need to know" and "need to share" which can apply equally to personal, commercial and government policy/security settings.

6. Are industry and the Australian government capitalising on the potential for public/private partnerships to contribute to disaster resilience? (community competence) What are their respective roles in this regard and what do you see as barriers to business/government partnerships?

7. The ABRDR claims to be strongly influencing government policy, including being a major instigator of the recent Productivity Commission Inquiry into Disaster Funding. In addition to the use by government of data from ABRDR commissioned publications, does the ABRDR have formal links\leverage with government in terms of a policy advisory role, membership of relevant industry policy advisory bodies etc?

8. The ABRDR advocates centralisation of data, decision making and funding for disaster resilience. This could be seen as incompatible with Australia's system of co-operative federalism and the principle of 'subsidiarity' which is key to disaster resilience. How can these centralised systems be implemented while maintaining, enabling and enhancing community disaster resilience and behaviour change rather than disempowering local communities.

E. **The Rivers and Ranges Community Leadership Program**

Primary question

How is disaster resilience policy being implemented at the local level by a Not-for-Profit organisation?

Number of interviewees (15 April 2016, 16 April 2016)

7

Interview Identifiers

RVM11 150416, RVM12 150416, RVM13 150416, RVM14 150416

RMD15, 150416, RMD16, 150416

RSP1718, 150416

RTM24 160416, RTM25 160416, RTM26 160416, RTM27 160416, RTM28 160416

RLL29 160416

RJT21 160416, RJT22 160416, RJT23 160416

RAB19 160416

Supplementary questions

How does River and Ranges Community Leadership Program establish, support and maintain networks for disaster resilience? (Social Capital).

Describe the mechanisms used by Rivers and Ranges Community Leadership Program for empowering communities to participate more broadly in policy implementation and decision making for disaster prevention, preparedness and planning? (Community Competence)

How the Rivers and Ranges Community Leadership Program generate and disseminate information both internally and externally? Would you say a shared narrative about disaster resilience is communicated by R & R and, if so, describe this narrative. (Information and communication)

Does the Rivers and Ranges Community Leadership Program play a role in promoting shared responsibility for disaster risk and risk mitigation and if so, how is it doing this? (Economic development)

Does the Rivers and Ranges Community Leadership Program participate in and/or contribute to community economic development and security, eg supporting livelihoods etc (economic development)

Thinking about the extent to which the Rivers and Ranges Community Leadership Program has links/partnerships with government (ie local, state and/or federal) describe how this contributes (or otherwise) to its ability to support disaster resilience (Federal system).

Appendix 5: Human Research Ethics Application

HUMAN RESEARCH ETHICS COMMITTEE
Application Form

Created by: **u3912856**
Record number: **7704**
Protocol type: **Expedited Ethical Review (E1)**
Protocol number: **2015/554**

Date entered: **21/08/2015**
Ethics program type: **Postgraduate**
Requested start date: **21/09/2015**
Requested end date: **31/03/2016**

Protocol title: **Implementing policy for enabling disaster resilience in the Australian Federation**

Investigators

Name	Role	Department
Eburn, Michael	Supervisor	ANU Law School, ANU College of Law, ANU
Hunt, Susan	Primary investigator	FSES General, CMBE Fenner School of Environment and Society, ANU

Investigators Detailed

Name: Eburn, Michael   **Role:** Supervisor

Expertise:

I am an Associate Professor in the ANU College of Law. I have completed a Master of Laws by thesis and a PhD by thesis. My area of research is in law and emergency management and I am regarded as a subject matter expert in the area of this research. I have completed prior research projects involving expert interviews and field research.

Name: Stephen Dovers   Role: Supervisor

Professor Stephen Dovers FASSA is Director of the Fenner School of Environment and Society and an ANU Public Policy Fellow. He has supervised >60 completed and current PhD candidates, a significant proportion of whom have undertaken research under ANU human ethics protocols. His areas of expertise are environmental policy, disaster management, climate adaptation, and science-policy interactions. In the domain of this application, he is a Cluster

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Lead Researcher with the Bushfire and Natural Hazards CRC, and co-author of the standard text *Handbook of Disaster Policies and Institutions* (2nd edition, Routledge, 2013).

Name: Karen Hussey   Role: Supervisor

Professor Karen Hussey's area of expertise is in policy and governance relating to environmental sustainability, with particular interests in designing and implementing policies in federal systems and the links between environmental regulation and international trade.

Professor Hussey supervises 12 PhD students undertaking research with a policy orientation, and until recently she convened or contributed to undergraduate, postgraduate, and graduate training educational offerings at the ANU, within the APS, and at international institutions. She was a member of the Human Research Ethics Committee at ANU for 2 years, and is well versed in the ethical dimensions of research involving humans.

Name: Hunt, Susan   **Role:** Primary investigator

Expertise: During 1994-2012 while working within the Australian Public Service, I managed numerous government funded research projects, primarily in the areas of social sciences and health and national security. My role involved working closely with researchers to develop funding agreements and research protocols and methodology, such as survey/questionnaire design and delivery and the conduct and recording/analysis of focus groups and their outputs. During 2003 I completed a Masters Degree in Public Policy at ANU which involved a major policy research project investigating the effectiveness of whole-of-government arrangements for implementing youth and child health policy.   The methodology included designing interview questions and conducting face-to-face semi-structured interviews with a number of senior officials within a federal government agency.   In the same year I completed a project on media ethics where I interviewed a senior Department of Defence public affairs officer.   In my earlier career I trained as a general and mental health nurse where I received formal training in individual and group counselling techniques and in interviewing patients and clients for purposes such as clinical admissions and mental and physical health assessment and monitoring. I also practically applied these skills over not less than 6 years as a community health educator, drug and alcohol counsellor, health promotion officer and aged care assessment team nurse and welfare officer. I operated effectively in these environments, which required my ongoing attention and adherence to ethical practice in health service delivery, not to mention an ability to communicate effectively and sensitively with people in often difficult circumstances.   These qualities and experience provide relevant background for conducting human research.

External Investigators

Name	Role	Institution

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Departments

	Primary	Department	Faculty
	No	ANU Law School	ANU College of Law
	Yes	FSES General	CMBE Fenner School of Environment and Society

Project Questions Detailed

Description of Project

This research will explore pathways between government policy and community disaster resilience, with particular regard to the opportunities and barriers presented by working within Australia's federal system of government.

Learning more about how disaster resilience policy implementation occurs within and between the different tiers of government and the community, including downstream and upstream impacts of federalism, will build understanding about how to strengthen Australia's disaster resilience.

Knowing that approaches to implementation are informed by evidence can also empower policy/program decision makers and practitioners and encourage uptake of disaster resilience principles in the wider community.

In undertaking this research I have consulted the academic and policy literature and identified four broad characteristics that are required to support disaster resilience. These are social capital, community competence, economic development and information and communication (Norris et al, 2008). While this theory is assumed to be sound, there is little evidence available about how to implement disaster policy to achieve these outcomes. My research is seeking to do this by identifying the policy implementation methods and practices that have the best chance of building capacity in these four domains. A theoretical framework for implementing disaster resilience policy has been produced that is being tested and refined using case studies. Four case studies will be developed to examine how a number of disaster resilience programs are being implemented. Each of these programs are managed at different levels by governments, business and the not-for-profit sector. The data for each case study will be obtained from key documents relevant to each program and from semi-structured interviews with selected staff from the managing organisations or agencies. This information will then be analysed using the theoretical framework to assess the nature of the links, if any, between particular implementation methods and social capital, community competence, economic development and information and communication.

Location of Data Collection

Australia Yes

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Overseas No

Provide country / area where data collection will be conducted Data will be collected from five organisations in the following areas: Geoscience Australia, a federal government agency in Canberra, ACT, The NSW Ministry for Police and Emergency Services in Sydney NSW, The Australian Business Roundtable for Disaster Resilience, supported by IAG Insurance in Melbourne, Victoria, The Rivers and Ranges Community Leadership Program situated in Broadford, Yarra Valley, Victoria and in the City of Lake Macquarie Local Government Area, NSW.

Aims of the Project

List the hypothesis and objectives of your research project. If disaster resilience policy needs to build capacity for social capital, community competence, economic development and information and communication, it is important to understand the links between policy implementation and the development of these characteristics. This main research question is: How can government policy be implemented to enablecapacity for disaster resilience in the Australian Federation?
Research questions:
- How can national, sub-national and local policy implementation arrangements enable community disaster resilience?
- How does the Australian federal system of government impact on the implementation of national strategic coordinating policy for disaster resilience?
- What changes, if any, to disaster resilience implementation arrangements are needed to optimise its effectiveness in terms of supporting sustainable long term community disaster resilience?

The objectives of the research are to:
- Develop a framework for implementing disaster resilience policy that can potentially be used to guide disaster resilience policy and program development in Australia, and
- Contribute to the literature on disaster resilience policy implementation and policy implementation, more broadly

Methodology

The project methodology includes theoretical and empirical components. The theoretical elements include study of the academic and grey literature relating to disaster resilience, community disaster resilience, policy implementation and studies, reports and commentary on Australian federalism to develop the research questions and an analytical framework. This presents negligible risk as it does not involve human participants

The empirical research involves qualitative methods including the development of case studies using data obtained from secondary and primary sources, such as policy and program documents provided by the participating organisations and from semi-structured expert interviews with key informants from those organisations.

Semi-structured expert interviews are assessed as being a low-risk methodology because participants are interviewed to gain access to their knowledge and professional views specific to their respective roles and experience within the organisation. Any risk will primarily be slight inconvenience, with some, but minimal likelihood of low levels of discomfort. This is distinct from asking participants to disclose personal feelings which far more likely to cause discomfort

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and distress.

Adhering to principles and processes for obtaining participant consent outlined in the *National Statement of Ethical Conduct in Research* (2000), will manage the existing low level of risk, including obtaining written consent from the subjects to participate in the interviews. Written consent provides the choice whether or not subjects wish to be identified and/or quoted, consulting them on the development of the interview questions, and providing the questions prior to the interviews. Any report or material that contains material generated from the interviews that is potentially publishable will be provided to the participants to allow them to comment on its content and to agree its use.

The document study will use mainly published material, which is regarded as a secondary source and therefore poses negligible risk. A small number of documents may be used that are only accessible within the organisation and its stakeholders. These will be shared with the researcher at the discretion and with the permission of the participating organisation and will be kept confidential ie will not be disclosed or distributed to a third party without permission. Parts of the research report that contain or refer to any confidential data collected from a participant (whether from a primary or a secondary source) will be provided to the relevant participants for their agreement, prior to its use, including publication.

It is possible that organisations may suggest that third parties be interviewed. For example, an industry stakeholder under contract to government. Similar permissions and agreements to participate would be obtained from these individuals and their organisations prior to the interview. Similarly, all data provided by a third party will be be kept secure and confidential and relevant content of any final report provided to them for their comment and agreement prior to publication or finalisation of the report.

Five organisations will participate in the case studies and it is expected that no more than four key informants from each organisation will be interviewed. This method of selection of the participant organisations is an example of "purposive sampling" ("National statement of ethical conduct in human research", 2007, page 25) where participants are targeted for inclusion because it is expected that they will be a good source of information about the research question. While it is acknowledged that a relatively small number of interviewees can increase the risk that a participant can be identified, the risk remains very small and within acceptable limits when the risk management strategies outlined above are put in place, such as allowing the choice of whether to remain anonymous or to be quoted, and if anonymity is required ensuring the analysed material is sufficiently generalised or aggregated to ensure comments are not attributable and providing reports to participants prior to publication. It should be noted that there may be the unlikely circumstance where it is not possible to ensure total anonymity. For example, an important finding may be dependent on demonstrating links between a certain response and a participant. How this is reported will be negotiated with the relevant participant/s to develop an approach that is acceptable to all parties. Advice will be sought from the project supervisor and panel of supervisors in this situation.

Provide the survey method, a list of the questions to be asked or an indicative sample of questions. The researcher will conduct face-to-face semi structured expert interviews one-on-one. Questions vary for each organisation. Indicative questions are provided in a separate document that is attached to this application.

What mechanisms do the researchers intend to implement to monitor the conduct and progress of the research project?

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The researcher meets monthly with Dr Eburn to discuss the progress and conduct of the research. Dr Eburn is also provided with updates on the research in between scheduled meetings, as are Professor Dovers and Dr Hussey, the other members of the research panel. as required. This occurs, by email, phone and at ad-hoc face-to-face meetings. Once human research ethics approval is obtained, a research plan and schedule for monitoring the project will be developed by the principal researcher. This will be used as a working document and updated regularly and provided to Dr Eburn as part of monthly supervisory meetings. It will contain information such as names and contact details of key organisational personnel, interview subjects and the interview schedule, a list of documents relating to implementation of the policy/program, meetings held and meeting outcomes, interview questions, current status of the research. For example, document study underway, interviews commenced etc.

Participants

Provide details in relation to the potential participant pool, including:

Five proposed sites for data collection correspond to five policy implementation settings ie federal, state and local government, corporate/business and not-for-profit. Organisations have been targeted in relation to their role in managing a specific disaster resilience policy or program. Criteria for selecting the programs or activities for inclusion in the case studies are based on:
- Potential to generate information that will contribute towards answering the main research question and associated lower level questions (purposive sampling).
-      Practical considerations such as being able to be done within available resources and geographically accessible to the researcher,
-      Information is available and accessible or potentially accessible to the researcher,
The federal and state government programs are familiar to the researcher due to previous experience in the emergency management sector. Tthe business and not-for-profit activity were identified through the project literature review and ongoing monitoring of disaster resilience and emergency management policy in the media and other public access internet sites.
The initial contact with Geoscience Australia and NSW Ministry of Police and Emergency Management was made via the Bushfire and Natural Hazards Co-operative Research Centre End-user representative in the Federal Attorney-General's Department. This was followed up by a face-to-face introductory meeting with representatives of both organisations to continue to scope potential for their involvement and to discuss and answer questions about the research. Initial contact with the Australian Business Roundtable on Disaster Resilience and Safer Communities (ABRDR) and the Rivers and Ranges Community Leadership Program was made directly to both organisations by email and later in follow-up phone conversations. Key emails are attached indicating contact with the participant organisations and indicating their permission to participate.

Proposed number of participants 15

Provide details as to why these participants have been chosen? They occupy relevant roles and/or have relevant knowledge and experience within the organisations that have agreed to participate in the research either self-identified or nominated by an authorised person or body within the organisation For example, Board of Management, Senior officials, supervisors.

Cultural and Social Considerations/Sensitivities

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What cultural and/or social considerations/sensitivities are relevant to the participants in this research project? This varies between individuals and organisations.

Participating individuals from government agencies are bound by Australian Public Service and relevant state government codes of conduct and legislation and may be constrained in their interview responses in terms of being prevented from disclosing information of a security-sensitive nature, or any other information that may potentially embarrass the government, information about 3rd parties, commercial-in-confidence etc. Although it is unlikely, participants may have concerns about their responses adversely affecting them in a professional sense. For example, if they make comments or express opinions about the implementation of the activity being investigatedthat may be perceived as critical or unfavourable, contrary to the view of colleagues or the organisation. Similar sensitivities may also exist for participants from the non-government sector, who will be subject to employment terms and conditions and organisational policies. Concerns about individual identification are likely to be the most relevant issue. This risk has been openly raised and considered by participants as a possible concern during initial scoping of the research..

Incentives

Will participants be paid or any incentives offered? If so, provide justification and details.
No

Benefits

What are the anticipated benefits of the research? (Also see "To whom will the benefits flow?"

The research will provide benefits at a number of levels including the broader community, the emergency/disaster management sector, and individuals and organisations directly involved in the research.

The community will benefit from the research by gaining access to information that will contribute to more successful policy implementation and improved outcomes for people exposed to/impacted by natural hazards.

The research will building overall disaster resilience research capacity. This knowledge and evidence will translate into guidance on effectively implementing disaster resilience policy for those working in related policy and program development areas.

The research will also offer practical benefits **to** participants by:
- Contributing to the quality of the final project outcomes and a better end product,
- Establishing professional and research networks between the participating organisations and ANU and BNHCRC.

the offer of pre-publication briefings/seminars on research outcomes that will directly inform and support the work of participating organisations

To whom will the benefits flow?

Benefits relating to application of the research findings will flow to the community in general in terms of improved outcomes for people exposed to/impacted by natural hazards. Increased knowledge and understanding about how to strengthen disaster resilience is relevant to the

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whole community and includes consideration of effective action and the level within the community where that action needs to be taken.   In addition, those in disaster policy and program implementation roles will be better equipped to design and target approaches that have the best chance of being effective in building disaster resilience.

Knowing that disaster resilience activities are informed by evidence gained through research like this, will empower policy and program practitioners and encourage uptake of disaster resilience principles across the community.

Direct benefits will accrue to
- the principal researcher, in terms of gaining skills, experience and research credentials that will contribute toward the successful completion of a PhD thesis,
- Dr Eburn will obtain professional benefit for supporting and advising on a successful research project,
- the ANU, specifically the Fenner School of Environment and Societ,   for its contribution to research and overall research capacity through training and support of new researchers,
The BNHCRC and the emergency services sector for receiving evidence-based information on how to strengthen disaster resilience that can be operationalised in the field
Participating organisations will benefit as described above.

Informed Consent

Indicate how informed consent will be obtained from participants. At least one of the following boxes MUST be ticked 'Yes'.

In writing Yes

Return of survey or questionnaire No

Orally No

Other No

If Oral Consent or Other, provide details.

Confidentiality

A consent form and information sheet will be provided to each person being interviewed. **Copies of the consent form and the information sheet are attached with this application.** These documents will cover the purpose of the interviews, key information about use of the data, confidentiality, the right of participants to withdraw permission, tick-boxes for participants to nominate whether they wish to remain anonymous and/or whether they agree for the interview to be recorded. The Information Sheet also outlines research protocols regarding collection and storage of information obtained from confidential documents that may be provided the principal researcher by the organisation and in the interviews.   During interview, privacy of the venue will be ensured.   For example, a room without other occupants or not used by others during the interviews.

For those who wish to be quoted anonymously, quotes will be used in a non-attributable manner.   For example, interview data will be described in broader categories disciplinary and professional expertise (eg. Emergency management, insurance, government, community etc)

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Data Storage Procedures

Any confidential electronic documents collected will be kept in a password protected ITC system eg ANU FSES hard drive (not on a portable flash drive) and if in hard copy form will be kept in a locked container or drawer within a locked office on the ANU campus. All records of interview both hard copy and recorded (subject to participants' permission to record interviews) will be stored in a locked drawer within a locked office at ANU. Any transcribed interviews will be kept on a suitably secure ANU computer hard drive with password protected access (not on a portable flash drive). Data will be kept for five years after the publication of the research.

Feedback

The overall project material and findings will be incorporated in a PhD thesis that will be due to submit for examination February 2017-August 2017.
Publication of all or any aspect of the project may potentially occur in the form of conference presentations, journal articles, reports and/or as a contribution to other co-authored material. Final material that is generated as a result of data collected from the participant organisations, will be presented to each of the organisations, prior to publication, in a form that would be negotiated. This could include as a pre-briefing, a report, a presentation or all of these options. As part of BNHCRC scholarship obligations the thesis (or parts of the thesis material) will be made available to end-user organisations by the BNHCRC through its end-user agencies, the annual Australasian Fire and Emergency Service Authorities Council (AFAC) conference, the BNHCRC website. However, the manner in which individual projects are disseminated by BNHCRC is yet to be determined. Participants will be informed that if they have suggestions on this matter (such as guidance for policy and program decision makers and practitioners, presentations tailored for the organisation, sharing via AFAC, the BNHCRC Annual Research forum etc) they will be fed through to the BNHCRC research management team by the principal investigator.

Supporting Documentation

Please ensure electronic copies of any supporting documentation have been uploaded the documents tab of the relevant protocol.

Has this work been approved by another Human Research Ethics Committee (HREC)? No

If yes, please give the name of the approving HREC. Not applicable

Funding

Is this research supported by external funding? Yes

The research is funded by an Australian Postgraduate Award (1183a/2010) and the Bushfire and Natural Hazards Co-operative Research Centre (BNHCRC) is providing an ANU Research Supplementary Scholarship (1361/2011) or 'top-up" scholarship of $10,000 per annum over 36 months. A copy of the BNHCRC executed Student Agreement is attached.

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Is the research conducted under the terms of a contract of consultancy agreement between the ANU and the funding source? No

Describe all the contractual rights of the funding source that relate to the ethical consideration of the research. Please refer to the attached BNHCRC executed Student Agreement, in particular, Section 1 STUDENT OBLIGATIONS and Section 4 INTELLECTUAL PROPERTY

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High Risk One Summary

Question	Answer
Is this a clinical trial?	No
Does this research involve the intentional recruitment or issues involving Aboriginal and / or Torres Strait Islander Peoples?	No

High Risk Two Summary

Question	Answer
Does this research involve Human Genetics?	No
Does this research involve Human Stem Cells?	No
Does this research involve Women who are pregnant and the Human Foetus?	No
Does the research involve people highly dependent on medical care who may be unable to give consent?	No
Does the research involve people with a cognitive impairment, an intellectual disability or a mental illness?	No
Does this research involve an intention to study or expose or is likely to discover illegal activity?	No
Does this research involve human gametes (eggs or sperm)?	No
Does this research involve excess ART embryos?	No

Expedited Questions Summary

Question	Answer
Third Party Identification	Yes
Children or Young People	No
Dependent or Unequal Relationship	No
Membership of a Group, or Related Issues	Yes
Physical Harm	No
Psychological Harm (includes Devaluation of Personal Worth)	Yes
Social Harm	No
Economic Harm	Yes
Legal Harm	No
Covert Observation	No
Deception	No
Sensitive Personal Information	No
Overseas Research	No

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Question	Answer
Collection, use or disclosure of personal information WITHOUT the consent of the participant	No

Questions Detailed

Third Party Identification No

Are potential participants given prior warning that they will be identifiable? Yes

Is specific consent for the identification to be obtained? Yes

Are there strategies to confirm the accuracy of the attributed comments? Yes

Membership of a Group, or Related Issues Yes

Has there been full consultation with the community? Yes

Are the risks easily negated, minimised or managed?: Yes

In 200 words or less, outline the measures which will be taken to address the risks*:

Third party identification is the main risk to participants of this research, who might be identified by the information they provide, despite efforts to hide their identities. This relates largely to the low numbers of participants in each organisation and their specific or specialised role within that organisation. While this risk cannot be eliminated it can be minimised by: raising this issue with participants in the first instance and prior to their participation, giving them the 'tick box' option in the consent form about whether they wish to remain anonymous, making sure that in the analysis and write up, comments are not attributed to any individual (unless this is their preference). De-identification of individuals in the analysis can also be assisted by generalising, and aggregating the information they provide. This, however, needs to be balanced against the possibility of neutering the data to the extent that it loses any value to the research. Another strategy for managing this risk is to provide transcripts, analyses, reports and other material that may be publicly released, to the participant for their comment prior to it being used. This may mean that the way the data is presented may need to be negotiated with the participant. If he/she is concerned about the extent to which it may allow their identification.

Participants are members of a group, formally, in terms of being employees of an organisation and are bound by rules and conditions of employment of that organisation. They are also members, informally of a collegiate group or of a team of professionals working on an activity which is the subject of this research. The risk of them either being vulnerable to breaching employment conditions or being professionally compromised with their peers is low and has been identified in initial discussions and considered, in the first instance, as part of their agreement to participate.

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In light of the complex stakeholder relations that some of the participating organisations are managing, one of these risks may be the implication of a stakeholder who has not agreed to participate in the research. In this situation their permission will be sought to mention them.

Does the research team include member(s) of a group? No

Will there be appropriate reporting back to the group and/or a direct flow of benefits to the community? Yes

Psychological Harm (includes Devaluation of Personal Worth) Yes

Is prior warning given? Yes

Are the risks easily negated, minimised or managed?: Yes

In 200 words or less, outline the measures which will be taken to address the risks*: This issue is most likely to apply to the not-for-profit organisation which was established in the aftermath of the Black Saturday bushfires in Victoria in 2009. It is possible that participants may have been directly impacted by this event and that the interview may unexpectedly trigger responses related to past trauma. The nature of the interview questions is confined to non personal experiences and what could be considered professional opinions about policy implementation. This greatly reduces the risk of the participant being adversely psychologically affected by the research. In addition, the selection and nomination of subjects for interview will be a matter for discussion with the Not-for-profit organisations' management team who will have an awareness of any vulnerabilities amongst their staff that may preclude them from being selected as participants. The proposed NFP organisation, Rivers and Ranges Community Leadership Program also has well established pastoral care and employee support and assistance programs that participants can access and be referred to by the researcher if required.

Will potential participants be screened on the basis of complicating mental health factors? No

Can the research team guarantee that a reasonable person would not find the stress significant? No

Will participants be provided with an appropriate contact if they become distressed? Yes

Economic Harm Yes

Is prior warning given? Yes

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Supporting Documentation

Please ensure electronic copies of the supporting documentation have been uploaded into the documents tab of your protocol

These may include (please circle the relevant answer):

List of indicative questions	Y	
Copy of questionnaire / survey		N/A
Invitation or introductory letter/s		Y
Publicity material (posters etc.)		Y
Information sheet		Y
Consent form	Y	
External approval documentation		Y
Research visa (if applicable)		N/A
Other (specify below)		N/A

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SIGNATURES AND UNDERTAKINGS

PROPOSER OF THE RESEARCH

I certify that all the persons listed in this protocol have been fully briefed on appropriate procedures and in particular that they have read and are familiar with the national guidelines issued by the National Health and Medical Research Council (the National Statement on Ethical Conduct in Human Research 2007).

I certify that the above is as accurate a description of my research proposal as possible and that the research will be conducted in accordance with the National Statement on Ethical Conduct in Human Research 2007. I also agree to adhere to the conditions of approval stipulated by the ANU Human Research Ethics Committee (HREC) and will cooperate with HREC monitoring requirements. I agree to notify the Committee in writing immediately of any significant departures from this protocol and will not continue the research if ethical approval is withdrawn and will comply with any special conditions required by the HREC.

Signed:... Date: 22/9/15

ANU SUPERVISOR

I certify that I shall provide appropriate supervision to the student to ensure that the project is undertaken in accordance with the undertakings above:

Signed:... Date: 22/9/15

AS FROM MONDAY 21ST OCTOBER 2013 THE SIGNATURE OF THE HEAD OF ANU DEPARTMENT/GROUP/CENTRE IS NO LONGER REQUIRED.

bushfire natural
HAZARDSCRC

Bushfire & Natural Hazards CRC Scholarship Conditions and Intellectual Property Agreement

This Agreement dated the 20 day of $June$ 2014

Between the following Parties to this Agreement ("the Parties")

BUSHFIRE & NATURAL HAZARDS COOPERATIVE RESEARCH CENTRE LTD ("BNHCRC")

5/340 Albert Street, East Melbourne, 3002
ABN 21 163 137 979

AND   **Susan Alexandra Hunt ("the Student")**

18 Stapylton Street, Holder, ACT, 2611

For the purposes of this agreement:

"Agreement" means this agreement and all Schedules and other documents as may be incorporated by reference;

"Centre Agreement" means the agreement between BNHCRC and its participant organisations relating to the operations and management of the BNHCRC;

"Confidential Information" means all financial information and other commercially valuable information of BNHCRC of whatsoever description and in whatever form (whether written or oral, visible or invisible) but excludes the interpretation, analysis and application of general information in the public domain;

"Intellectual Property" "IP" means all rights resulting from intellectual activity whether capable of protection by statute, common law or in equity and including copyright, discoveries, inventions, patent rights, trade marks, design rights, circuit layouts and plant varieties.

"Project" means the BNHCRC project in which the Student is involved;

"Project IP" means Intellectual Property which is created, developed or discovered as a result of conducting the Project. Project IP does not include copyright in the Student's thesis.

"Research Manager" means the Research Manager of BNHCRC;

"Student Project" means the specific research project undertaken by the Student with their candidature (Schedule 2a).

1. STUDENT OBLIGATIONS

1.1. The Student must maintain their university enrolment and satisfactory progress during their candidature.

1.2. The Student must comply with all relevant policies, procedures and codes of conduct of the University at which they are enrolled (including leave arrangements and employment restrictions).

1.3. The scholarship awarded by the BNHCRC is for candidature in the award and university where the Student is enrolled (Schedule 1).

1.4. The scholarship awarded by the BNHCRC is to facilitate and enable the Student to carry out a specific research project consistent with their candidature (Schedule 2a).

1.5. The Student will follow a research plan consistent with and contributing to the objectives of the BNHCRC project with which he or she is associated (Schedule 2b).

1.6. The Student will be expected to present their research outcomes and results at least one BNHCRC research workshop or major meeting during the candidature, subject to BNHCRC making funding available to cover costs of travel, accommodation and participation.

1.7. The Student will be expected to participate in BNHCRC review processes and contribute, as appropriate and requested, to the BNHCRC Annual Report.

1.8. The Student is expected and encouraged to maintain contact with their nominated BNHCRC end user agency contact throughout their studies (Schedule 2c).

1.9. The Student will lodge with the BNHCRC Research Manager both an electronic and hard copy of their thesis and any publications resulting from their BNHCRC-related research.

1.10. The Student will also be expected and encouraged to become involved in BNHCRC activities including the annual BNHCRC conference and workshops and participate in BNHCRC professional development activities, subject to BNHCRC making funding available to cover costs of travel, accommodation and participation.

1.11. The Student must submit all publications for approval by the Research Manager as outlined in the Scholarship Agreement with the University.

1.12. The Student must abide by all the communication and media policies as made available on the BNHCRC website and updated from time to time.

2. FUNDING AMOUNTS AND PAYMENT

2.1. Funding amount and payment start dates and periods are outlined in the letter of offer from the BNHCRC to the Student (Schedule 3 & 4).

2.2. The Student will submit an annual report on progress against their project plan on or before the anniversary of the commencement of their individual agreement.

2.3. BNHCRC does not make payments directly to the Student; payment is via the payment system at the institution where the student is enrolled.

3. TRANSFERS, EXTENSIONS, LEAVE AND CESSATION

3.1. Both full and top-up BNHCRC scholarships can be transferred to another university provided the transfer is approved by the BNHCRC Research Manager.

3.2. A student may apply for an extension of stipend of six months only, under extraordinary circumstances encountered during candidature which are beyond the student's control.

3.3. BNHCRC scholarship holders are entitled to annual leave, sick leave and parental leave consistent with the leave provisions applicable to the conditions of the degree and university where the Student is enrolled (Schedule 1).

3.4. The BNHCRC may terminate this Agreement, whereupon all scholarship payments will be stopped and the Student must return all materials, research, documentation and publications that relate to the Project to the BNHCRC upon request, if the Student:

    3.4.1. ceases their candidature;

    3.4.2. fails upon request to demonstrate progress to the satisfaction of BNHCRC;

    3.4.3. ceases to follow a research plan consistent with and contributing to the objectives of the BNHCRC project with which he or she is associated (Schedule 2b); or

    3.4.4. commits a breach of this Agreement.

4. INTELLECTUAL PROPERTY

4.1. The BNHCRC has a written agreement with participant organisations (the Centre Agreement) and the University which governs amongst other things, the treatment of Intellectual Property relating to and arising out of BNHCRC activities.

4.2. Subject to clause 4.3, all Intellectual Property developed as a result of the conduct of the Project is owned by BNHCRC.

4.3. Where the Student prepares material for examination as part of that Student's examination regime, copyright of that material will be owned by the Student but all rights in relation to BNHCRC Intellectual Property comprised in that thesis will continue to be owned by the BNHCRC and such thesis or any part thereof may not be published without the prior written permission of the Research Manager.

4.4. Written notification to restrict publication of a document must be made by BNHCRC within 14 days of receipt of the material. If no such notification has been made within 14 days of receipt of the document, the document can be assumed to have been approved with no restriction on publication.

4.5. Provided that the Research Manager has given prior written permission for publication, BNHCRC will grant a non-exclusive, royalty free licence to the student of the Project IP to the extent that such licence is necessary for the student to publish any publication that is a requirement of the student's course assessment.

4.6. The BNHCRC must in administering this clause act reasonably, suggest alterations to a publication in order to avoid affecting commercially valuable intellectual property rights and consult with the Student to assist in determining an acceptable manner of publication.

4.7. Notwithstanding any other clause of this Agreement, the Student has the right to have any thesis or material referred to in this clause examined, provided the reasonable confidentiality requirements of the BNHCRC are met.

4.8. Unless otherwise agreed in writing by the parties, the Student will make available outcomes of their research work to BNHCRC staff and stakeholders; and acknowledge BNHCRC support in permitted publications, presentations and their thesis.

4.9. The BNHCRC may seek written permission from the Student to use or reproduce, for non-commercial purposes, part(s) of the Student's work. The Student's permission should not be unreasonably withheld. If such use occurs, due acknowledgement will be made to the source of the work.

5. BNHCRC OBLIGATIONS

5.1. The BNHCRC will offer opportunities to the Student to benefit from involvement in the BNHCRC Program, from direct contact with researchers in multidisciplinary and multi-organisational research teams, and from BNHCRC activities.

5.2. The BNHCRC will offer the Student support through additional professional development, training activities and opportunities to apply for additional funding to attend conferences and participate in collaborative research.

5.3. The BNHCRC will offer opportunities for the student to benefit from BNHCRC assistance, post-degree, in obtaining relevant employment or postdoctoral research opportunities.

6. SUPERVISION OF BNHCRC STUDENTS

6.1. The Student must have at least one BNHCRC researcher in their supervisory panel (Schedule 2d).

6.2. The role of the supervisory panel is to ensure, in consultation with the Student and relevant project leader(s) that the study program and timelines are relevant to the BNHCRC's research objectives and within the Student's abilities, direct the research program, ensuring that the academic requirements of the relevant partner university are met and that the candidate is making satisfactory progress; and guide the Student to (a) submit his or her thesis within the duration of candidature, and (b) prepare high-quality, relevant scientific papers and reports.

6.3. The Student acknowledges and agrees that he or she will comply with directions given by the supervisory panel and the leader of the Project.

7. CONFIDENTIALITY

8.1 The Student agrees that they will keep confidential any information or data provided by the BNHCRC on a confidential basis. Any confidential information will be clearly designated as such by the BNHCRC when it is provided to the Student.

8.2 The obligations of confidentiality imposed on the student shall survive termination of this Agreement.

8. COMPLIANCE WITH ALL LAWS

The Student must comply with the provisions of all relevant Acts, Regulations, Rules, by-laws or similar statutory instruments, whether Commonwealth, State, Local or otherwise, which applies to the activities of the Student in relation to his or her involvement with BNHCRC.

9. GENERAL

This document may only be varied or replaced by a document duly executed by the parties.

EXECUTED by the Parties as an Agreement effective as of the commencement date set forth in Schedule 3.

I hereby agree to accept the offer of a BNHCRC Scholarship as set out in the BNHCRC's letter of offer. I agree to abide by the terms and conditions outlined in this agreement.

SIGNED by or on behalf of **THE STUDENT**)
) _____ 20/06/2014_
    Student signature   Date

    Susan Alexandra Hunt

In the presence of:

    _____ 20/06/2014_
    Witness signature   Date

    Katy Paterson
    Typed or printed name

SIGNED for and on behalf of **BNHCRC**)
LIMITED by its duly authorised officer)

    _____ 3/6/2014_
    Duly authorised officer signature   Date

    Richard Thornton
    Typed or printed name

    CEO
    Position

In the presence of:

    _____ 3/6/2014_
    Witness signature   Date

    Leonie Beattie
    Typed or printed name