HAZARD **NOTE**

WHAT IS DISASTER RESILIENCE AND HOW CAN IT BE MEASURED?

ABOUT THESE PROJECTS

This is an overview of the *Understanding and measuring social resilience* cluster of Bushfire and Natural Hazards CRC research projects. This cluster has three linked studies:

1. **The Australian Natural Disaster Resilience Index** – Dr Phil Morley, Dr Melissa Parsons, A/Prof Graham Marshall, Dr Sonya Glavac, Dr Richard Stayner, Dr Judith McNeill, James McGregor, Dr Ian Reeve, University of New England; Dr Peter Hastings, Queensland University of Technology. Contact pmorley@une.edu.au

2. **Scoping north Australian community resilience** – Adj Prof Jeremy Russell-Smith, Dr Kamaljit Sangha, Prof Andrew Campbell, Charles Darwin University; Dr Bevlyne Sithole, ARPNet; Glenn James, Peter Yu, Melissa George, North Australian Indigenous Land and Sea Management Alliance; Prof Bob Costanza, Dr Ida Kubizewski, Australian National University. Contact jeremy.russell-smith@cdu.edu.au

3. **North Australian bushfire and natural hazard training** – Stephen Sutton, Dr Petra Buergelt, Dr Peter Jacklyn, Dr Natalie Rossitor-Rachor, James Smith, Charles Darwin University; Ken Baulth, Bushfires NT; Ed Hatherly, Department of Parks and Wildlife WA; Clifton Bieundurry, Department of Fire and Emergency Services WA; Bruno Griemel, Queensland Fire and Emergency Services; Otto Champion-Bulmaniya, Guruwilling Rangers; Dr Bevlyne Sithole, ARPNet. Contact stephen.sutton@cdu.edu.au

▲ **Above:** BRIGADE PERSONNEL INSTRUCT RESIDENTS HOW TO PREPARE FOR A BUSHFIRE. PHOTO: DAMIEN FORD, NSW RURAL FIRE SERVICE.

CONTEXT

While extreme natural disasters usually cannot be prevented, their risks can often be minimised and impacts on people and property reduced. For Australian communities, 'disaster resilience' broadly means the capacity to cope with, adapt to, learn from and transform behaviour and social structures in response to a natural hazard and its aftermath.

The shift from a risk-based approach to managing natural hazards toward ideas of disaster resilience reflects the uncertainties inherent in natural disasters. These uncertainties range from predicting their location and impact, to the changing patterns of natural hazard risks resulting from changing climate and demographics. Understanding how to enhance disaster resilience will help communities, governments and organisations to develop the capacities needed for living with natural hazards.

THE AUSTRALIAN NATURAL DISASTER RESILIENCE INDEX

BACKGROUND

Natural hazard management policy and program directions in Australia and internationally are increasingly being aligned to ideas of resilience. However, there is little consensus about how to measure or operationalise resilience in practice. Part of operationalising this in Australia involves assessing the current state of disaster resilience. The Australian Natural Disaster Resilience Index is designed to assess resilience to natural hazards nationwide with various inputs from macro-level policy, strategic planning, community planning and community engagement at national, state and local levels.

The Index will provide a tool for assessing the resilience of communities to natural hazards by first providing a snapshot of the current state of natural hazard resilience at a national scale. Secondly, it will be a layer of information for use in strategic policy development and planning. Its third function is to be a benchmark against which to assess future changes in resilience to natural hazards. The Index will also provide content for use in agency profiling, community engagement and information initiatives.

RESEARCH ACTIVITY

The project has published a conceptual framework that outlines the philosophy and structure of the Index. The framework defines the boundaries – the why, what and how – around the evidence that will be used to assess disaster resilience.

The Index assessment has a hierarchical structure. The first level comprises the coping and adaptive capacity dimensions of disaster resilience. Below this are themes that express elements of coping or adaptive capacity (see figure below). Coping capacity has six themes that express the availability of resources and abilities to prepare for, absorb and recover from a natural hazard. The themes are:

- social character
- economic capital
- infrastructure and planning
- emergency services
- community capital
- information and engagement.

Adaptive capacity has two themes that express the processes that enable adjustment through learning, adaptation and transformation. They are:

- governance, policy and leadership
- community and social capital.

Each theme contains indicators that relate and combine to provide an indication of the resilience of an area for that theme. The Index is a top-down assessment of disaster resilience and uses existing data to evaluate the capacities for disaster resilience in Australia. Data sources include the Australian Bureau of Statistics. It is not a scorecard approach that uses local surveys, but a macro-level, standardised reading of the state of disaster resilience in Australia based on coping and adaptive capacities.

RESEARCH OUTCOMES

Scheduled for release in 2018, the results will be freely available to download in the form of maps and reports that will span Australia. For any location, users will be able to drill down

at different spatial scales and determine various aspects of resilience for that specific area. This will allow the prioritisation of issues and areas. The Index and indicators will also be the basis of a state of disaster resilience report that will interpret the strengths and opportunities in disaster resilience

THE HIERARCHICAL STRUCTURE OF THE AUSTRALIAN NATURAL DISASTER RESILIENCE INDEX
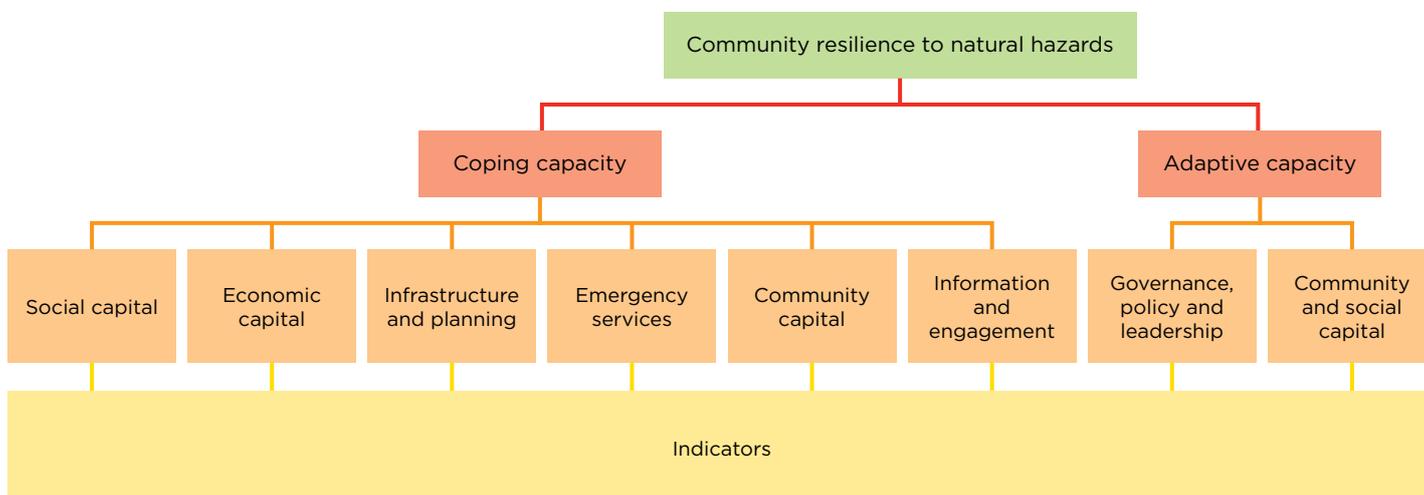
SCOPING NORTH AUSTRALIAN COMMUNITY RESILIENCE

BACKGROUND

Community resilience among Indigenous communities in remote areas is a complex and challenging concept. Nearly 45% of northern Australians in remote areas are Indigenous, with most of these residents living in communities that are susceptible to cyclones, floods and bushfires. Despite this, it has proven difficult to provide the communities with effective emergency services. Poor infrastructure, restricted communication services and economic opportunities, and at times problematic governance models have heightened residents' vulnerability to natural hazards. Many current government services struggle to deal effectively with natural hazards, now or in the foreseeable future. A key question for this project is: What service models can improve resilience in Australia's remote Indigenous north?

RESEARCH ACTIVITY

Two major desktop studies have been completed; a literature review on the current understanding of community resilience in northern Australia; and an asset mapping exercise in the Northern Territory communities of Gunbalanya and Ngukurr.

Participatory action research has also been undertaken in both communities through the Aboriginal Research Practitioners Network, which involves trained Indigenous researchers conducting interviews with local people, in the local language and with due attention given to local cultural sensitivities. Twenty-two researchers spread across two teams conducted field research for a total of 10 days. Researchers are currently analysing data from interviews with 194 residents.

Economic resilience is being assessed through developing culturally appropriate land and sea management economic opportunities, which in turn will build local community resilience. An initial assessment of payment for environmental service enterprise opportunities available at Gunbalanya, Ngukurr and surrounding outstations has been undertaken, and an initial assessment of the monetary value of tangible and intangible ecosystem services from the Indigenously-held Fish

▲ **Above:** DR BEVLYNE SITHOLE BRIEFS THE ARPNET RESEARCH TEAM IN NGUKURR. PHOTO: HMALAN HUNTER-XENIE, ARPNET

River Station in the NT. A detailed literature review on current uses of savanna lands and related economic returns has also been conducted. It is hoped the Fish River Station research will highlight the monetary value of ecosystem benefits to local Indigenous communities and provide an early template for similar studies.

RESEARCH OUTCOMES

The asset mapping study recorded 'hard' infrastructure, such as a community's essential physical assets, including transport/mobility, communication, energy, water management and housing. It also mapped 'soft' infrastructure – all the institutions required to maintain the economic, health, and cultural and social standards of a community (including emergency services, social, economic and natural heritage). This mapping also accounts for resilience enablers (which strengthen community resilience) and potential threats.

The literature review identified information gaps relating to Indigenous perspectives on risk and hazards, as well as an understanding of the existing capacity of communities to respond to these hazards. It identified key enablers of community disaster resilience, including local/cultural knowledge and economic diversification, and highlighted land management activities in enabling resilience and considered the relationship between emergency management service providers and Indigenous communities. There also appears to be a

gap in translating strategies and policies for building community resilience into practical emergency response and recovery approaches and actions.

The participatory action research found that participants' stories about disasters related to local land features, such as rivers, and their vulnerability. Safety stories were connected to views about housing quality and infrastructure and, most of all, to the absence of people on country. Participants advocated strongly for returning people to country to strengthen connections and coping capabilities within families. Among the survey findings were that disasters further worsen the physical, spiritual and economic conditions of most Aboriginal households, and that only 46% of those surveyed knew that there was an emergency plan for their community, while only 15% had actually seen the emergency plan. A report detailing the key findings, and a preliminary set of recommendations and protocols for how remote Indigenous communities can be more effectively engaged in emergency management, will be available soon.

Both the participatory action research and the desktop studies highlight the significant gap between the roles and responsibilities of emergency service agencies on the one hand, with the expectations of community members on the other. A critical challenge for government authorities is to effectively engage with Indigenous community governance structures in order to develop mutually respectful partnerships.

The economic resilience research suggests that fire management projects will contribute to improving natural and social capital, build capacity for dealing with natural hazards, and thus contribute to enhancing community resilience. This is based, in part, on having Indigenous managers conduct better planned burning regimes that reduce greenhouse gas emissions, thereby generating income through the Federal Government's Emissions Reduction Fund. There are many potential benefits from developing Indigenous land management enterprise opportunities, focused, for example, on fire, weed, and pest management, while enabling ongoing cultural practices. These benefits include protecting biodiversity and enhancing cultural identity. At Fish River Station, Indigenous management and engagement activities have been valued at between $93 million to $355 million annually, depending upon the valuation method. This research is currently being extended to examine the value of ecosystem services and potential economic returns to remote Indigenous communities derived from land sector ecosystem services across the savannas.

NORTH AUSTRALIAN BUSHFIRE AND NATURAL HAZARDS TRAINING

Left: RESEARCH IS DEVELOPING BETTER TRAINING COURSES TO SUIT THE NEEDS OF REMOTE COMMUNITIES.

PHOTO: BILL MCLEOD, BUSHFIRES NT.

FURTHER READING
Parsons M, Morley P, Marshall G, Hastings P, Glavac S, Stayner R, McNeill J, McGregor J & Reeve I (2016), The Australian Natural Disaster Resilience Index: conceptual framework and indicator approach, Bushfire and Natural Hazards CRC.

Russell-Smith J, Scoping remote north Australian community resilience and developing governance models through action research (2015), Bushfire and Natural Hazards CRC.

Sangha KK, Russell-Smith J, Yates C, Gould J, Michael C & James G (2015). Developing enterprise opportunities and resilience in remote north Australian communities, proceedings from the Bushfire and Natural Hazards CRC and AFAC Conference, Adelaide, 2015.

BACKGROUND
This project aims to provide a training program that builds on the current assets in the north, such as ranger programs, and increases competence and confidence in dealing with natural disasters and, in turn, resilience. The project responds to north Australian stakeholder concerns that existing training does not meet their needs because it is based on models suitable for southern Australia. The factors differentiating between northern and southern training needs are significant, ranging from geographical (the scale of northern natural disasters and distances), to social and cultural, as in the impacts of natural disasters on remote Indigenous communities. Indigenous researchers, through the Aboriginal Researchers Practitioners Network, are evaluating the delivery of pilot training in remote communities.

RESEARCH ACTIVITY
The project has reviewed 21 training courses offered through Charles Darwin University and its Registered Training Organisations.

Five new training units have been completed. The team is developing additional units and adapting existing units to suit the needs of northern Australia.

These adapted and new units will provide a comprehensive training package that is sensitive to Indigenous cultural and language variations and reflects local knowledge and contexts. This will allow qualified trainers to deliver training in ways that can be tailored to suit remote locations. The project has also developed a Course Delivery Handbook based on the training materials.

RESEARCH OUTCOMES
The course and education review identified three areas that the current project addresses. It found current courses are high quality and need to be supplemented, rather than replaced. Key areas that are being addressed are adding a northern focus, as well as incorporating Indigenous knowledge and practices. The various courses are also distributed in different faculties, streams and settings; the new training units are designed to be integrated into current streams, making the training more easily accessible.