



On the disconnect between climate science & climate change adaptation: why aren't the insights & recommendations being implemented?

Anthony Kiem, Emma Austin & Danielle Verdon-Kidd
Environmental & Climate Change Research Group
University of Newcastle

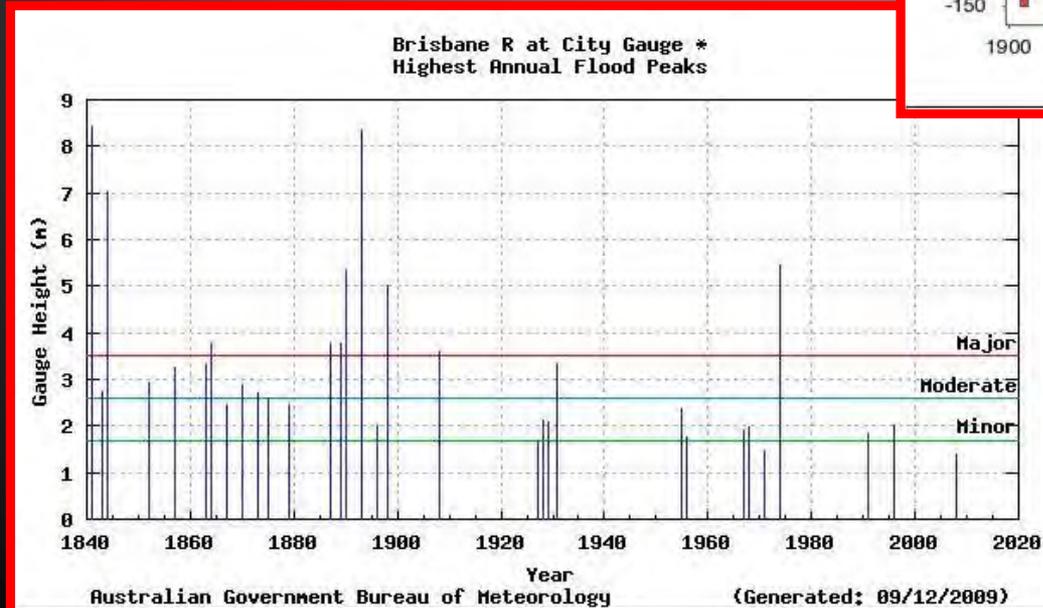
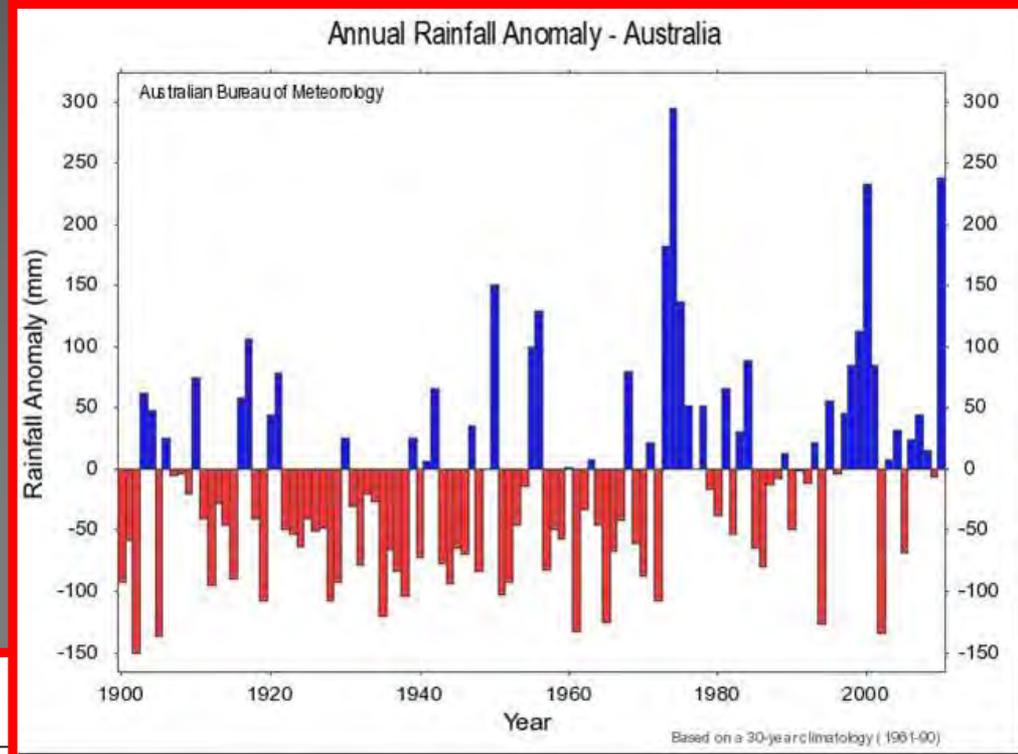


Summary

- Climate change and the need for adaptation
- Barriers and limits to adaptation
- Evidence of the disconnect
- Quantifying the disconnect
 - Initial findings NCCARF funded
 - Literature, interviews, scenario workshops
 - Currently qualitative, future quantitative
 - Online survey..... coming soon.....

Climate change: the need for adaptation

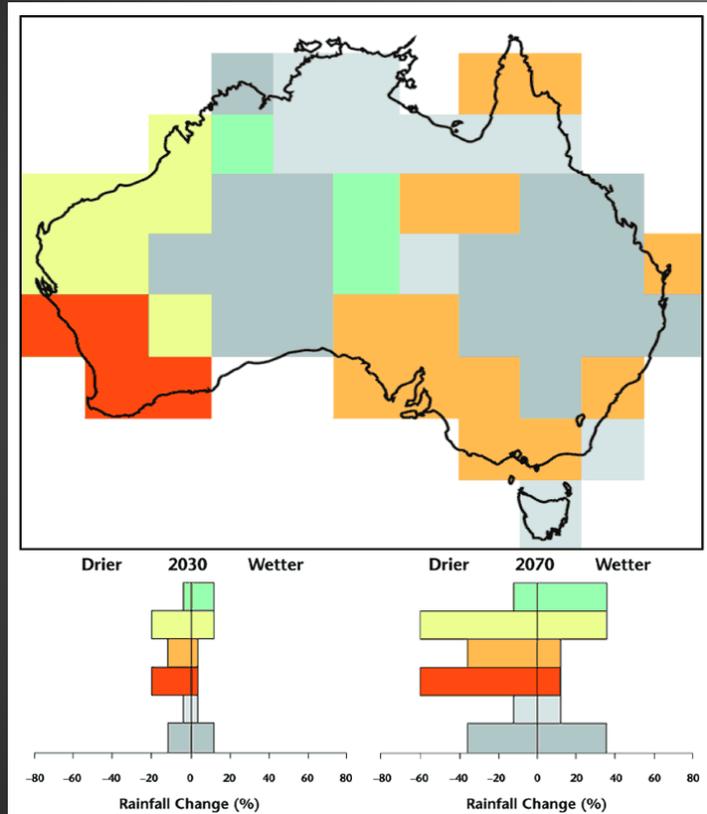
- Driest inhabited continent
- One of most variable rainfalls
- Natural climate variability
- Natural climate change
- Anthropogenic climate change



- Rural communities have traditionally adapted
 - Reactive vs proactive

Climate change: the need for adaptation

Over most of Australia, annual average temperatures are projected to increase by 0.4-2.0°C from 1990 levels by the year 2030 and by 1-6°C by 2070.³



Spatial distribution of projected changes in Australian precipitation (left) and temperature (right) in 2030 and 2070.

What is climate change adaptation?

- IPCC: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
 - Proactive, Autonomous or Planned
- Moser and Ekstrom (2010): Involving changes in social-ecological systems (SES) in response to actual and expected impacts of climate change in the context of interacting nonclimatic changes.
- Defining adaptation terminology is a science in itself
 - transformational vs incremental
 - resilience vs vulnerability

Barriers & limits to adaptation

- Adaptation is a necessity
 - Particularly in agriculture
- Considerable research has been, and continues to be, conducted in climate change adaptation

HOWEVER, THERE IS STILL MINIMAL IMPLEMENTATION OF WELL DOCUMENTED FACTS, THEMES AND RECOMMENDATIONS

- Why aren't solutions and priorities implemented?
- Barriers preventing implementation?
- How to overcome barriers?

Barriers & limits to adaptation

- Barriers to CCA
 - Moser and Ekstrom (2010)
 - “Obstacles that can be overcome with concerted effort, creative management, change of thinking, prioritisation, and related shifts in resources, land uses, institutions etc”
 - Overcoming all barriers does not necessarily = successful outcome
 - Unrealistic to expect no barriers
 - Be wary of maladaptation
 - Aimed at reducing/avoiding vulnerability BUT increases vulnerability elsewhere (Barnett and O’Neill, 2010)
- Barriers are focus of research



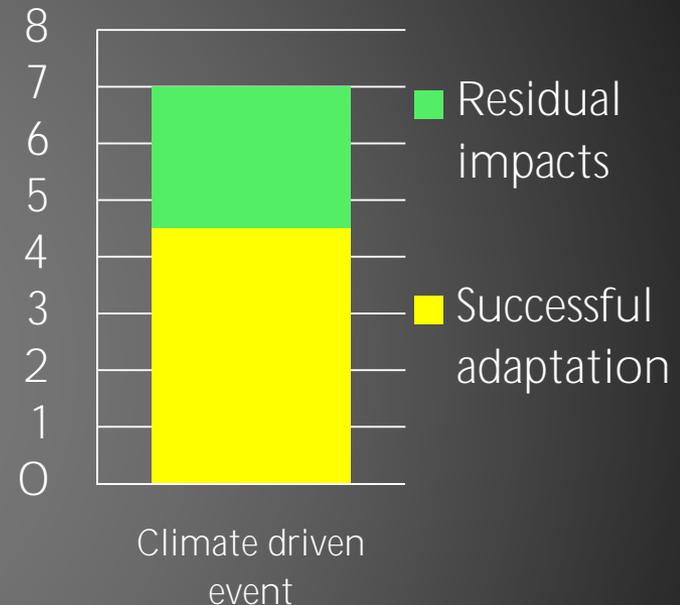
Barriers & limits to adaptation

- Limits to CCA

- Moser and Ekstrom (2010)

- Obstacles that tend to be absolute in a real sense
 - “Constitute thresholds beyond which existing activities, land uses, ecosystems, species, sustenance or system states cannot be maintained, not even in a modified fashion”

Limits to adaptation

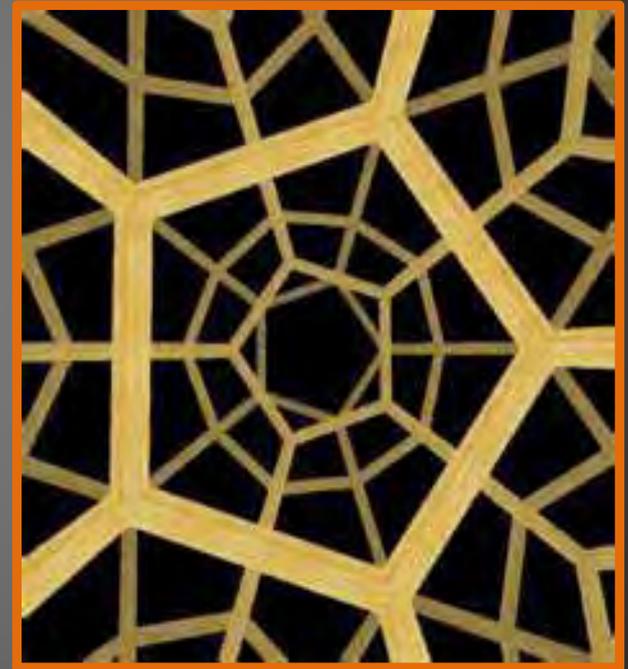


- Limits = residual impacts after adaptation

- See ongoing NCCARF Limits to Adaptation project www.nccarf.edu.au/node/541

Barriers to adaptation

- Moser and Ekstrom (2010) identify 4 important barriers that are repeated and intertwined throughout the 3 phase process of adaptation
- Barriers:
 1. *Leadership*
 2. *Resources*
 3. *Values and beliefs*
 4. *Communication and information*
- Significance varies according to context (governance), actors, system of concern and temporal/spatial scales



Source: <http://www.imaginify.org/post/index.php?name=News&catid=1>

All adaptation to date has at least 1 of these 4 barriers

Barrier: communication & information

- Cash et al (2003)
 - Salient
 - Credible
 - Legitimate
- Continuum
- Hindrances to interactions
- Effective communication = positive outcomes
- Information creation
 - Whether, which, who and how



Source: <http://caitlinhanzlick.com/reflection14.html>

Whether, which, who and how

| | Information creation | Qualitative evidence from preliminary research |
|---------|--|--|
| Whether | Climate science understanding | Information is available, but is not useful or easily understood |
| Which | Format Variable Temporal/spatial scale Extremes Usefulness | <p>30/30 interviewees believe that current climate science does not facilitate informed decision-making and therefore successful adaptation</p> <ul style="list-style-type: none"> •Biased sample group (all rural community) •Rigorous statistical analysis needed <p>Primary climate variables and averages aren't enough or useful</p> <ul style="list-style-type: none"> •Rural stakeholders need to know extremes <ul style="list-style-type: none"> •Heatwaves, droughts, floods, cyclones, frosts etc •Not readily available <ul style="list-style-type: none"> •GRDC project to commence soon..... |
| Who | Develops Delivers Receives | <p><i>"I was worried there for a while when we had all these drought initiatives and we're trying to tell people to come out and not be stuck at home etc, but they were saying 'well, every time I come out it costs me money, we have to get a babysitter etc'. There's a financial impact to every time they go out, because they've got to drive a car 15km for a start."</i></p> <p style="text-align: right;">Mayor, Buloke Shire</p> |

Whether, which, who and how

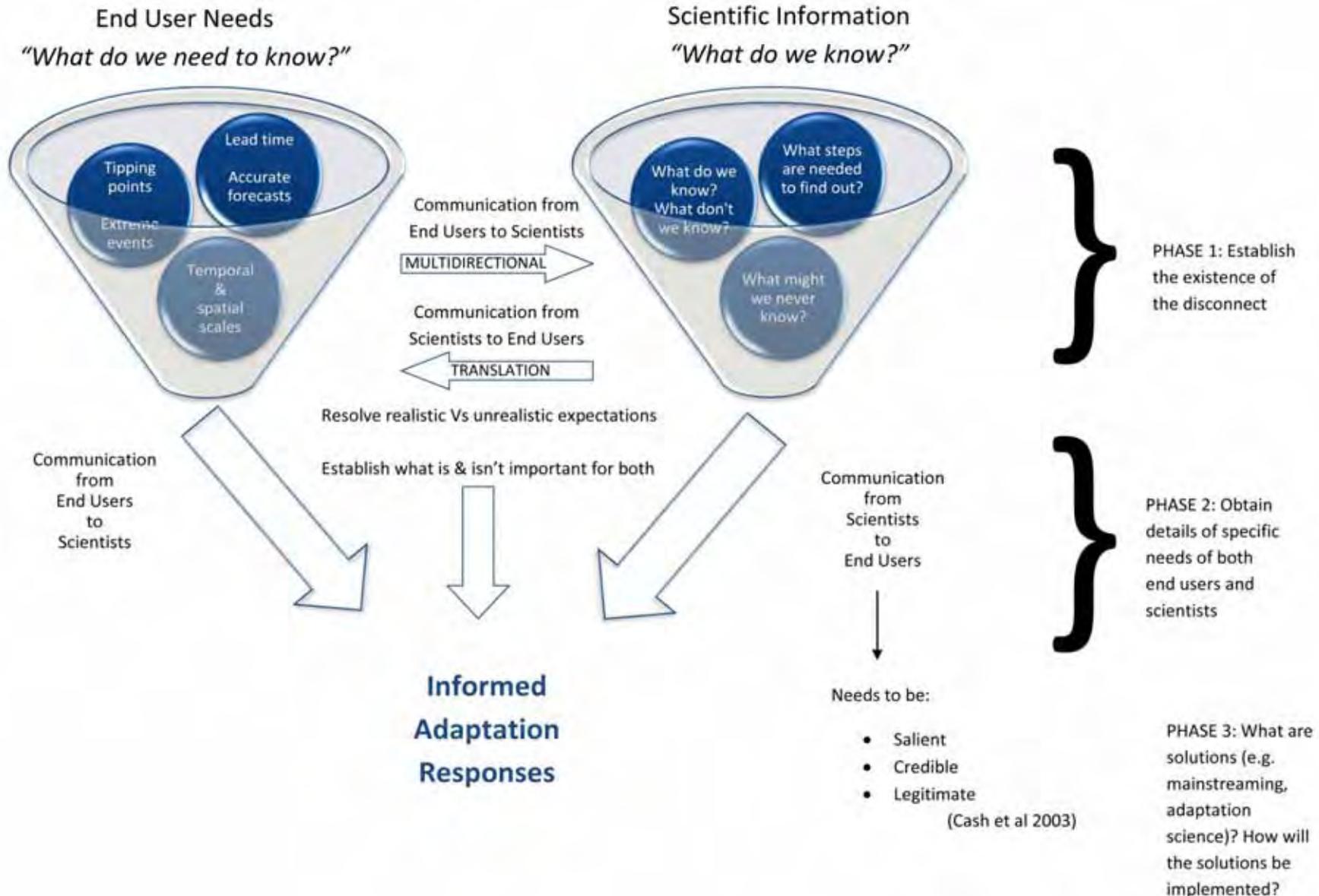
| Information | What | Qualitative evidence from preliminary research |
|-------------|---------------------------------------|---|
| How | Developed Provided Communicated | <p>Policy changes and funding have altered traditional methods of communicating</p> <ul style="list-style-type: none"> •Closure of research facilities in rural areas •Govt agency presence <p><i>“Having that [research facilities] just helps so much with an overall socio demographic when you’ve got people that have got their research PhDs behind them and are engaged in that learning and passing that learning on back to the community, not just here but Australia wide, and all of a sudden that’s lost.”</i></p> <p style="text-align: right;">CEO, Mildura Development Corporation</p> <p><i>“Basically we used to have DPI people walking around helping farmers with their problems. There would be farmers now who are 35 years old who have never met a bloke from DPI because they just don’t come to their farm. Once upon a time they did. We have a Shire of 7 000 people but not one DPI person servicing us at this point. I’m going to continue to labour that point with the government and say ‘where are you? You’re just not servicing us, you’ve gone missing.’”</i></p> <p style="text-align: right;">Mayor, Buloke Shire</p> <p>When asked about experience of scenario planning: <i>“It takes a lot of time. So I think what came out of it for a lot of them was the experience of going through this cycle rather than, the outputs, and the scenarios themselves.”</i></p> <p style="text-align: right;">Project Officer, Victorian DPI</p> |

Adaptation planning actors

- Assessments require close collaboration (Füssel 2007):
 - climate and impact **scientists**
 - sectoral **practitioners**
 - **decision-makers and other stakeholders**
 - policy **analysts**
 - Wide range of objectives, conceptual models, terminologies, background info, time horizons
 - Diverse group = formidable challenge

“Adaptation assessments performed exclusively by scientists will, however, most probably miss elements critical to the success of recommended actions in the real world”

The disconnect between climate science & rural community end users



Online survey

- Data collected will be used to quantify the **magnitude** & **cause** of the disconnect
- Example questions
 - In your opinion, what is the most important product of climate forecasts?
 - Temporal scale e.g. seasonal, monthly
 - Spatial scale e.g. regional, farm
 - Extreme events
 - Lead time
 - Accuracy
 - What sort of climate science information do you find most useful:
 - General Circulation Models (GCMs), i.e. projections and predictions
 - Storyline, i.e. comparisons of potential future scenarios
 - Stochastic, i.e. random, quantified uncertainty
 - Does your lack of resources prohibit or limit your ability to conduct adaptation planning?
 - Resources may include time, financial resources, expertise, information etc.
- Model relationships between variables



Conclusions

- A disconnect exists, it is enhanced in the climate science/rural community
- Qualitative studies indicate the magnitude of the disconnect is significant
 - There was widespread agreement that:
 - Climate science has limited usefulness for informed decision-making.
 - Current methods of communication act as a barrier to implementing well documented insights and recommendations for adaptation.

Conclusions

- Future research will focus on **why** the climate science has limited usefulness for rural communities and agriculture

To participate in the survey

- Please email emma.austin@newcastle.edu.au or
- Give your card with contact details to Emma