bushfire&natural HAZARDSCRC

THE AUSTRALIAN NATURAL DISASTER RESILIENCE INDEX

A system for assessing the resilience of Australian communities to natural hazards

An Australian Government Initiative

CRC AUSTRALIA

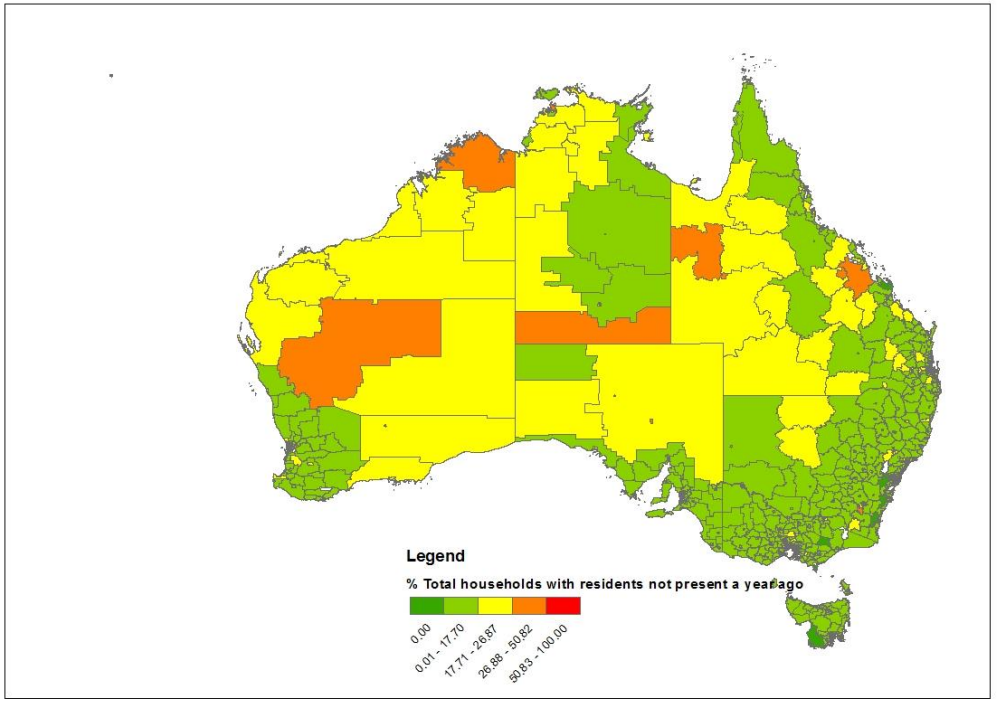
une University of New England

Project aim:

To develop an index that measures the current state of disaster resilience in Australian communities – the Australian Natural Disaster Resilience Index (ANDRI)

Major output:

State of Disaster Resilience report



TODAY'S TALK

1) Conceptual boundaries for the assessment of disaster resilience

2) Progress on indicator themes

3) Designing the State of Disaster Resilience Report

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ORIGINAL PAPER

The landscape of disaster resilience indicators in the USA

Susan L. Cutter[1]

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Abstract The landscape of disaster resilience indicators is littered with wide range of tools, scorecards, indices that purport to measure disaster resilience in some manner. This paper examines the existing qualitative and quantitative approaches to resilience assessment in order to delineate common concepts and variables. Twenty seven different resilience assessment tools, indices, and scorecards were examined. Four different parameters were used to distinguish between them—focus (on assets baseline conditions); spatial orientation (local to global), methodology (top down or bottom up), and domain area (characteristics to capacities). There is no dominant approach across these characteristics. In a more detailed procedure, fourteen empirically based case studies were examined that had actually implemented one of the aforementioned tools, indices, or scorecards to look for overlaps in both concepts measured and variables. The most common elements in all the assessment approaches can be divided into attributes and assets (economic, social, environmental, infrastructure) and capacities (social capital, community functions, connectivity, and planning). The greatest variable overlap in the case studies is with specific measures of social capital based on religious affiliation and civic organizations, and for health access (measured by the number of physicians). Based on the analysis a core set of attributes/assets, capacities, and proxy measures are presented as a path forward, recognizing that new data may be required to adequately measure many of the dimensions of community disaster resilience.

Keywords Disaster resilience indicators · Measuring community resilience · USA

1 Introduction

While not a new concept, resilience has burst onto policy agendas in the last few years largely due to three interrelated events. First, a series of prominent disasters (Hurricanes Katrina and Sandy, as well as the Great Eastern Japan, Christchurch and Nepal

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RESEARCH PAPER

Framing disaster resilience

The implications of the diverse conceptualisations of "bouncing back"

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Abstract

Purpose – To confront the increasingly devastating impacts of disasters and the challenges that climate change is posing to disaster risk management (DRM) there is an imperative to further develop DRM. The resilience approach is emerging as one way to do this, and in the last decade has been strongly introduced into the policy arena, although it is not new for DRM practitioners and researchers. Nevertheless, resilience is a highly contested issue, and there is no agreed definition of it, which has resulted in confusion for stakeholders when applying it to practice. Therefore, the purpose of this paper is to investigate how resilience is framed by researchers and DRM practitioners.

Design/methodology/approach – The analytical framework used was Hajer's "social-interactive discourse theory", combined with analysis of government documents, in-depth interviews with practitioners and observation of field and practices within the context of the Natural Disaster Resilience Program in Queensland, Australia.

Findings – One of the key findings is that the idea of "bouncing back" is central to the resilience discourse but different interpretations of this idea results in real-world implications. Three different ways (storylines) in which practitioners construct the meaning of disaster resilience emerge from this study. Importantly the divergences between these storylines reveal possibilities for reframing to occur and these could lead to different policy options and practices.

Originality/value – The results presented in this paper offer empirical evidence on how resilience is understood on the ground, contributing to extending resilience theory and informing DRM and resilience practice.

Keywords Climate change, Disasters, Disaster risk management, Resilience, Framing, "Bounce back"
Paper type Research paper

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PAPER - CONCEPTUAL BOUNDARIES OF THE INDEX

General properties of disaster resilience assessment	Properties of the Australian Natural Disaster Resilience Index (ANDRI)
Assessment purpose	
Top-down or bottom-up assessment	
Assessment scale	
Conceptual framework	
Structural design	
Indicator selection	
Data analysis and index computation	
Reporting and interpretation	

PAPER - CONCEPTUAL BOUNDARIES OF THE INDEX

General properties of disaster resilience assessment	Properties of the Australian Natural Disaster Resilience Index (ANDRI)
Assessment purpose	Audit at one point in time
Top-down or bottom-up assessment	Top-down assessment
Assessment scale	National scale
Conceptual framework	Capacities approach
Structural design	Hierarchical
Indicator selection	
Data analysis and index computation	
Reporting and interpretation	

PAPER - CONCEPTUAL BOUNDARIES OF THE INDEX

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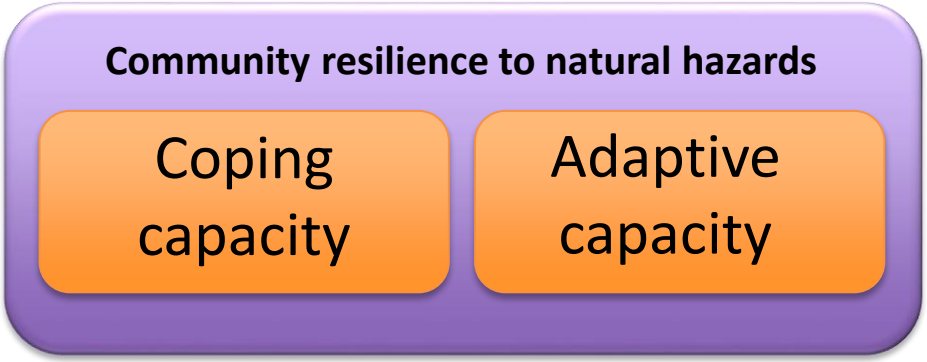
Assessment purpose	Audit at one point in time
Top-down or bottom-up assessment	Top-down assessment
Assessment scale	National scale
Conceptual framework	Capacities approach
Structural design	Hierarchical
Indicator selection	Themes of adaptive and coping capacity Data availability at national scale
Data analysis and index computation	Easily interpreted index Sensitivity and uncertainty
Reporting and interpretation	State of Disaster Resilience Report End-user operability

COPING AND ADAPTIVE CAPACITIES



The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster (UNISDR 2004)

The arrangements and processes that enable adjustment through learning, adaptation and transformation

Factors influencing the ability to prepare for, absorb and recover from a natural hazard event

The facilitation of adaptation by governance, institutional, management and social arrangements and processes.

COPING CAPACITY

Social capital

Social and demographic factors that influence ability to prepare for and recover from natural hazard events

Economic capital

Economic factors that influence ability to prepare for and recover from natural hazard events

Infrastructure and planning

Preparation for natural hazard events using strategies of mitigation or planning

ADAPTIVE CAPACITY

Emergency services

The presence, capability and resourcing of emergency services, warning systems and disaster response plans

Community capital

The cohesion and connectedness of the community

Information and engagement

Availability of natural hazard information, community engagement and partnerships to encourage risk awareness

Governance, policy and leadership

Organizational enablers of learning, adaptation and transformation

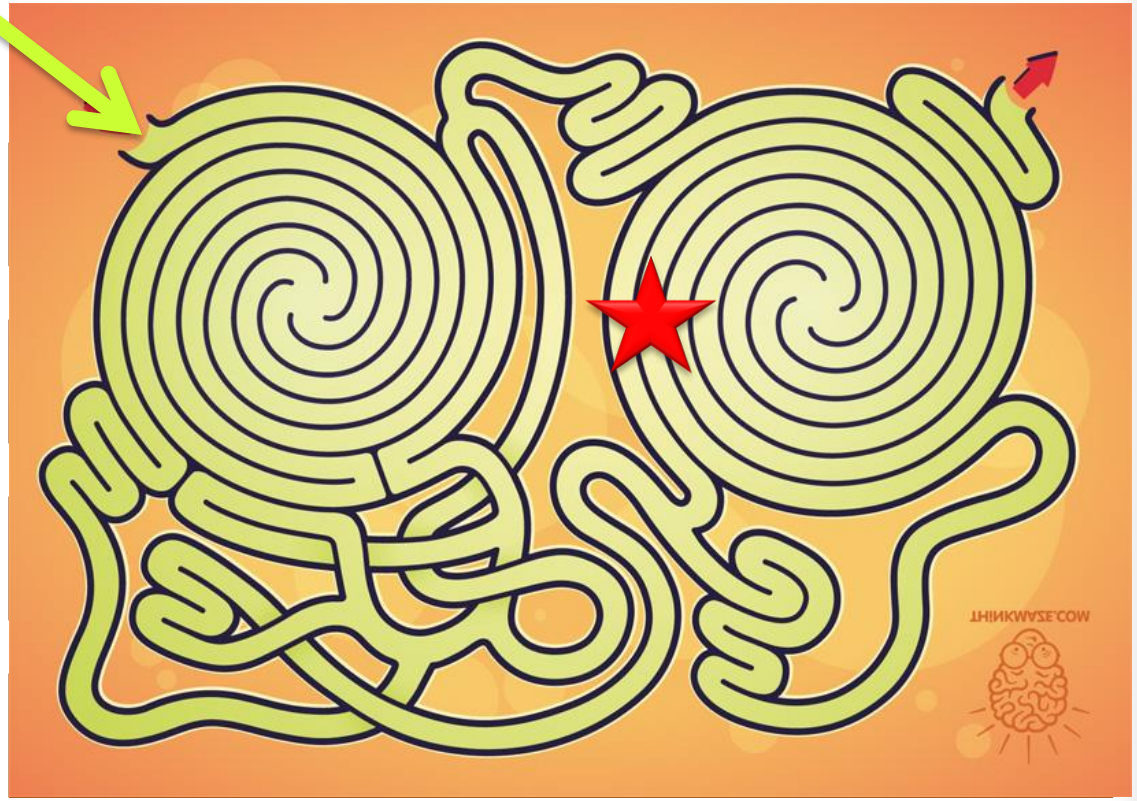
Community and social engagement

Social enablers of learning, adaptation and transformation

DATA COLLECTION

- Social capital
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement
- Governance, policy and leadership
- Community and social engagement

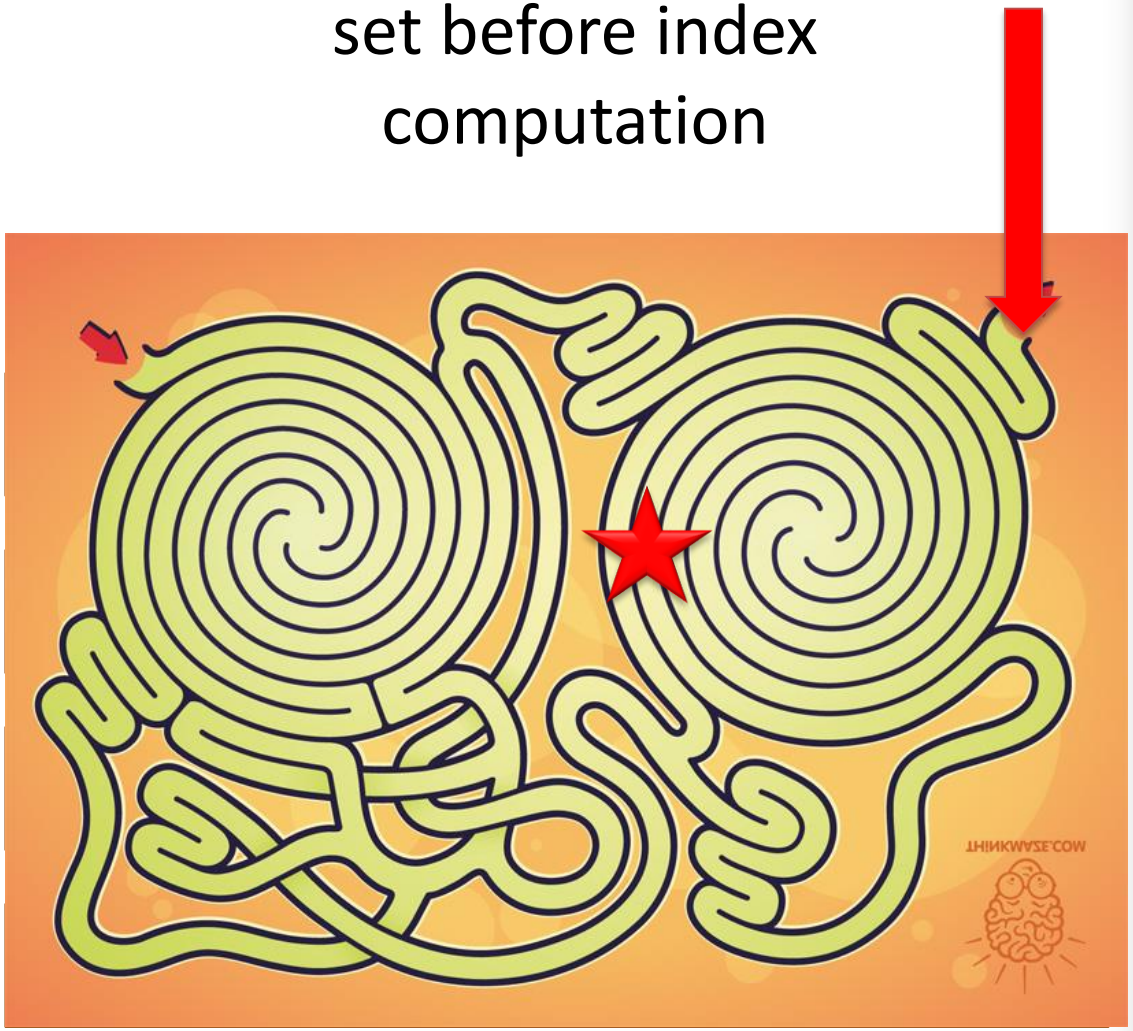
Education, Age, Income, Employment, Gender, Household structure, Migration, English language proficiency

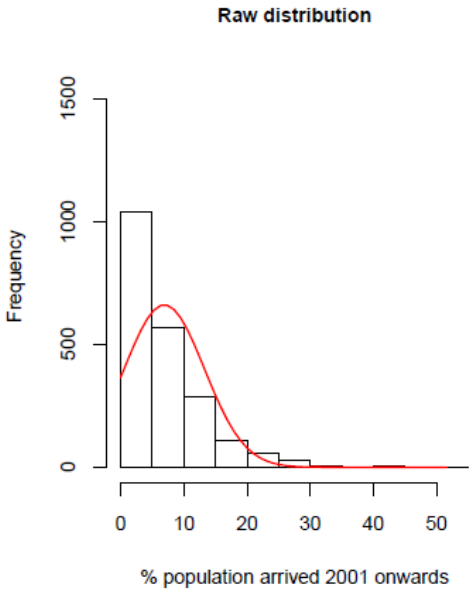


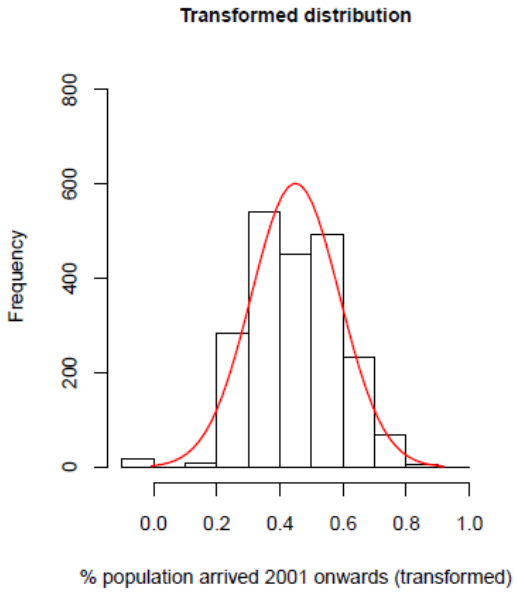
DATA COLLECTION

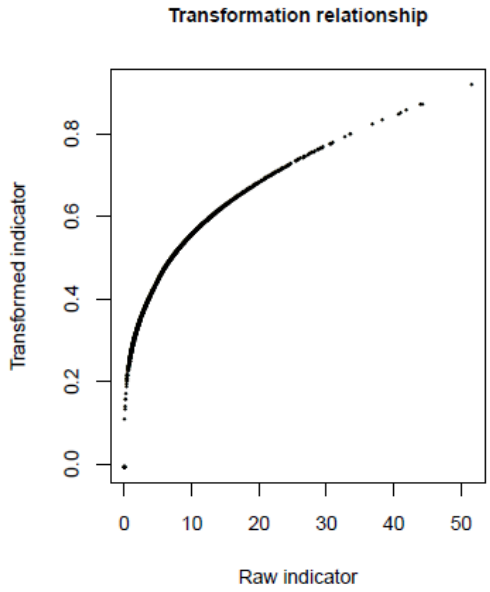
- Social capital
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement
- Governance, policy and leadership
- Community and social engagement

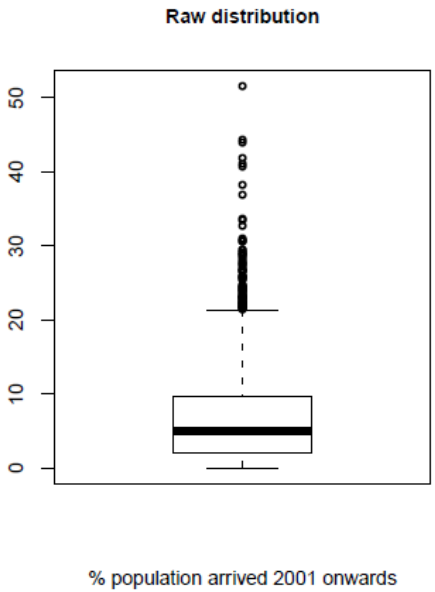
Need to collect the full data set before index computation

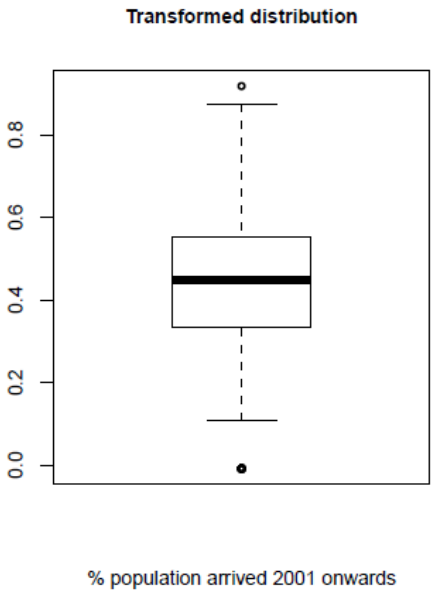












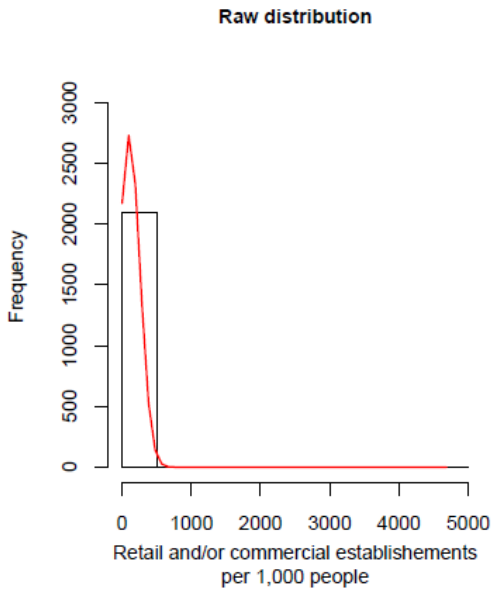
TRANSFORMATION DETAILS

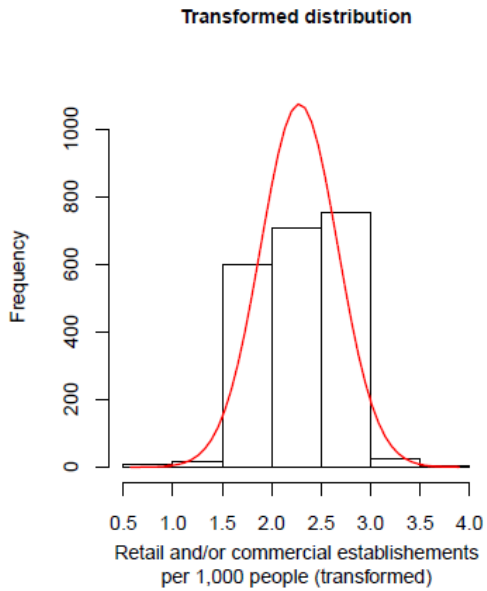
Reversed

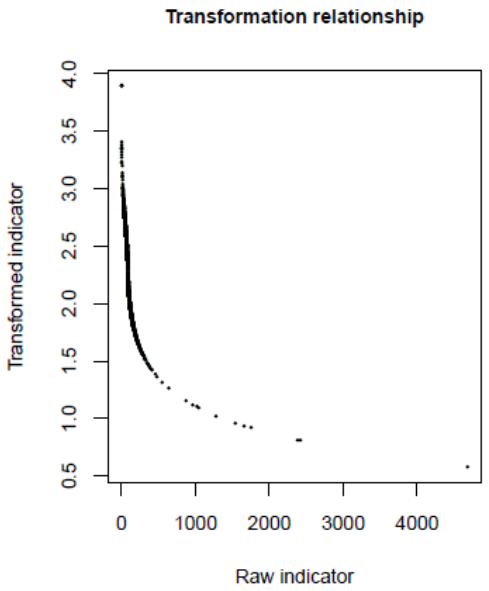
Skewness:
Power transform: 0.56
Pre−transform skewness: 1.8
Post−transform skewness: 0.0

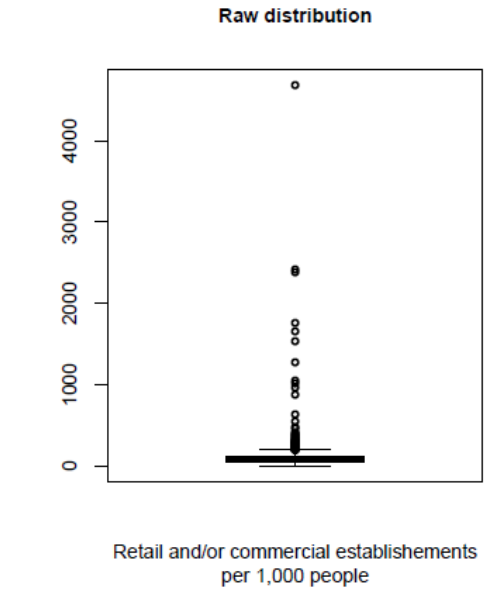
Kurtosis:
Power d−m: 0.81
Pre−transform kurtosis: 4.9
Post−transform kurtosis: 0.0

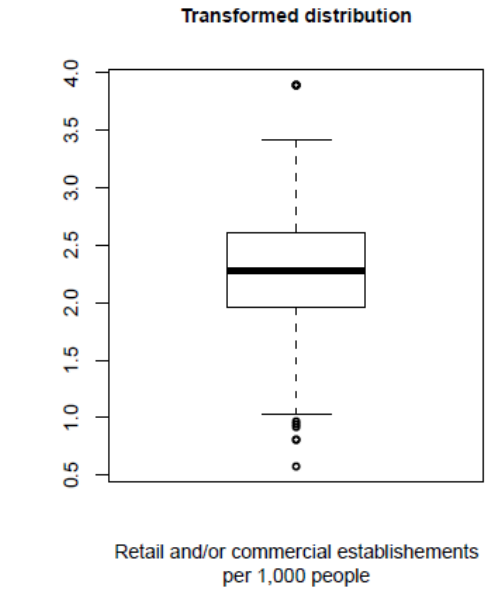
Outliers:
Pre−transform outlier count: 83
Post−transform outlier count: 19











TRANSFORMATION DETAILS

Unreversed

Skewness:
Power transform: 0.19
Pre−transform skewness: 18.0
Post−transform skewness: −0.0

Kurtosis:
Power d−m: 0.59
Pre−transform kurtosis: 441.1
Post−transform kurtosis: 0.0

Outliers:
Pre−transform outlier count: 88
Post−transform outlier count: 10

OVERVIEW OF THEMES

Social capital

Social and demographic factors that influence ability to prepare for and recover from natural hazard events

0 100

Completeness of data set

None

Data issues

Indicator dimensions

1) Immigration
2) Internal migration
3) Language proficiency
4) Need for assistance
5) Family composition
6) Household composition
7) Sex
8) Age
9) Education
10) Employment & Occupation

OVERVIEW OF THEMES

Economic capital

Economic factors that influence ability to prepare for and recover from natural hazard events

Completeness of data set

None

Data issues

Indicator dimensions

1) Home and car ownership
2) Income
3) Employment
4) Economy

OVERVIEW OF THEMES

Infrastructure and planning

Preparation for natural hazard events using strategies of mitigation or planning

Completeness of data set

Indicator dimensions

1) Dwelling type
2) Building codes
3) State and local emergency planning
4) Local land use planning for hazards

Data issues

- Scoring system for assessing emergency and land use planning capacity

OVERVIEW OF THEMES

Emergency services

The presence, capability and resourcing of emergency services, warning systems and disaster response plans

Indicator dimensions

1) Health response workforce
2) Emergency response workforce
3) Remoteness

Completeness of data set

Data issues

- Need regional numbers for:
  - Police, fire and ambulance personnel
  - SES/Fire Agency – staff & volunteers

OVERVIEW OF THEMES

Community capital

The cohesion and connectedness of the community

Completeness of data set

- None

Data issues

Indicator dimensions

1) Household support
2) Access to services
3) Wellbeing
4) Unemployment
5) Volunteering
6) Place attachment
7) Crime and safety

OVERVIEW OF THEMES

Information and engagement

Availability of natural hazard information, community engagement and partnerships to encourage risk awareness

Indicator dimensions

1) Community engagement and hazard education
2) Access to telecommunications

Completeness of data set

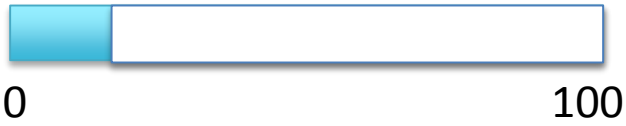
Data issues

- Obtaining comparable information about community engagement variables across States

OVERVIEW OF THEMES

Governance, policy and leadership

Organizational enablers of learning, adaptation and transformation



Completeness of data set

- None

Data issues

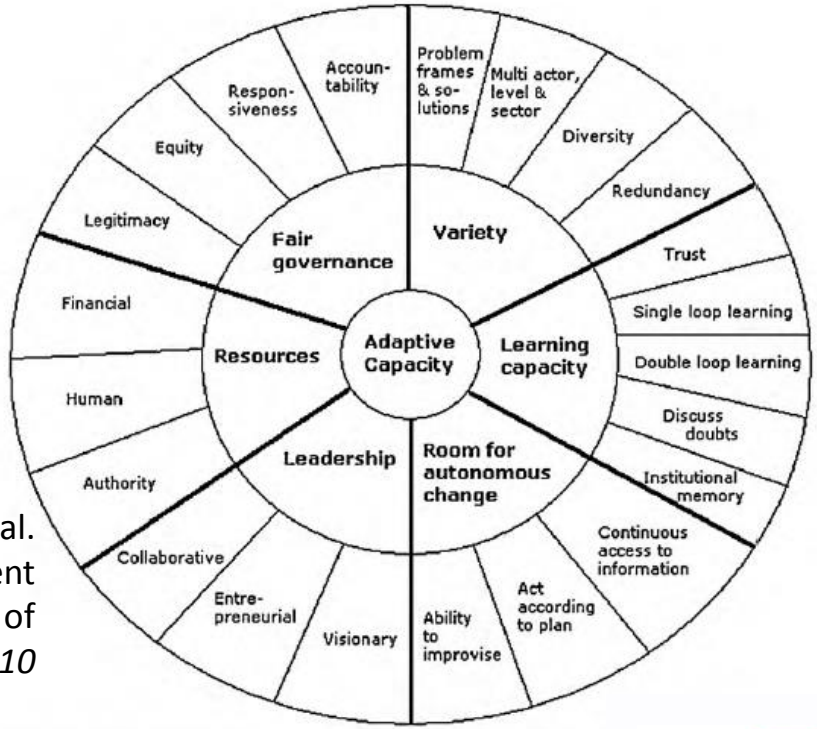
Indicator dimensions

1) Institutional character
2) Policy and legislation
3) Research and development

OVERVIEW OF THEMES

Governance, policy and leadership

Organizational enablers of learning, adaptation and transformation



Joyeeta Gupta et al. The adaptive capacity wheel. A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science and Policy, 2010*

Dimension	Indicators
Institutional character	Capacity for institutional learning Leadership Resource levels Capacity for institutional innovation
Policy and legislation	Age of legislation and policy Uptake of resilience strategic directions
Research and development	Expenditure on research and development

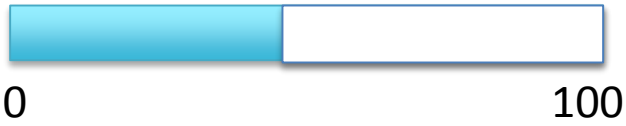
OVERVIEW OF THEMES

Community and social engagement

Social enablers of learning, adaptation and transformation

Indicator dimensions

1) Skills for learning
2) Social engagement

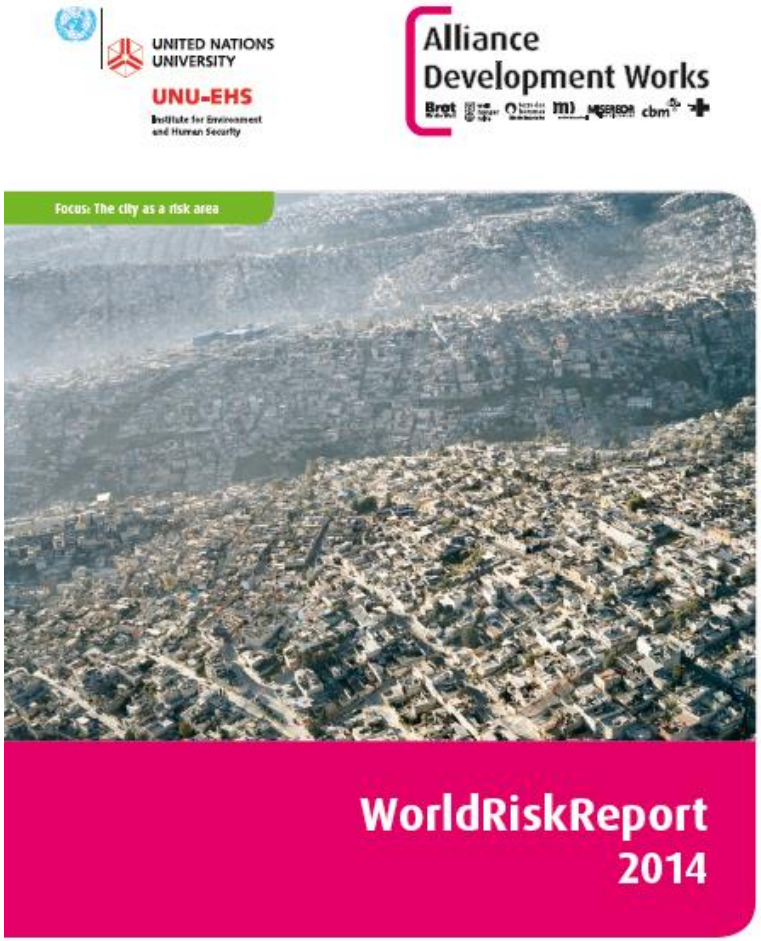


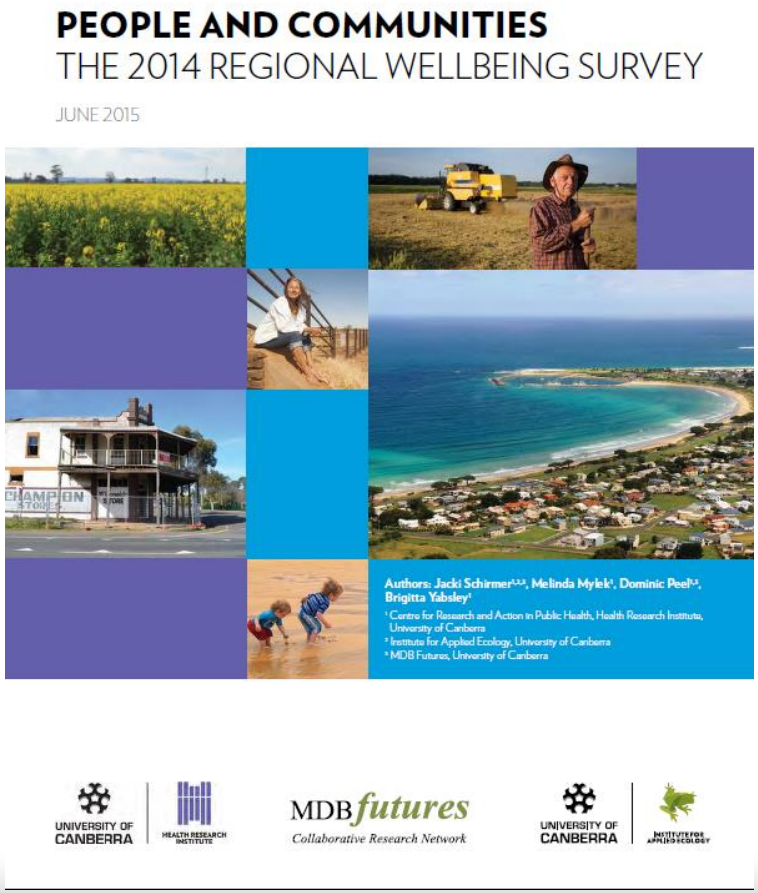
Completeness of data set

- Coverage of social engagement data in urban areas

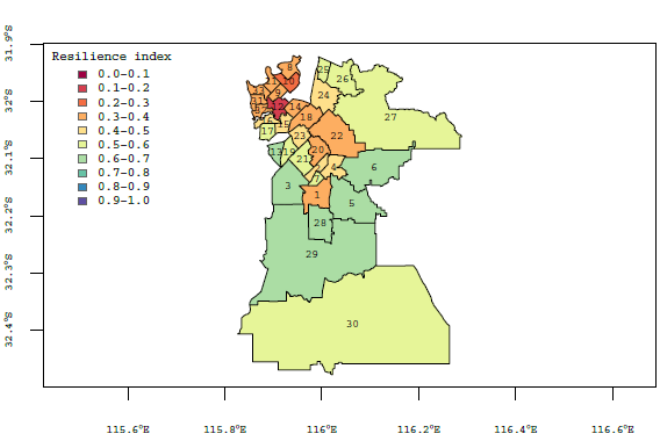
Data issues

DESIGNING THE STATE OF DISASTER RESILIENCE REPORT

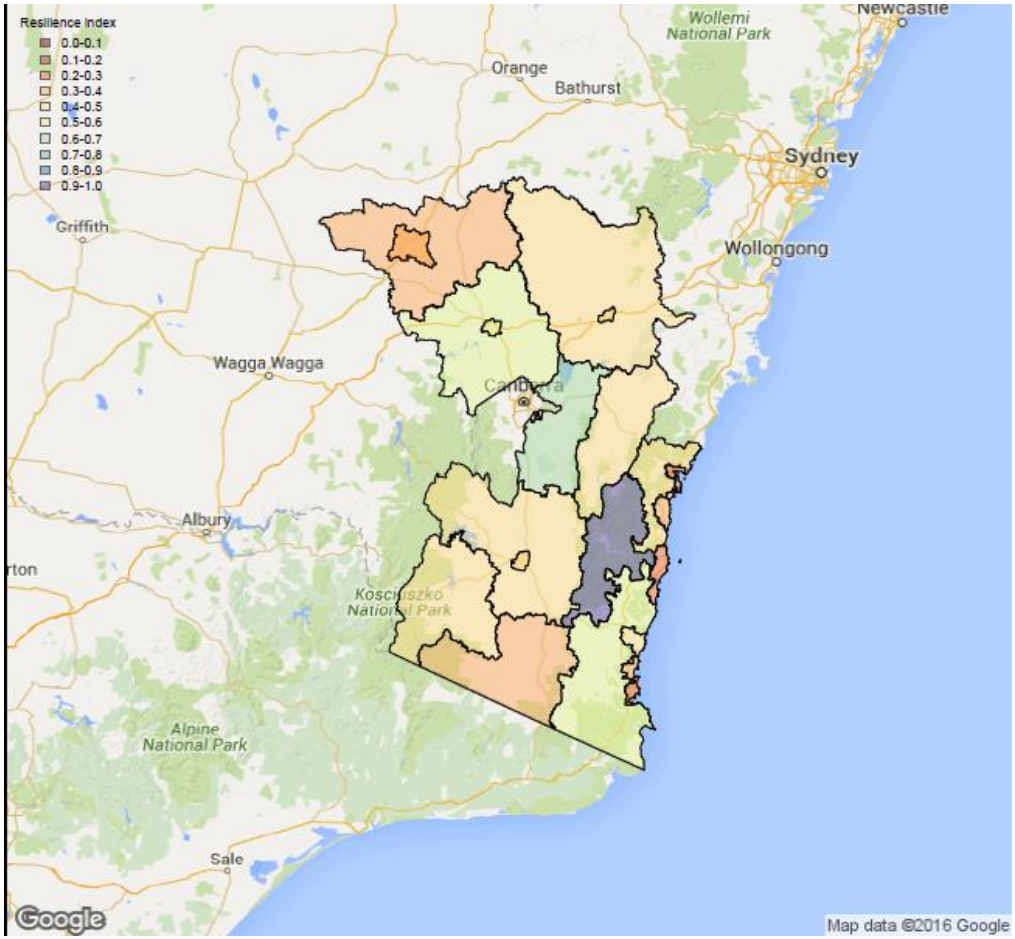




DESIGNING THE STATE OF DISASTER RESILIENCE REPORT



Key	SA2	ANDRI	Family income ($/wk)	% renting	% >75 yrs	% no English	RDI
1	Armadale - Wungong - Brookdale	0.33	1124	36.08	6.81	1.39	0.88
2	Camillo - Champion Lakes	0.43	1300	25.83	3.52	2.01	0.87
3	Forrestdale - Harrisdale - Piara Waters	0.66	2176	13.21	0.72	1.68	0.88
4	Kelmscott	0.45	1402	26.16	6.58	1.24	0.93
5	Mount Nasura - Mount Richon - Bedfordale	0.66	1876	8.86	5.12	0.37	0.91
6	Roleystone	0.69	1976	9.55	3.35	0.42	0.91
7	Seville Grove	0.54	1545	23.47	1.81	1.21	0.87
8	Belmont - Ascot - Redcliffe	0.32	1699	37.92	6.74	3.33	0.84
9	East Victoria Park - Carlisle	0.34	1827	42.96	5.28	3.85	0.87
10	Rivervale - Kewdale - Cloverdale	0.28	1473	40.24	6.99	4.65	0.87
11	Victoria Park - Lathlain - Burswood	0.34	1943	47.99	4.23	4.28	0.84
12	Bentley - Wilson - St James	0.19	1301	47.85	11.45	5.97	0.93
13	Canning Vale - West	0.63	2154	12.34	2.07	3.29	0.93
14	Cannington - Queens Park	0.34	1468	40.66	4.01	7.71	0.92
15	Parkwood - Ferndale - Lynwood	0.45	1566	21.38	6.12	4.50	0.95
16	Riverton - Shelley - Rossmoyne	0.40	1917	25.00	8.32	3.00	0.91
17	Willetton	0.53	1977	17.95	4.16	3.45	0.93
18	Beckenham - Kenwick - Langford	0.39	1317	28.13	3.38	7.01	0.92
19	Canning Vale - East	0.59	2060	16.25	1.81	4.06	0.93
20	Gosnells	0.33	1271	29.47	7.54	2.68	0.89
21	Huntingdale - Southern River	0.58	1832	18.02	1.74	2.37	0.90
22	Maddington - Orange Grove - Martin	0.36	1304	22.66	6.10	4.05	0.87
23	Thornlie	0.48	1589	19.87	4.05	3.99	0.92
24	Forrestfield - Wattle Grove	0.48	1671	20.03	4.71	1.61	0.85
25	High Wycombe	0.53	1670	19.17	3.95	0.84	0.83
26	Kalamunda - Maida Vale - Gooseberry Hill	0.58	1922	12.18	7.65	0.54	0.91
27	Lesmurdie - Bickley - Carmel	0.56	1913	12.38	6.69	0.80	0.89
28	Byford	0.61	1797	15.37	3.07	0.43	0.84
29	Mundijong	0.63	1808	12.79	2.48	0.40	0.81
30	Serpentine - Jarrahdale	0.54	1587	15.82	3.84	0.48	0.74
31	Como	0.32	2039	42.99	8.23	1.98	0.82
32	Manning - Waterford	0.37	2132	29.60	8.06	3.20	0.86
33	South Perth - Kensington	0.39	2527	42.30	5.12	2.13	0.75



PEOPLE

Phil Morley
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Ian Reeve
Martin Thoms
Sonya Glavac

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Paul Fletcher, SA MFB
Colleen Ridge, SES Tas
Holly Foster, EM Vic
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Suellen Flint, DFES WA
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