



Implementation Plan for Climate Change Adaptation and Emergency Management

August 2009

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1. Purpose of Implementation Plan

This Implementation Plan sets out a national strategy for research to address the priorities identified in the *National Climate Change Adaptation Research Plan for Emergency Management* (the Research Plan). There is a particular focus on (1) facilitating collaborative arrangements, (2) maximising resources for priority research, and (3) optimising the timing of investments to maximise partner buy-in.

2. Basis for Research Collaboration

In March 2009, the Minister for Climate Change and Water approved the Research Plan, which identified the high priority research areas to enhance community and organisational resilience to the risks posed by climate change in respect of emergency management.

The Research Plan was written by a team of experts in consultation with key researchers and stakeholders, and its development included a period of public consultation. The high priorities identified in the Research Plan are set out in Appendix A.

3. Potential Sources of Research Capability

This section describes some of the main research organisations that might be involved in implementing the Research Plan. In many cases these research organisations have access to resources that might be used to fund the research.

3.1 CSIRO

CSIRO Sustainable Ecosystems is the science home for CSIRO research in bushfire behaviour and interactions between people, fire and the built environment. Much of this research capability is deployed through the CSIRO Climate Adaptation Flagship, in particular through the Sustainable Cities and Coasts theme. The overall goal of the theme is to conduct research and build partnerships that contribute to the revitalisation of Australia's cities and coasts in response to changing climate, through new planning, design, infrastructure, management and governance solutions.

The intent of the research partnerships with Australian governments, communities, industry and research organisations is to provide examples of the knowledge required for effective urban and coastal climate adaptation and sustainable urban development. The theme is developing tools and processes for integrated urban planning, design and development including display projects that demonstrate the adoption of new practices, products and policies that respond to climate change.

Some examples of research projects include developing community adaptation options - energy rating systems and urban and coastal management strategies that take account of interactions between engineering, economic, social and ecological ways of thinking about people and their needs in buildings, neighbourhoods, communities, cities and vulnerable urban coasts.

The Sustainable Cities and Coasts theme has a deliberate focus on understanding the adverse effects of extreme events such as bushfires, storm surge, heat waves and cyclonic winds on people and infrastructure in the built environment. Engagement with governments, industry, researchers, and the community is developed through examining vulnerability to extreme events and then developing adaptation pathways to prepare for, or recover from, the adverse effects of extreme events in local communities and their built environments.

CSIRO considers partnerships on a case-by-case basis depending on the mutual alignment of interests. This could include long term partnerships in CRCs and other research ventures where the prospects of end-user engagement and research effectiveness are likely to be increased by partnering or through strategic short term consultancies depending on the nature and value of the opportunity. CSIRO is not a funding agency but does co-invest from time to time when and where there are distinct opportunities to align its research interests with the evidence-based outcomes of partner organisations.

CSIRO is conducting research that is applicable to the four broad research areas described in the Research Plan (see Appendix A) as underpinning knowledge contributing to a better understanding of emergency management responses.

3.2 Centre for Australian Weather and Climate Research (CAWCR)

The Centre for Australian Weather and Climate Research (www.cawcr.gov.au) is a partnership between Australia's leading atmospheric and oceanographic research agencies: the Bureau of Meteorology and CSIRO. The Centre was established in 2007 to ensure that Australia remains a world leader in climate, weather and oceans research so that it can meet the severe weather and climatic challenges that continue to confront the nation.

The Centre has five Research Programs:

1. Atmosphere and Land Observation and Assessment
2. Ocean Observation, Assessment and Prediction
3. Coupled Earth System Modelling
4. Weather and Environmental Prediction
5. Seasonal Prediction, Climate Variability and Climate Change.

These research activities will improve observational databases, our understanding of observed climate variability, and the delivery of seasonal to decadal climate predictions for use in risk assessments. Improved accuracy and resolution of the prediction of future climate and its extremes are particularly relevant to emergency management.

CAWCR could provide a collaborative foundation for the range of selective research projects addressing the Adaptation Research Plan.

3.3 Cooperative Research Centres (CRCs)

Cooperative Research Centres (CRCs) bring together researchers from universities, CSIRO, other Australian and state government research organisations, private industry, and/or public sector agencies in long-term collaborative research arrangements. CRCs are funded to support research, development, and education activities to achieve real outcomes of national economic and social significance.

3.3.1 Bushfire CRC

The Bushfire CRC is a partnership between major fire and land management research agencies, which is currently completing a bid for continued funding post 2009. The Australian Government has announced an additional \$15 million (over the period 2010/11 to 2012/13) as supplementary funding for the Bushfire CRC to address issues arising from the Victorian bushfires in February 2009.

Risk assessment is one of the four proposed areas of research for the new CRC, with a considerable emphasis on modelling and future scenarios of climate change. The CRC will be interested in partnering with NCCARF to address relevant priorities in the Research Plan relating to understanding the nature and location of the risks posed by climate change.

The CRC has expressed intent to work with the NCCARF and its Adaptation Research Network for Emergency Management, and this can proceed following the approval and announcement of continued CRC funding by Innovation Minister Kim Carr on 7 August 2009.

3.3.2 Other Cooperative Research Centres

The research activities of a number of other CRCs are relevant, but not central, to climate change and emergency management. The Research Plan identifies the following Cooperative Research Centres as relevant: Antarctic Climate and Ecosystems (ACE) CRC, CRC Aboriginal Health, CRC Construction Innovation, CRC Mining, CRC Forestry and the CRC Sustainable Tourism.

Opportunities with these CRCs are still to be explored in relation to collaboration to fund national level research into climate change and emergency management. It seems that

there is limited opportunity for program level collaboration with any of these CRCs. However, NCCARF will in future explore opportunities for collaboration with these CRCs.

3.4 Geoscience Australia

Geoscience Australia (GA) is a prescribed agency within the Department of Resources, Energy and Tourism. It conducts geoscience research to inform government policy, including development of fundamental data and information products that are needed for climate change adaptation, and assessment of community safety issues such as natural hazard risk.

GA's Risk & Impact Analysis Group develops risk assessment models, tools and databases to assess the risk to a range of natural and human-caused hazards. Climate-related hazards of interest include tropical cyclone, storm surge, flood, landslide and coastal erosion. An example of climate change adaptation research is the assessment of physical and socio-economic vulnerability of coastal communities to the consequences of sea-level rise and potential changes in storm frequencies and magnitudes.

GA develops fundamental spatial data which is of value for emergency management applications. The National Mapping & Information Group develops topographic maps and coordinates spatial data infrastructure initiatives such as the National Elevation Data and Information System – information that is critical to understanding stream flows and flood hazard. The National Earth Observatory Group (NEOG) within GA acquires and processes remotely sensed data from satellites which can be used for assessing disaster footprints such as bushfire scars and flood inundation areas. NEOG also operates Sentinel, a national bushfire monitoring system that provides timely information about bushfire hotspots to the public and to emergency services across Australia.

GA's research and policy advice is done in large part through the agency's appropriated budget, and through collaborative or co-funded projects with the Australian, state and local governments, CRCs, universities, and industry partnerships. GA seeks partnerships to develop and maintain geoscience information and to value-add this information to inform government policy and the public in the national interest. GA is not a funding agency, but does co-invest in areas of interest to the Resources, Energy and Tourism portfolio, including community safety issues where geoscience information is required.

3.5 Universities

Universities possess wide ranging capabilities for research across disciplines in humanities and in social and biophysical sciences - and from highly theoretical approaches which challenge the ways we think about and frame problems through to practical problem solving.

Much research in Australian universities is undertaken with limited external sources, so it is likely that research relevant to climate change adaptation is being undertaken in isolation using internal resources. The Adaptation Research Network for Emergency Management, hosted by RMIT University, provides a valuable mechanism to identify and publicise such research, and to build and coordinate research across a wide geographic spread.

There is also the opportunity for large groups of researchers across universities to tackle complex multi-faceted problems. Universities generally welcome partnership arrangements

such as those with CRCs, other research groups (including those overseas) and agencies, but need to consider carefully costs and benefits on a case-by-case basis.

Three examples of university groups working in emergency management research are given below as indicative of the work currently underway. See websites for additional detail.

- *Risk Frontiers* at Macquarie University operates as a private company with some support from parts of the insurance industry. Among other resources and activities, it has fatality datasets for a wide range of Australian natural hazards, national data for types of vulnerability, and undertakes risk modelling.
- *The Centre for Disaster Studies* at James Cook University works closely with the fire and emergency management sector, especially in Queensland. It undertakes a range of social science research on resilience and natural hazards.
- *The Centre for Risk and Community Safety* at RMIT University works with fire and emergency service agencies and research groups including the Bushfire CRC. The Centre examines disaster resilience and climate adaptation through research drawing on economics, law, geography and policy.

4. Potential Sources of Research Funding

This section deals with potential sources of research funding available to address climate change adaptation in the area of emergency management, including current investment activities and opportunities for collaboration.

NCCARF has approached key potential research funding organisations to scope the availability of funding for research in climate change adaptation in the area of emergency management. This includes examining the alignment of the priorities identified in the Research Plan with each organisation's funding priorities, the organisation's (current or future) programs for funding open calls for research, opportunities for collaborating in funding research in this area and possible mechanisms for co-funding.

NCCARF has consolidated the responses received from potential partners and drawn relevant conclusions relating to the composition of a national investment research portfolio. This information is summarised below.

4.1 Australian Government

4.1.1 Department of Climate Change - Adaptation Research Grants Program seed funding

The Department of Climate Change (DCC) intends to allocate \$2 million as seed funding for research in climate change and emergency management through its Adaptation Research Grants Program.

A key requirement of the Program is for this seed-funding to be used to support a nationally coordinated effort – bringing together available funding resources from the Australian Government, state, territory, and local governments, research organisations, community organisations, and industry.

The grants funding will be available from early 2009/10, and all projects funded through this program will need to be completed by June 2012. This means in practical terms that the maximum duration of funded projects can only be 2½ years. Ideally, there will be a mix of both long and short term projects.

There are a number of options for maximising the effectiveness of the DCC seed-funding. The DCC, in partnership with NCCARF, may initiate one or more open research calls, commission research projects, or form strategic alliances with one or more funding partners.

Given the timing, it is proposed that the DCC initiates a single open research call to address the high priorities identified in the Research Plan. If there are gaps in the research program stemming from the open call, or emerging issues, DCC may wish to consider supplementary action, possibly through commissioning further work to address identified needs.

4.1.2 Attorney General's Department

Disaster Resilience Program (DRP)

The new Disaster Resilience Program (DRP) has been established in 2009 to develop and reform the Australian Government's approach to emergency management and to increase Australia's resilience to a range of natural and human-caused disasters, including the expected increases in extreme weather events resulting from the impact of climate change.

The DRP replaces four existing disaster mitigation grant programs (National Disaster Mitigation Program, Bushfire Mitigation Program, Directed Assistance Package and, from 2010/11, the National Emergency Volunteer Support Fund). The focus of the DRP is on funding partnerships between the Australian and state/territory governments to implement on-ground works to better prepare communities for possible disasters.

Currently the DRP has no research component; however, it is possible that a small proportion of program funding may eventually be directed for research activities, although a climate change focus for any such investments is not guaranteed. Opportunities for collaboration stemming from the DRP over the next year or so are likely to be on a project-by-project basis, rather than at the program level, but even so opportunities appear limited.

The DRP provides funding for mitigation activities and preventative projects, such as natural disaster risk management studies, warning systems, community education initiatives and structural works to protect against damage.

Climate change is increasingly being addressed in the projects supported by the DRP. It is unlikely, however, that opportunities will arise in the near future for partnership arrangements at a program level to address the priorities in the Research Plan. On the other hand, individual projects may be able to secure some funding through the DRP by negotiation with relevant state agencies.

4.1.3 Australian Research Council (ARC)

Generally, the Australian Research Council grants program would be the first port of call for many researchers and research institutions that seek additional support. Grants offered by the ARC under its National Competitive Grants Program (NCGP) include Discovery Project and Linkage Project grants. Through the NCGP, the ARC aims to support research and

research training of national benefit. *Responding to climate change and variability* is identified as a priority goal under the National Research Priority of *An environmentally sustainable Australia*.

It appears that any collaborative arrangement with the ARC to address research priorities in climate change and emergency management will need to be on a project-by-project basis – at least in the short term.

4.2 State, Territory and Local Government Organisations

NCCARF has held discussions with representatives of some state and territory government agencies to explore collaborative arrangements. These discussions have not yet identified opportunities for partnerships at the program level to lever funding towards a national investment portfolio for research in climate change and emergency management. NCCARF will continue to explore possible opportunities with state, territory, and local governments. State-based research organisations are able to respond to research calls with the possibility of attracting some state-based support on a project-by-project basis.

4.3 Private Sector

The private sector has a very strong interest in emergency management and NCCARF will explore opportunities for partnership. Existing mechanisms such as the Attorney General's Trusted Information Network and the Insurance Council of Australia may be useful in contacting the right people and organisations.

5. Strategy for National Coordination

5.1 Immediate Opportunities

There is some existing research relevant to the Research Plan which will be drawn on to help implement further research. Examples include research under the previous Natural Disaster Mitigation Program and the National Coastal Vulnerability Assessment. However, it will also be necessary to find new resources for additional research.

In the short term it seems likely that the main source of dedicated funding to address priorities in climate change and emergency management is the seed funding provided by the Adaptation Research Grants Program through the Department of Climate Change. It is recommended that an open call for research proposals addressing the priorities identified in the Research Plan be made to initiate the investment portfolio for climate change and emergency management. This should be a two-stage process, involving expressions of interest to be followed by invitations to develop full proposals.

It is anticipated that the research call may encourage other funding organisations to identify and allocate additional funds toward these priorities, especially on a project-by-project basis.

5.2 Building Future Programs

The Adaptation Research Network for Emergency Management, hosted by RMIT University, has a lead role in promoting adaptation research in the emergency management community.

It is currently analysing stakeholders with a view to developing and enhancing opportunities for collaboration. It is also developing the existing international links of individual members of the network, for example through its international visiting professor program.

It is proposed that NCCARF continue to explore options to build the national research funding base to address the priorities in the Research Plan. NCCARF will convene a workshop of potential funding organisations in early 2010 to continue the dialogue with potential research funders, review the outcomes of the initial research call, and scope the way forward.

6. Impediments and Risks

Australia has a small research community – especially in the area of climate change and emergency management. It is recognised that it will not be easy or straightforward to harness the necessary resources to deliver research directed to the priorities in the Research Plan.

It is therefore expected that implementing the research agenda will take time. A key focus will need to be on increasing the size of the research funding directed to this research agenda – across a wide variety of organisations and stakeholder groups – while at the same time utilising the resources available immediately for carefully targeted and effective research. The Adaptation Research Network for Emergency Management will need to play a prime role in substantially building the research agenda and reducing risks in program implementation.

7. Monitoring

NCCARF will work with the Adaptation Research Network for Emergency Management to track research being conducted across Australia that implements the Research Plan. NCCARF will monitor the progress of research commissioned through the Adaptation Research Grants Program in order to identify emerging gaps and research needs through continuing dialogue with key stakeholders and the research community. NCCARF will produce an annual report on the progress of the Implementation Plan, with the first to appear in 2010/11.

NCCARF will also synthesise research outcomes in the area of climate change and emergency management as they evolve.

Success in developing and implementing research directed towards priorities in the Research Plan will be measured in terms of the extent to which the research budget is built nationally, the degree of collaboration and coordination to maximise the efficiency of resource use, and the extent to which the research delivers to the needs of research funders, to decision makers, and to stakeholders nationally.

Appendix A

Research Priorities in the Area of Climate Change Adaptation and Emergency Management

1. Understanding risk

1.1 Understanding the changes in climate that will place the natural environment, human activities and welfare at the greatest risk; the nature, location and intensity of these changes.

[Note that successful proposals under this heading will not include climate modelling activity.]

1.2 Identifying and evaluating the tools that will enable decision-making under future climate uncertainty.

[Note that successful proposals under this heading will not include climate modelling activity.]

2. Community and organisational resilience

2.1 Understanding community resilience in a changing climate.

2.2 Identifying behaviours that promote community preparedness and community preventive strategies in a changing climate.

2.3 Identifying the most effective strategies to ensure that individuals, governments and the private sector adopt better practices in preparing for the increased risk to communities, business operations or critical infrastructure arising from climate change.

3. Adaptive strategies

3.1 Understanding how climate change will affect the emergency management sector's capacity to support preparedness, response and recovery.

3.2 Understanding the role of the private sector in adaptation through emergency management.

4. Regional Implications

4.1 Understanding how the climate change adaptive capacity of other countries, particularly those in the Pacific region, impacts upon the Australian emergency management system and Australian fire and emergency services organisations.