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The challenge of integrating climate change adaptation and disaster risk management

**Michael Howes, Deanna Grant-Smith, Kim Reis,
Peter Tangney, Karyn Bosomworth, Michael Heazle,
Darryn McEvoy and Paul Burton**



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Lessons from bushfire and flood inquiries in an Australian context

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Preface

The research on which this paper is based was conducted by a project team from Griffith University and RMIT University. This project—*The Right Tool for the Job: Achieving climate change adaptation outcomes through improved disaster risk management policies, planning and risk management strategies*—aims to: reconceptualise the framing of climate change adaptation and disaster risk management; develop a new approach to these challenges based on this re-conceptualisation; and indicate how existing policy and planning tools might be modified by this new approach.

This research was supported by the Urban Research Program at Griffith University, RMIT University and the Queensland Department of Community Safety. The authors would particularly like to acknowledge the input and assistance of Robert Preston from the Queensland Department of Community Safety. This work was carried out with financial support from the Australian Government (Department of Climate Change and Energy Efficiency) and the National Climate Change Adaptation Research Facility. The views expressed herein are not necessarily the views of the Commonwealth or the State of Queensland, and neither the Commonwealth nor the State accepts responsibility for any information or advice contained herein.

Executive summary

Emergency management and climate change adaptation will increasingly challenge all levels of government because of three main factors. First, Australia is extremely vulnerable to the impacts of climate change, particularly through the increasing frequency, duration and/or intensity of disasters such as floods and bushfires. Second, the system of government that divides powers by function and level can often act as a barrier to a well-integrated response. Third, policymaking processes struggle to cope with such complex inter-jurisdictional issues.

This paper discusses these factors and explores the nature of the challenge for Australian governments. Investigations into the 2009 Victorian bushfires, the 2011 Perth Hills bushfires, and the 2011 Brisbane floods offer an indication of the challenges ahead and it is argued that there is a need to: improve community engagement and communication; refocus attention on resilience; improve interagency communication and collaboration; and, develop institutional arrangements that support continual improvement and policy learning. These findings offer an opportunity for improving responses as well as a starting point for integrating disaster risk management and climate change adaptation policies. The paper is based on the preliminary findings of an NCCARF funded research project: *The Right Tool for the Job: Achieving climate change adaptation outcomes through improved disaster management policies, planning and risk management strategies* involving Griffith University and RMIT.

It should be noted from the outset that the purpose of this research project is not to criticise the actions of emergency service workers and volunteers who do an incredible job under extreme circumstances, often risking their own lives in the process. The aim is simply to offer emergency management agencies the opportunity to step back and rethink their overall approach to the challenge they face in the light of the impacts of climate change.

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Acronyms & abbreviations

COAG	Council of Australian Governments
EMA	Emergency Management Australia
PPRR	Prevention, Preparedness, Response and Recovery
QFCI	Queensland Floods Commission of Inquiry
VBRC	Victorian Bushfires Royal Commission

Glossary

The following definitions are quoted directly from the IPCC (2012) and Althaus, Bridgman & Davis (2007). [Annotations have been added in square brackets.]

Adaptation

“In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate” (IPCC 2012:5).

Climate Change

“A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use” (IPCC 2012:5).

Climate Extreme (extreme weather or climate event)

“The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. For simplicity, both extreme weather events and extreme climate events are referred to collectively as ‘climate extremes’” (IPCC 2012:5).

Disaster

“Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery” (IPCC 2012:5).

Disaster Risk

“The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery” (IPCC 2012:5).

Disaster Risk Management

“Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, resilience, and sustainable development” (IPCC 2012:5).

Policy

“Policy is the instrument of governance, the decisions that direct public resources in one direction but not another. It is the outcome of the competition between ideas, interests and ideology that impels our political system” (Althaus, Bridgman & Davis 2007:5).

Resilience

“The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions” (IPCC 2012:5).

Vulnerability

“The propensity or predisposition to be adversely affected” (IPCC 2012:5). [Please note that both bio-physical and socio-economic factors may contribute to this propensity or predisposition.]

Wicked Problems

“Wicked problems’ refer to those dilemmas that either cannot be defined or, at best, are not open to easy formulation. Rittel and Weber (1973) explain that wicked problems are unstable in that they are characterised by embedded interdependencies where a possible ‘solution’ can create yet another interlocking complex problem. Moreover, it is difficult to obtain clear or definitive expertise regarding possible solutions because the problem is either ‘shifting’ or there is no way of learning about the issue without trying potential ‘answers’ that come with unintended consequences. It is impossible to isolate the problem, let alone work out what to do about it” (Althaus, Bridgman & Davis 2007:54).

Introduction

Apart from the current fierce competition for scarce public resources, governments are also facing the challenge of being expected to address a growing list of complex interrelated issues that their political institutions and policymaking processes were not designed to address. Climate change adaptation and disaster risk management, for example, have been prominent on the policy agenda over the last five years and as the climate changes further, the number of weather-related disasters (such as floods and bushfires) will increase in intensity, duration, and/or frequency. While the policy responses to both have developed largely in isolation to date, they share the common goal of increasing community resilience. What is needed is an integrated response across all levels of government that makes the best use of scarce public resources.

This paper addresses this research problem in several stages. The first section outlines the nature of the challenge posed by climate change as an issue and explains the link between adaptation and disaster risk management. Section two then outlines the additional challenges posed by the institutional architecture of the Australian system of government, particularly with regards to the vertical and horizontal separation of powers. In section three, policymaking processes are explored with reference to the ongoing debates about how they should function. The fourth section then considers how the limitations of these institutions and processes manifest themselves in current responses to disaster risk management and climate change adaptation. Finally, some proposals are synthesised from the official inquiries into recent natural disasters in Australia that could help to integrate and improve responses.

The purpose of this paper is not to criticise the actions of emergency service workers and volunteers who do an incredible job under extreme circumstances, often risking their own lives in the process. The aim is simply to offer agencies the opportunity to step back and rethink their overall approach to the challenge they face in the light of the impacts of climate change.

The nature of the problem

The best available science indicates that the climate is changing and there will be significant environmental, economic and social impacts as a consequence. The environmental impacts include rising temperatures, increases in sea levels, coastal erosion, changing precipitation patterns, reductions in ice and snow cover, loss of habitat, accelerated species extinction, and an increase in the frequency, duration and/or intensity of weather-related events such as cyclones, storms, floods, heatwaves, droughts and bushfires. The economic impacts will include the loss of agricultural production, increased damage to built assets, higher insurance costs, greater defensive infrastructure costs, and more resources spent on emergency responses. Finally, the social impacts will include higher mortality and injury rates, damage to homes, the loss of livelihoods, an decrease in fresh water availability, an increase in food scarcity, a rise in the number of displaced people, and an increased risk of conflict (IPCC 2007a, b, c, 2012; Royal Society 2010; AAS 2010; NOAA 2011; Stern 2005).

Australia is particularly vulnerable to the impacts of climate change because of its geography, economy and settlement patterns. Although it is difficult to accurately predict local impacts, the long term trend is for the majority of the temperate south to get drier and the tropical north to get wetter. For the south this means a significant reduction in crop production, more pressure on water supplies, and the increased risk of bushfires. For the tropics, it means increased risks from storms and cyclones. Around the country, most of the major population centres are located on the coast, which means they face a higher risk of inundation and coastal erosion. Further, the likelihood of more frequent, extreme and prolonged heatwaves will increase the rate of mortality, particularly amongst the elderly and the ill (IPCC 2007b, 2012; CSIRO 2010; Garnaut 2011).

Some examples of what is to come might be drawn from recent history. The 2011 Queensland floods demonstrated what happens when there is a deluge in catchment areas that feed into major cities and towns, while the 2009 Victorian bushfires and 2011 Perth hills bushfires revealed the increased fire risk from prolonged dry periods. It should be noted, however, that climate scientists are reluctant to attribute specific events such as these to climate change. Floods, droughts and bushfires have always been a part of the Australian environment, but these kinds of events are likely to increase because of climate change (IPCC 2012; QFCI 2012; GWA 2011; VBRC 2010). The argument put forward here is simply that climate change is linked to disaster risk management through these weather-related events, so an integrated and improved response to both is needed.

The complex and far reaching nature of climate change has led many to label it a ‘wicked’ policy problem (APSC 2007; Head 2008; Rittel & Weber 1973) and some have even gone so far as to call it ‘diabical’ (Garnaut 2008). The concept of wicked problems was developed by Rittel and Weber (1973) who gave them ten defining attributes:

1. They are difficult to define;
2. There is no end or boundary to the problem;
3. There is no agreed criteria to judge the correctness of a response;
4. Responses have unforeseen consequences;
5. Responses that go wrong cannot be easily undone;
6. It is not possible to identify all options;
7. There is no suitable precedent to guide decision makers;
8. They are interconnected with other problems;
9. There is no agreed explanation of the problem; and,
10. Mistakes in either action or inaction are very costly.

While climate change clearly exhibits these attributes, it is interesting to ask whether the move to classify them as ‘wicked’ might also be an indictment of the limitations of existing systems of government.

The nature of climate change has significant implications for politics and public policy from the international to the national, state and local levels of government and it cannot be handled by a single agency or portfolio (Howes & Dedekorkut-Howes 2012). The link between climate change and extreme weather-related events, in particular, needs an integrated response in both adaptation policy and disaster risk management. The prevailing institutional structures and policymaking processes, however, may create significant barriers in developing an effective, efficient and appropriate response.

The institutional context

Beck (1992) pointed out that the main institutions of modern government were created in the nineteenth century and were not designed to address current complex environmental issues. The oldest environmental agencies only date back to the early 1970s, and climate change organisations did not emerge until the late 1980s (Howes 2005). The Australian system of government is a case in point. It was shaped by a constitution drafted in the 1890s by a group of independent colonies that were reluctant to cede power to a new national government. The result was a compromise that blended institutions from the USA and UK into what is sometimes referred to as the ‘Washminster mutation’ (named after the governments of Washington and Westminster) (Jaensch 1997; Thompson 1980). Local Governments were not mentioned in the constitution and exist entirely at the mercy of State Governments that were formed from the pre-existing colonies (Howes & Dedekorkut-Howes 2012). Climate change and disaster risk management were simply

not on the political agenda when these institutions were created, so there is no mention of them in the constitution either.

The underlying dynamic of the Australian political system is an on-going vertical power struggle between the three tiers of government. This has been particularly fierce when it comes to complex issues related to the environment that cut across local, state and national boundaries (Howes 2005; Toyne 1994). There have, however, been some moves to improve collaboration between levels through the Council of Australian Governments (COAG) and a range of joint councils (Howes & Dedekorkut-Howes 2012).

In addition to the vertical power struggles, there have been corresponding horizontal rivalries between different organisations within each level. Governments have traditionally divided up their responsibilities into discrete areas, such as emergency services, the environment, public health, housing, infrastructure, business, agriculture, etc. This strict demarcation has led to a 'silo mentality' within organisations that encourages a narrow view of issues within their purview and tends to overlook the broader or cross-agency implications. Furthermore, there is the risk of 'turf wars' as responsibilities and resources are jealously guarded while other organisations are seen as competitors (Liebrecht & Howes 2006). These kinds of rivalries are exacerbated by issues such as climate change and disaster risk management that necessarily cut across the defined areas of responsibility (Productivity Commission 2012; APSC 2007). A flood or a bushfire, for example, will have implications not only for the emergency services that need to provide the immediate response, but will also require the intervention of other government organisations to provide health care, housing, financial assistance, and repairs to infrastructure. There have been moves to improve cooperation and coordination in Queensland, for example, at the regional level, with joint bodies being established between various agencies and local government to coordinate the delivery of services (Rolfe, et al. 2009; Howes 2006). This was extended by the creation of the Queensland Reconstruction Authority after the 2011 Queensland floods.

Policymaking processes

While the governing institutions at the heart of the Australian political system set the stage, the policymaking processes within them direct the behaviour of the actors. These processes have a strong formal component that is embodied in public sector rules and procedures but there is some debate as to how they might best be described. Perhaps the most popular view is that of the 'policy cycle' which characterises policymaking as a series of logical steps: issue identification; policy analysis; policy instruments; consultation; coordination; decision; implementation; and, evaluation. At the end of the evaluation step, any issues that are revealed or unresolved start the next turn of the cycle (Althaus, Bridgman & Davis 2007). Critics of this view argue that policymaking is not as logical or clear cut and point out that even the proponents of this model have admitted that it is more of an ideal than a definitive explanation of practice (Colebatch 2005). The idea of a logical step by step process remains influential in many policies, plans and decision-making routines. Notwithstanding the attraction of the policy cycle, one of the ongoing debates is whether the process should proceed via giant leaps (the rational comprehensive school) or small steps (incrementalism).

The rational comprehensive approach conceives policymaking as rational, balanced, objective and analytical process in which decisions are made in a series of stages starting with identification of the problem or issue and ending with the implementation of a solution. The approach advocated by this model implies that all possible options are considered in detail and that one alternative is chosen over others entirely on merit thus effectively discounting the influence of political and other external factors (Productivity Commission 2012). Critics of the rational comprehensive approach consider it to be based on an unrealistic ideal, noting that such comprehensiveness is

rarely possible in practice, sufficient information is rarely available and ‘solving’ policy problems is a fantasy; in practice, problems are redefined, insufficiently addressed or re-emerge (Handmer & Dovers 2007; Sutton 1999). There have also been criticisms of the step-wise approach and of the assumption that policy formulation and implementation can be separated (Heazle 2010; Bell 2002; Neiman & Stambough 1998; Sutton 1999). What if a problem is not easy to define? What if there are clashing goals and objectives? What if policymakers are not aware of all the options available? What if the costs and benefits cannot easily or accurately be calculated? What if policymakers and planners are influenced by factors such as ideas, economic interests, political ideology, discourses or values and so fail to optimise the cost-benefit ratio?

Incrementalism, the main competitor to the rational comprehensive model, was proposed in the 1950s by researchers such as Charles Lindblom who acknowledged that policymakers have to deal with imperfect or incomplete information about issues and options (Lindblom 1979). He believed that democratic systems tend to resist radical change and that a strategy of incremental change through small steps could allow policy makers to address parts of larger problems by using familiar tools and drawing on their past experience. While critics of this theory argue that such an approach makes substantial improvements to society impossible, Lindblom suggested that over time these steps could build into significant changes. While this view of policymaking is perhaps more realistic than the rational comprehensive model, it is less than optimal and does not provide a strategic way forward because it only considers a small number of alternatives for dealing with a problem and tends to choose options that differ only marginally from existing policies (Handmer & Dovers 2007). Only the most important consequences are considered for each alternative. There is no optimal policy decision, the focus is on small changes and relies on constant improvement and review to identify and address problems with the policy and emerging issues.

Attempts to avoid the pitfalls of both the rational comprehensive and incremental models have given rise to hybrid approaches that propose an iterative or sequential approach to policy development and implementation (Dror 1964). This approach has the capacity to adopt an institutional learning cycle that draws on the on-the-ground knowledge of key stakeholders to drive policy changes. Indeed it has been suggested that responding to problems like climate change require such a sequential or iterative decision-making approach because it allows “decisions to be made and revised repeatedly over time in response to new knowledge, accumulated experience, or changed conditions” (Parson & Karwat 2011:744). This might include new scientific knowledge about climate change and associated impacts, changes in technologies, or changes in goals and priorities.

Although complex interlinked issues like climate change and disaster risk management appear to be well suited to rational comprehensive policy the uncertainty inherent in the knowledge of local risks and the clash of values renders this model unworkable in practice (Heazle 2010). On the other hand, the issues and challenges they present are so pressing their resolution requires more rapid and substantial changes than an incremental approach can deliver. Perhaps the best hope lies in the adoption of a sequential, iterative approach, although questions of how this might cope with uncertainty, the clash of values, and whether it can deliver the needed changes in time would still need to be resolved.

Implications for the present

The preceding sections have outlined three elements of the policy problem. First, climate change has profound policy implications for Australia, particularly with regards to adaptation and disaster risk management, and has been characterised as a ‘wicked’ problem. Second, although an integrated response is needed, the Australian institutional context discourages collaboration

across and within levels of government. Third, there remains considerable disagreement about how to best characterise and guide policymaking processes. All three elements have manifest themselves in current responses to climate change adaptation and disaster risk management.

The *National Climate Change Adaptation Framework* (COAG 2007) is the touchstone for coordinating action across the three levels of government in Australia. It was developed by COAG in 2007 to improve understanding of the problem, build adaptive capacity and reduce vulnerability. This led to the creation of the *National Climate Change Research Facility* and identified priority areas of action in: water resources; coastal regions; biodiversity; agriculture, fisheries and forestry; human health; tourism; settlements, infrastructure and planning; and, natural disaster management. In 2009 the Australian Department of Climate Change released *Climate Change Risks to Australia's Coasts: A first pass national assessment* (DCC 2009) that provided all levels of government with some indication of the key risks to coastal settlements. This was followed in 2010 by the Commonwealth's *Adapting to Climate Change in Australia: An Australian Government Position Paper* (DCC 2010) acknowledging that responsibility for adaptation is shared by all levels of government, business and the community. While the Commonwealth saw itself as playing a leading role in some areas, it was made clear that most of the heavy lifting would have to be done by the other levels of governments.

Most State Governments have developed policies on adaptation. These tend to focus on providing information on the potential impacts of climate change and possible adaptation strategies. For example, a *Climate Change Action Plan* is being developed in New South Wales to outline potential policy responses to climate change impacts on buildings, sea level, bushfires, health, agriculture and the environment. Other states have in place overarching legislative frameworks that support climate change adaptation. The *Climate Change Act 2010* requires the Victorian Government to develop a *Climate Change Adaptation Plan* every four years, with the first one due at the end of 2012. Queensland did develop some climate change policies that dealt with adaptation under the Bligh government, including *ClimateQ: Toward a Greener Queensland*, the *Draft South East Queensland Climate Change Management Plan*, and the *Southeast Queensland Regional Coastal Management Plan*. With the election of the Newman government in 2012 these policies are currently being reviewed. Most states also have in place strategies to consider the risk of rising sea levels, although the target figure used varies.

Responsibility for disaster risk management also falls largely to the States to protect life, property and the environment by providing day-to-day emergency services. This is not to suggest that the Commonwealth has no role and it has moved to support the States and Territories in developing their disaster risk management capabilities (Pitman 2006:4) by providing policy leadership and training through Emergency Management Australia (EMA). EMA is the lead agency for coordinating national disaster responses and the Commonwealth also provides assistance when requested by other governments during emergencies (EMA 2000). The Commonwealth and EMA seek to facilitate a national approach to disaster risk management through maintaining a constructive dialogue between the States and Territories on issues of national importance. It is through this coordination and policy leadership role that the basic emergency or disaster policy framework and associated definitions developed by the Commonwealth have been widely adopted by the States and Territories. The Commonwealth has developed a large number of policy documents and manuals to guide the States in planning and discharging their disaster response responsibilities (e.g. the *Emergency Management Manual* and the *National Emergency Risk Assessment Guidelines*, etc.). The Commonwealth also assists state and local disaster recovery efforts through National Disaster Response and Recovery Arrangements.

Despite State and Commonwealth efforts to incorporate climate change adaptation into their policy repertoire, adaptation efforts in Australia have largely been delegated to local government. Preston, Danese & Yuen (2011:2-3) believe that this has been justified by the argument that

'adaptation is local' as well as the fact that Local Government bears responsibility for implementing local planning policy including environmental planning and development approvals. This has been viewed by Local Government as another instance where a responsibility has devolved to the local areas in the absence of sufficient guidance and resources. In an attempt to orient themselves to the challenge of adaptation, Local Government efforts have centred on undertaking climate change risk assessments to underpin adaptation planning. The extent of their involvement in climate change adaptation varies. Many Local Governments have focused on assessing the implications of climate change for their operations and planning decisions. They have mandatory responsibilities for land use planning schemes that duly consider the environment, settlement patterns and economic activities within their communities. Equally, in most states, Local Governments have responsibilities for developing emergency management plans. In Queensland, for example, the *Disaster Management Act 2003* made Local Governments responsible for developing disaster risk management plans. Likewise with planning legislation (*Integrated Planning Act 1997* and more recently the *Sustainable Planning Act 2009*), Local Governments have been charged with the responsibility for developing strategic land use plans as a part of their planning schemes.

Queensland's state planning policy *SPP1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* sets out the State's interest in ensuring that these natural hazards are adequately considered when making land use decisions about development. This policy guides planning schemes and development decisions to reduce community vulnerability and the financial impacts of natural hazards. The SPP requires the identification of natural hazard management areas within which minimising risks to the community should be a key consideration. Local Governments are obliged to take this into consideration while preparing planning schemes and assessing new developments. Thus, in this context, local government is the main vehicle via which practical policy and planning adaptation to climate change occurs at the community level (Bajracharya, Childs & Hastings 2011:5). Yet while recent discussions surrounding climate change have given greater focus to reducing greenhouse gas emissions, there are still few formalised links between examination of potential impacts of climate change, which includes predicted changes to natural hazard occurrence and intensity patterns (i.e. likelihood), with disaster risk management and land use planning (Bajracharya, Childs & Hastings 2011:2).

Lessons for the future from floods and bushfires

Despite these developments, the question remains about how well this pastiche of policies, processes and institutions will cope with the impacts of climate change, particularly with regards to the increasing demands on disaster risk management. Three recent natural disasters offer some useful proposals for improvement: the 2009 Victorian bushfires; the 2011 Perth Hills bushfires; and, the 2011 Brisbane floods. A comparative analysis of the official inquiries into these disasters has been matched against more general research in the area to produce four ideas. First, there is a need to improve community engagement and communication. Second, there is a need to refocus attention on resilience. Third, there is a need to improve interagency communication and collaboration. Finally, there is a need to develop institutional arrangements that support continual improvement and policy learning. These proposals should help to address the problems discussed in the previous sections of this paper for both disaster risk management and climate change adaptation. Further, they may provide key points for developing an integrated response to both policy issues.

In terms of community engagement and communication, responding to issues such as disaster risk management and climate change adaptation requires a whole of government approach that necessarily relies on a willingness to work across agency boundaries and with the community and business at the local level (Productivity Commission 2012; APSC 2007:36). Goode, et al.

(2011:17-18) note that there is scope for improvement in community engagement particularly with respect to clearly communicating risks and hazards. Our own analysis of the 2009 Victorian Bushfires Royal Commission (VBRC) bore this finding out with repeated references to the need for better community engagement and communication appearing in its reports (VBRC 2010c:3, 31, 34, 37, 230, 352). Similarly, it emerged in the report into the 2011 Perth hills bushfires which extended the concept to include the shared responsibility for disaster risk management across sectors (GWA 2011:13, 46). It also appeared in the Queensland Floods Commission of Inquiry (QFCI) final report with regards to improving community preparedness and assisting local groups (QFCI 2012:118, 122). In short, a communication and engagement approach is needed to enable well-informed communities to participate in their own adaptation and risk management.

With regards to refocussing on resilience, traditionally disaster risk management has followed the prevention, preparedness, response and recovery (PPRR) model. Although this approach has been very useful for emergency management organisations, it has been suggested that PPRR creates artificial barriers between these elements of risk management and a more proactive approach may be better (Handmer, et al. 2011; Rogers 2011). Introducing the goal of building community resilience as a central component of PPRR might allow for a more integrated and pro-active approach. One of the problems that was identified by the Victorian, Perth and Brisbane disaster inquiries was the lack of consensus on the definition of resilience (VBRC 2010:31, 34, 230; GWA 2011:13, 46; QFCI 2011:115, 118, 122). The task is therefore to adopt a “holistic approach” which generates a “common understanding that is robust enough to operate in different policy contexts” (Prosser & Peter 2010:10-11). If both disaster risk management and climate change adaptation policies can develop this common understanding, then opportunities for integration should become apparent and be more easily pursued.

On the point of improving interagency communication and collaboration, there is a growing awareness that the top-down, hierarchical, command-and-control approaches to policymaking are being increasingly challenged by more collaborative, flexible and networked models of governance (Waugh & Streib 2006). This is certainly the case in Australia where disaster risk management arrangements depend on interagency and intergovernmental actions as well as working together with volunteers, non-government organisations, businesses and the community. Of course there are still improvements to be made. The Victorian Bushfire Royal Commission found that there the “operational response was hindered by difference between agencies’ systems, processes and procedures” (VBRC 2010a:18) and “true integration was not achieved” (VBRC 2010a:8). Communication and coordination problems were also cited as problems in both the Brisbane floods and Perth hills bushfires inquiries (QFCI 2011:115; GWA 2010: 133). Goode, et al. (2011:17) note that each agency has its own specialised knowledge in relation to specific risks and that there is not a lot of understanding between these silos of knowledge. All three inquiries highlighted the need to clarify roles and responsibilities, to coordinate actions better, and for improved leadership arrangements to upgrade interagency communication. Effective interagency communication and collaboration is essential for a delivering a coordinated all hazards, all agency approach as advocated by Emergency Management Australia and State Governments. Improved networking, cooperation, collaboration and cooperation has the potential to deliver a range of benefits in both a disaster management and climate change context relating to the building of inter-agency trust, improved information exchange, collaborative decision making, risk sharing and pooling limited resources to achieve common goals. These points also apply equally to climate change adaptation.

Finally, regarding the need for institutional arrangements that support continual improvement and policy learning, all government organisations have to respond to rapidly changing economic, social and environmental contexts. As a consequence they need to redesign their structures and procedures to enable continual improvement and policy learning. The Victorian Bushfires Royal Commission (2010c:81, 86, 229) promotes the need for agencies to learn from their experience

and conduct more research into the level and distribution of risk. The Perth Hills bushfire report recommended a new set of institutional reviews, education and training (GWA 2011:188). The Brisbane floods inquiry recommended improving hydrodynamic modelling and forecasting to improve decision making (QFCI 2011:24, 62). Goode, et al. (2011:16) note that the inquiries highlight institutional issues associated with State emergency management arrangements. Part of the solution to these challenges requires innovative, comprehensive solutions that can be modified in the light of experience and on-the-ground feedback (ASPC 2007; Waugh & Streib 2006). Successfully tackling these problems requires a broad acceptance and understanding, including from governments, that there are no quick fixes and that levels of uncertainty around the solutions need to be tolerated. In order to be effective disaster risk management and climate adaptation need to be integrated into mainstream government operations and each other. Furthermore, they require continuous review with to encourage policy learning and improvement. Institutional arrangements which support this may include integrating climate adaptation into all phases of the PPRR model (Birkmann & von Teichman 2010).

Conclusions

In summary, governments are increasingly being asked to do more with less. They face a growing list of interlinked policy issues that require a more integrated response in order to make the best use of scarce public resources. Climate change adaptation and disaster risk management, for example, are closely related issues that challenge the existing institutional architecture of government as well as its embedded policymaking processes. Recent major disasters (such as the 2009 Victorian Bushfires, 2011 Perth hills bushfires, and 2011 Brisbane floods) provide examples of the pressures that are increasingly going to be placed on future governments. Our analysis of the official inquiries into these events, however, offers four useful proposals for change: improve community engagement and communication; refocus attention on resilience; improve interagency communication and collaboration; and, create institutional arrangements that support continual improvement and policy learning. These changes will not only help to improve disaster risk management but apply equally well to climate change adaptation. They also provide starting points for the potential integration of policy responses to both issues that could enable governments to make more effective, efficient and appropriate use of scarce public resources.

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