

**NCCARF/SEID**

**Climate Change Adaptation and Governance**

**Workshop**

16-18 November 2010  
University of New South Wales, Sydney

**Synthesis Report**



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# Climate Change Adaptation and Governance

## Introduction

Over the past decade there has been growing international concern over the need for adaptation to climate change on the part of vulnerable communities (IPCC 2007). This has also led to the emergence of contrasting approaches to the issues of governance in relation to mitigation and adaptation (Mastrandrea & Schneider 2010). Paradoxically, while there has been considerable refinement in the capacity of climate science to better model and understand the complex system that shapes local variability in climatic impacts, adaptive capacity is being found to be less dependent upon scientific understanding. In many cases the effectiveness of communities to adapt to the impacts of drought and extreme weather events such as coastal erosion is independent of any agreement about the cause. Whilst many farmers in rural Australia are highly sceptical of human-induced climate change, they are no less effective in adapting farming practices to increased drought conditions and diminished access to water as a consequence.

This is in marked contrast to the circumstances of climate change mitigation where very different challenges emerge, particularly in relation to the role of science and scientific evidence. For mitigation, the science of human-induced climate change needs to be broadly accepted before political action can drive the macro-economic and energy industry reform needed to address it (Diesendorf 2007, Schneider 2009). While mitigation strategies have involved a range of responses to reduce the wasteful use of energy and resources on the part of individuals, it is global population and economic growth, as well as equity issues between rich and poor countries, which will mean that such restraint or demand management will have only a limited impact on global greenhouse gas (GHG) emissions. The cutting of GHG emissions will require a move to non-carbon based energy systems, technological innovation and significant macro-economic reforms on the part of government (e.g. carbon taxes and/or emission trading schemes) (Stern 2006, Garnaut 2008). Government policy, economic instruments and price signals within markets can be expected to shift away from the reliance on fossil fuels by making renewable energy systems relatively cheaper, in turn attracting investment into their further development. However, as has been seen in relation to the FCCC meeting in Copenhagen in 2009 and in Cancun in 2010, there have been orchestrated efforts by those with economic interests to sway popular opinion to doubt the scientific consensus on the cause of climate change, and therefore undermine the legitimacy of governments to drive through economic and political reforms needed to address rising global GHG levels (Hamilton

2009, Oreskes & Conway 2010). In the case of China, India and other high-growth regions in Asia and South America, the priority to address GHG emissions in terms of enacting government policy to change energy and transport systems is low compared to the priority of maximising economic growth and achieving living standards comparable to that of the developed countries.

This paralysis in international governance, while affecting longer term adaptation planning capacity at a national level, has not necessarily diminished capacity and initiatives at the local government and community level. This is largely because at the local level the issue of climate change impacts can be treated as an extension of existing disaster recovery or extreme weather event management (such as coastal erosion and more intense and frequent bush fires) (Merson 2004). While the building of adaptive capacity in vulnerable communities may well require local government support, much of this capacity is dependent on other factors such as social capital. Brunner and Lynch (2010) in their study of the Alaskan community of Burrow, argue that their resilience in the face of extreme storm surges, inundation and coastal erosion was based their high social capital and the community's unique understanding of their local environment. The same attribute was found to be equally important in the effective response to natural disasters by communities in the alpine regions of rural Victoria (Tryhorn & Lynch 2010).

While advances in science play an essential part in helping to develop biophysical scenarios and in the monitoring of key variables necessary for more adaptive management strategies, the characteristics of adaptive resilience lie in the capacity of local community groups to organise and initiate innovative responses based on sound local knowledge. The lessons learned in relation to climate change impacts are not necessarily unique. They often follow the patterns of adaptation to past environmental change, especially where effective engagement by state agencies is supported by community-initiated and managed strategies. The case of the NSW Rural Fire service and regional fire management, and the success of local Landcare groups working with Catchment Management Authorities are cases in point. However, as we saw in the Victorian bushfire of 2009, past adaptive responses in the case of fire management and the behavioural norms of communities may not be adequate in the future as extreme weather events driven by highly unpredictable climate change conditions become more common.

It is clear that state planning and institutional support is needed to prepare for these longer-term or extreme climate change impacts. The issue is at what level of government and in what form such support should take (Urwin & Jordan 2008). One thing is abundantly clear, that both

'bottom-up' and 'top-down' capacity building is required if adaptation is to be coherent and sustained. However, in the area of state and regional planning there is an additional factor that has emerged in the broad literature on adaptation and governance that needs to be considered here. This is the 'wicked' nature of the problems involved. This notion of a 'wicked problem' was first developed by Rittel and Webber in a presentation they gave to the panel on Policy Science at the American Association for the Advancement of Science meeting in 1969. They provided an early outline of the difficulties of traditional scientific management and engineering engaging in effective planning and decision-making under conditions of high uncertainty and complexity. In listing some of the characteristics of 'wicked problems' in their paper 'Dilemmas in a General Theory of Planning', Rittel and Webber (1973) observed that they do have a continual feedback from the environment, and that the process of formulating the problem is interconnected with the process of finding the solution. In other words to ask all the relevant questions to gain information on the problem, you must already know all the conceivable alternative solutions.

This issue of uncertainty in complex systems was further developed by Hollings and Gunderson (2004) in relation to understanding the dynamic nature of ecosystem resilience where interdependent biological processes of growth, collapse and regeneration or 'panarchies' operate at different temporal and spatial scales. The sudden shift from one state to another in the whole system is difficult to explain or to adequately model. These findings led them to abandon the epistemological conceit of scientific certainty, and to call for an approach to problem definition that recognised the high levels of uncertainty and complexity. Hollings and Gunderson (2002) argued that policy and management strategies would therefore need to be adaptive and treated as hypotheses - subject to verification through monitoring key variables within ecosystems. They also argued that policies and management practices would need to be promptly abandoned when found to be inadequate or inappropriate. As Bormann et al (1994) observed in relation to adaptive management, it was a matter of 'learning to manage by managing to learn'.

These concepts have increasingly been applied in relation to climatic change adaptation. Some conservative economists have argued that because of the very high uncertainty of what the actual impacts of climate change will turn out to be, pre-emptive action would be more costly to the global economy than addressing the real events as they unfold. By contrast, Stern (2006) and Garnaut (2008) have argued against this position, and the same dilemma has begun to emerge in relation to responses of local and state governments to the threat of coastal erosion. With climate modelling that predicts more extreme storm surges and sand

erosion, what action should be taken? We have already seen highly polarised and publicised positions taken in the case of beachfront property owners in the Byron Shire on the north coast of New South Wales, with the Land and Environment Court of NSW overriding the Council's restrictions on land owners creating virtual sea walls at the boundary of their properties. However, building a sea wall to stabilise one property can have more adverse effects on public assets nearby, and in the longer term such expensive investment might only be deferring the necessity of people moving from some coastal regions as land use becomes unsustainable. Yet as we have seen in the case of the Byron Shire, policies recommending retreat from vulnerable coastal areas are being challenged on the grounds of the right of individual property owners to protect their properties and investment. Such legal and jurisdictional conflicts are likely to increase in the future with many coastal councils rapidly trying to establish the extent of their legal vulnerability and responsibilities in relation to future and past coastal developments.

There have been a number of research initiatives by local government to support decision-making in this area, and to help vulnerable communities come to terms with climate change impacts. These include studies by the Sydney Coastal Councils Group (2008), Gippsland Coastal Board in Victoria (2008) and the Sunshine Coast in Queensland (2010). It is in this context that the 'bottom-up' or community-based responses to emerging climate change impacts need to intersect with 'top-down' national and state planning processes. It is for these reasons that the NCCARF/SEID network decided to focus on this issue of Climate Change Adaptation and Governance as the central theme for its 2010 workshop.

## Bibliography

Bormann, B.T.; Cunningham, P.G.; Brookes, M.H.; Manning, V.W.; Collopy, M.W. (1994) *Adaptive ecosystem management in the Pacific Northwest*. Gen. Tech. Rep. PNW-GTR-341. Department of Agriculture, Forest Service, Pacific Northwest Research Station, USA

Brunner, R & Lynch, A. (2010) *Adaptive Governance and Climate Change*, American Meteorological Society

Deisendorf, M. (2007) *Greenhouse Solutions with Sustainable Energy*, UNSW Press

Garnaut, R. (2008) *Climate Change Review: Interim Report*, Commonwealth of Australia

Gippsland Coastal Board (2008) *Climate Change, Sea Level Rise and Coastal Subsidence along the Gippsland Coast*, July 2008

Hamilton, C. (2009) *Requiem for a Species: Why we reject the truth about Climate Change*, Allen & Unwin, Australia

Holling, C.S. & Gunderson, L. (2002) *Panarchy: Understanding Transformations in Human and Natural Systems*, Island Press, USA

IPCC (2007) Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds) Cambridge University Press, UK & USA

Mastrandrea, M.D.; Schneider, S.H. (2010) *Preparing for Climate Change*. MIT Press, October 2010

Merson, J. (2004) 'Climate Change and Ecosystem Stress: The Impact of increased forest fire frequency and intensity on Australian protected and World Heritage areas'. Proceedings of *Global Synthesis Workshop on Biodiversity Loss and Species Extinction: Managing Risk in a Changing World*, IUCN 2004.

Oreskes, N.; Conway, E. (2010) *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*, Bloomsbury Press, UK

Rittel; Horst; Melvin Webber (1973) *Dilemmas in a General Theory of Planning*, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, pp. 155–169, 1973

Schneider, S. (2009) *Science as a Contact Sport: Inside the Battle to Save the Earth's Climate*, National Geographic, USA

Stern, N. (2006) *The economics of climate change: the Stern review*, Great Britain Treasury

Sydney Coastal Councils Group (2008) *Case Studies of Adaptive Capacity*

Sunshine Coast (2010) *Climate Change and Peak Oil Strategy*

Tryhorn, L.; Lynch, A. (2010) *Climate Change adaptation in the Alpine Shire of Australia: a decision process appraisal*, Policy Sciences Vol 43: 105-127

Urwin, K.; Jordan, A. (2008) *Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of government* Global Environmental Change, vol. 18, pp. 180-193

## The Workshop

In the planning of the 2010 NCCARF/SEID workshop an informal committee was established that included John Merson (UNSW), Jon Barnett (University of Melbourne) and Stephen Dovers (ANU), with coordination and administrative support provided by Sarah Terkes (UNSW) and Tina Soundias (University of Melbourne).

It was in the context of the broad issues outlined above that the committee decided to hold a three day workshop on Climate Change Adaptation and Governance in November 2010 at UNSW. In August a flyer announcing the workshop and the issues it proposed to address was sent out to all members of the SEID network and also advertised on the NCCARF website. The flyer invited the submission of a 300 word abstract that focused on adaptation and governance case studies by the end of September. Over fifty applications were received from researchers and project managers in Universities, local and state government agencies, and NGOs from across Australia and the Asia/ Pacific region (Appendix 2).

It was decided at the outset that, with the exception of the SEID Adaptation College members (around 20), only those presenting papers would be able to attend. This meant that we were able to invite 51 of the applicants of produce a short paper of at least 2000 words (based on their abstract) to be submitted by the end of October. The task of structuring an effective workshop with fifty one presenters was challenging, but the diversity and the quality of the papers made it hard to get below that number. Given the principle adopted for the workshop of having equal time for discussion and presentations, it was decided to run parallel sessions, but to stagger the starting times. This would make it possible to attend all presentations, but not diminish time for discussion (Appendix 3).



Also included in the schedule was a series of half hour plenary discussion times at midday and in the evening of the first two days. The morning of the third and final day of the workshop was devoted to a review of the workshop and its outcomes, which included a recommendation for a follow up survey, the results of which are included in this report (Appendix 1).

The afternoon of the final day was devoted to a field trip to Botany Bay led by A/Professor Paul Brown (pictured, 3rd from left).



## Program Structure

The workshop's program was a natural outcome of the spectrum of papers received. These ranged from papers addressing the conceptual issues of adaptation and governance to those focusing on community, local and state level governance issues. There was a cluster of papers that focused on natural resources, rural landscapes and ecosystems, and another cluster that dealt with the specific issue of adaptation in developing countries in the Asia Pacific region.

To give the workshop a logical structure it was decided to start the program with papers that focused on the broad theoretical issues and then move onto community and local governance; regional and rural/natural resource systems; and finally those with specifically international focus. This thematic division served primarily to cluster papers, as there were many equally strong interlinking themes between sessions. These themes were picked up where possible during the panel discussions that occurred at the end of each morning and afternoon session. On the opening day, Jean Palutikof provided an introduction to NCCARF and her perspective on the issues of adaptation and governance. She was also a panelist along with Ron Cox (Convenor of the NCCARF Settlement and Infrastructure Network). Other panelists and session chairmen were John Merson, Jon Barnett, Stephen Dovers, Paul Brown, Tim Bonyhady, Betsi Beem, Jim Falk and Judy Lawrence.



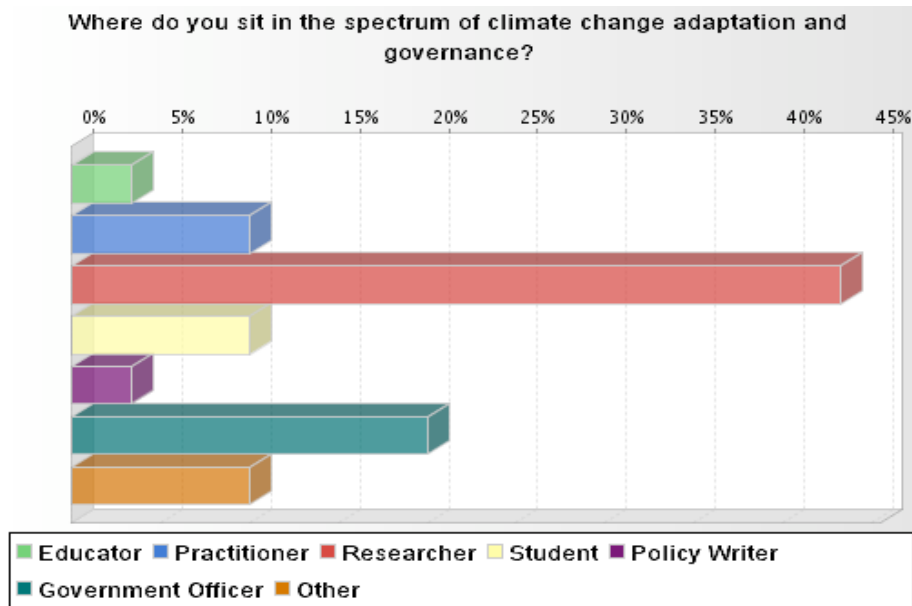
Wendy Steele's presentation on Adaptive Governance and Climate Change: the challenge for cities



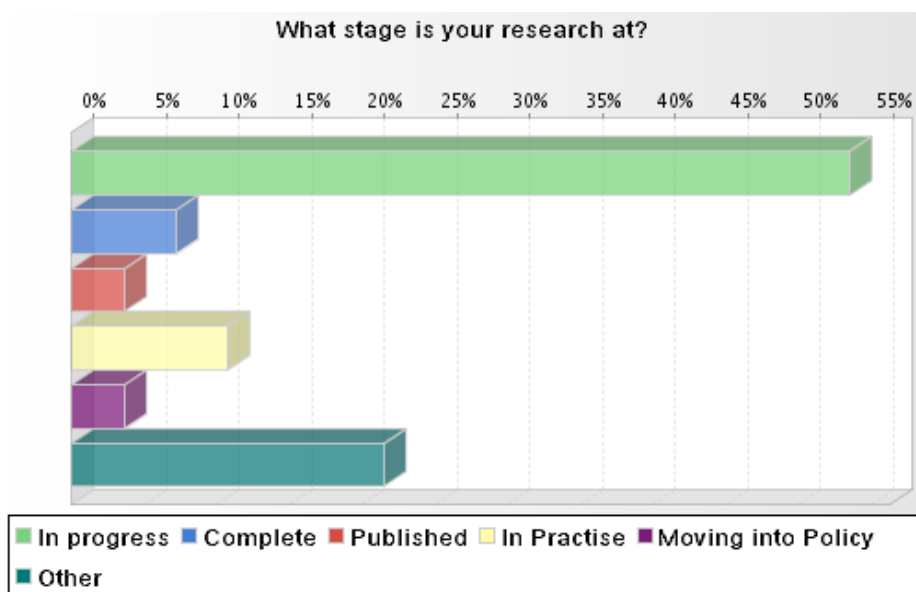
Lunch break in the courtyard

## Outcomes

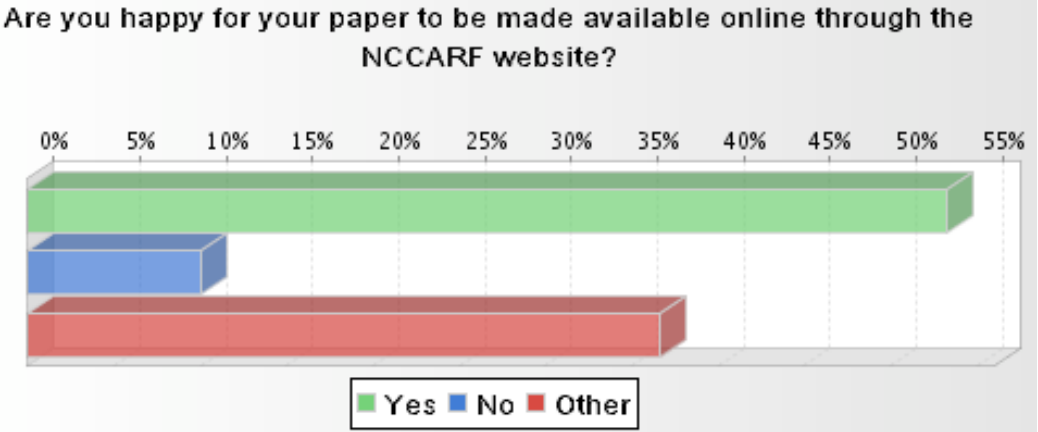
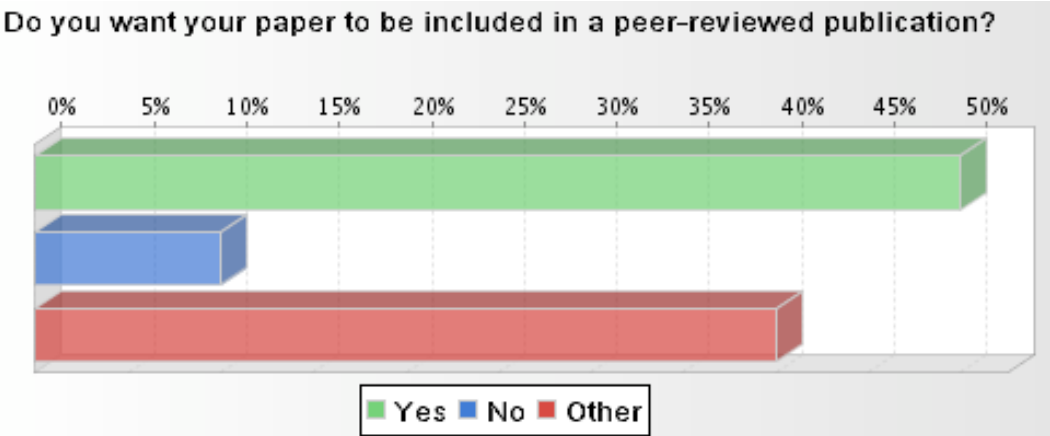
There were a number of workshop objectives that could only be addressed in the discussion on the final day and resolved in the subsequent survey. The survey was useful in obtaining insights from those directly engaged in the issue of adaptation and governance. The following data represent the two thirds of participants who have responded at this stage.

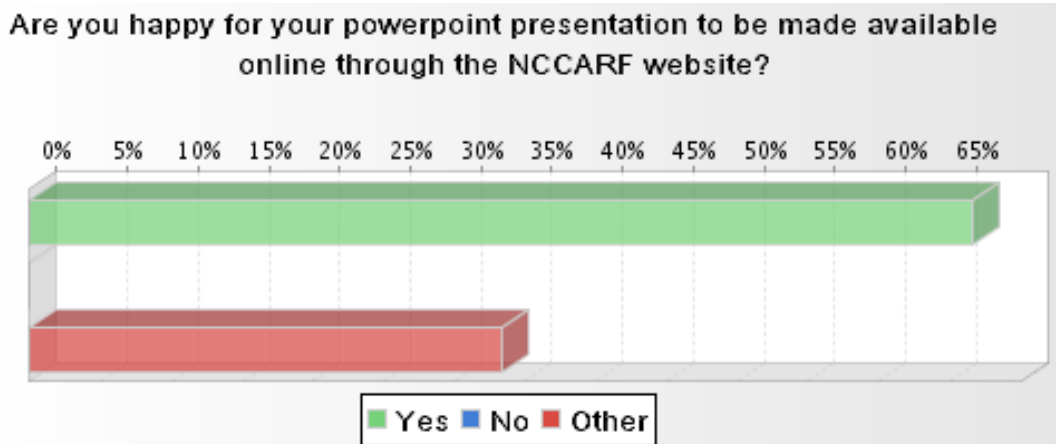


The survey also aimed to get some perspective on the stage of the research presented and what use might be made of the research findings following the workshop.



There was wide recognition of the value of the case studies presented and the insights they provided. A significant issue for the participants was what options there were for this material to be published. It was decided that the survey would help clarify the options. One proposal was for a peer reviewed collection of the more academically oriented papers, and another was to simply provide access to the existing short summary papers (approx 2000 words) through the NCCARF website. There was also the matter of access to the presentations and this option was also included in the survey.

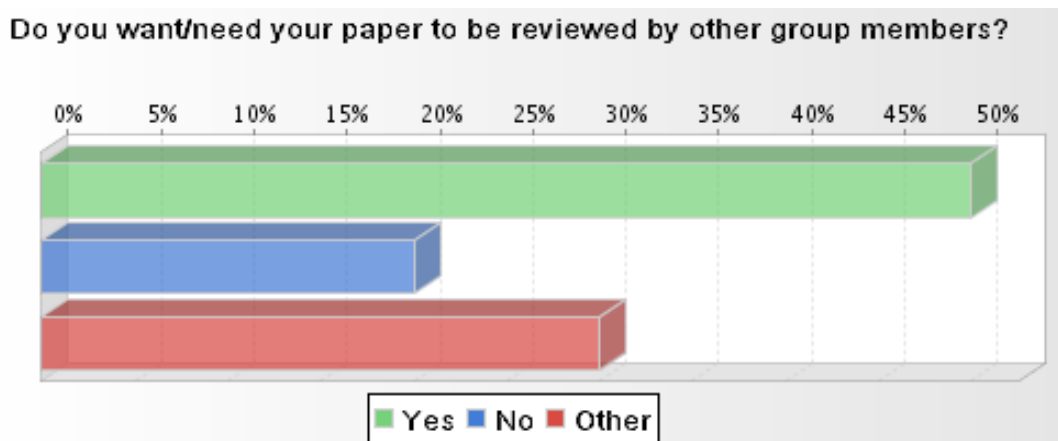




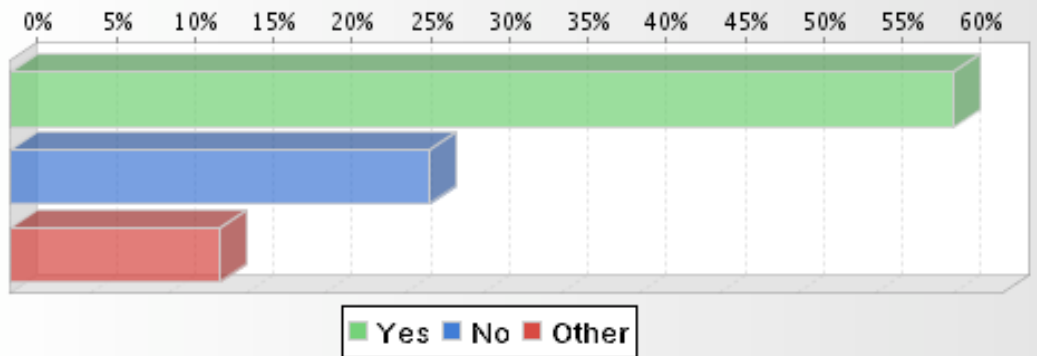
On the basis of the survey responses received so far fifty per cent of participants were keen on the option of putting together either a special edition of a journal, or a peer reviewed publication.

Fifty five per cent were also happy to have their existing short conference paper made available on the NCCARF website, and sixty eight per cent wanted their presentations made available through the NCCARF website and linked to the workshop. A further review of these options will be undertaken in the New Year.

A second significant outcome was the enthusiasm of participants for the approach taken in the workshop and its capacity to bring together such a diverse and interesting group of academic researchers, government planners, advocates and activists. In terms of the effectiveness of the workshop and the SEID Network to stimulate longer term collaboration amongst participants, this is reflected in their preparedness to have their own work peer reviewed (50%) and their willingness to peer review the work of others (60%).



**Are you willing to peer-review other people's papers?**



While these survey results are only indicative of participant attitudes, the potential for building this network further seems very positive, and could well be a useful resource in relation to future workshops. There was also recognition of where some of the significant gaps in research lay, and also an increased awareness of alternative approaches to engaging with and supporting communities in building adaptive capacities. A more detailed perspective on participant's views on the content and value of the workshop is available in Appendix 3.

**Participant Organisations represented in Feedback:**

- |  |  |
|--|--|
| University of New South Wales                  | Alam Sekitar Malaysia Sdn. Bhd.                              |
| University of Adelaide                         | Ecohaus Benchmark for Homes Pty Ltd                          |
| University of Manchester                       | NT Department of Health and Families                         |
| Melbourne University                           | City of Rockingham, WA                                       |
| Southern Cross University                      | Department of Sustainability & Environment                   |
| Australian National University                 | Lancaster Environment Centre, UK                             |
| Bond University                                | Dept of Sustainability and Environment, Victoria             |
| Curtin University                              | Tasmania Dept Primary Industries, Parks, Water & Environment |
| James Cook University                          | Department of Primary Industries, VIC                        |
| Griffith University                            |  |
| RMIT   |  |
| Victoria University – Wellington, NZ           |  |
| Stockholm Resilience Centre                    |  |
| Local Government and Shires Association of NSW |  |

## Workshop Participants

### Panelists & Chairs

Jean Palutikof (NCCARF)  
John Merson (UNSW)  
Jon Barnett (UMELB)  
Paul Brown (UNSW)  
Ron Cox (UNSW)  
Stephen Dovers (ANU)  
Tim Bonyhady (ANU)

### Presenters

Alex Baumber  
Alex Gold  
Alice Bergonia  
Alison Browne  
Alvin Chandra  
Amy Lovesey  
Anne Leitch  
Asa Persson  
Awais Piracha  
Betsi Beem  
Carolyn Hoffmester  
Chi Truong  
Claire O'Neill  
Douglas Bardsley  
Edward Boydell  
Elissa Waters  
Fiona Miller  
Jacki Schirmer  
Jim Falk  
Johanna Mustelin  
Johannes Luetz  
Judy Lawrence  
Julie Davidson  
Karlie Tucker  
Kath Fisher  
Katherine Daniell  
Kim Byrnes  
Laura Stocker  
Lawrence Yu  
Li Wang  
Lorraine Bates

Martin Rice  
Melanie Bainbridge  
Michelle Croker  
Nadine White  
Nahid Sultana  
Natasha Kuruppu  
Neil Lazarow  
Patricia Fitzsimmons  
Pedro Fidelman  
Peter Glynn  
Philip Ireland  
Phoenix Lawhon-Isler  
Riyanti Djalante  
Roslyn Taplin  
Simon Niemeyer  
Siri Veland  
Syed Mohazri  
Taniela Faletau  
Timo Leiter  
Wendy Steele

### Adaptation College

Andrew Sullivan  
Carol Farbotko  
Carolina Roman  
Emma Woodward  
James Smith  
Jennifer Cane  
Jennifer Harrison  
Kate Wood  
Kirsten Maclean  
Marie Waschka  
Naomi Rakela  
Neil Collier  
Saffron O'Neill

## Appendix 1: Participant Feedback

This is a summary of the feedback given by participants of the workshop. This feedback has been left in its original form wherever possible. However, for publication purposes, some of the text has been edited to provide clarity when read alone. Not all comments have been included due to duplication.

### Key insights gained from the workshop participants

- There is a lack of comprehensive social science research on the issue of climate change adaptation and governance.
- There is a need to critically analyse and evaluate the policy governance process.
- Whilst difficult, there is a need to engage stakeholders. An international comparison would highlight whether engagement challenges and methods are unique to Australia, or if there are more general lessons to be learnt.
- Any low-cost policy response to climate change will need to involve substantial behavioural change. However, this needs the right incentive and partnership structure to promote adaptation at a local level.
- Adaptation is closely intertwined with development activities and needs to be integrated with broader business sector, regional and local planning processes, as well as at the individual project level.
- All levels of government should synchronise efforts for climate change adaptation.
- There is a need to transfer policy/governance concepts into more concrete systems/processes so that concepts can be implemented and tested.
- We are making progress linking research with policy development. However, the process is going to take time, especially when dealing with different audiences and needs.
- In many cases, policy development using evidence alone (as opposed to assumptions or modelling) is unsatisfactory. Once the evidence is available, it may already be too late to resolve the problem.
- In contrast, research is necessary to test theories in order to demonstrate what works.
- NCCARF could include political/economic issues and human behavioural psychology research in its' research agenda and for discussion at further sessions. In this context, the NZ Climate Change Centre (a grouping of climate change researchers in NZ) is hosting a social science session on 6 December and there might be some synergies with this group.
- There are significant challenges of governing adaptation to sea-level rise, as well as challenges of avoiding maladaptation.
- It is important to make academic research accessible to local and state government practitioners and researchers.
- There is a need to collaborate and shift traditional ways of research away from a specific group or context, eg academic or government. It is also important to appreciate that the process (the how) is as important as the content (the what).
- It would seem that people are at a similar stage of thinking about adaptation; it would be good to have a workshop that synthesises and develops those ideas further.
- There has been very little work done to inform the social or policy requirements to achieve climate change adaptation.
- Some interesting insights to the legal implications of conducting risk assessments were raised.
- There is a need for interdisciplinarity and new conceptual frameworks for considering climate change adaptation. Commonalities in quite different types of research suggest that there are potentially strong links between researchers within the network.
- There is a lot of research looking at definitions and theory, but much less looking at

adaptation and governance on the ground.

- There should be greater community consultation, key stakeholder engagement, and grassroots-derived research.
- There is an impressive range of work being done on governance and climate change. However, it is hard to say whether much progress is being made - a major synthesis of the research program would be helpful at this point, particularly to highlight the gaps.
- It is important to have an explicit understanding of our vulnerability to climate change to ensure appropriate adaptation strategies are developed.
- Collaborative research requires true collaboration between researchers and policy makers. Consideration is required on how to incorporate policy makers in the design and execution of the research to ensure research influences policy outcomes.
- A wide range of deliberative processes are being undertaken with a range of stakeholders and these are not necessarily benefitting the stakeholders. True deliberation requires stakeholders to participate in the research, commencing at the design phase.

## **Best aspects of the workshop**

### **Summary of the responses:**

12/30 = 40% = Networking / meeting people / sharing

12/30 = 40% = Program design / discussion time

10/30 = 33% = Learning from others / gaining insights

8/30 = 26% = The mix of researchers & practitioners

### **Details of responses:**

**Q:** What were the best aspects of the workshop for you?

**A:**

- It was well organised with good time to present, discuss and network.
- It was good to hear practitioner perspectives.
- It was good to learn about adaptation challenges and governance responses in Australia, as well as networking with other researchers.
- The opportunity to discuss cases through panel discussions was welcomed.
- It was important to learn what has been done by others and to understand the magnitude of problems faced by the different levels of governance within a country.
- It was good to network with Adaptation College Fellows and have reinforcement of themes/issues that need addressing (e.g. interdisciplinarity; research-policy-practice nexus; learning from other sectors).
- Networking and the ability to share a practical project with a mixed audience of practitioners and researchers.
- The field trip was relevant in being able to see climate change issues on the ground.
- Hearing about the research of others and discussing this both one on one and within the group was helpful from a New Zealand perspective, and to find synergy across work going on in Australia.
- For policy officers using research, these events offer an opportunity to network with current researchers and have more robust discussions. While there were limited opportunities for this to occur due to program design, the time that was provided was extremely useful.
- The workshop provided a useful update on work in progress, including the range of research projects being undertaken by PhD students.
- There was a mix of government people and researchers present.
- The workshop provided an opportunity to network with people who have similar interests.
- The workshop identified who is doing what on adaptation, and provided an opportunity to discuss presentations at length.



- The format allowed attendees to go to all presentations.
- The presentations were of good quality and the networking opportunities were welcome (albeit brief and hence somewhat limited). Opportunity to gain key insights into appropriate conceptual frameworks for investigating adaptation.
- The papers presented were diverse.
- The format was excellent as it allowed everyone to hear each presentation and provided enough discussion and networking time for those wanting to find out more from the researchers. However, the parallel format meant that people moved between lecture rooms to hear presentations rather than stay for the discussions.
- The plenary session was useful.
- It was a good opportunity to share research and experience with others and learn first-hand about the research being undertaken in the field.

## Suggestions for the next workshop

### Summary

13/30 = 43% = More interaction and collaboration between participants, via small groups, structured networking and other deliberative processes

8/30 = 26% = Less presentations / being more selective on who is invited to present / less research and more policy & practical presentations

7/30 = 23% = More spacious & controlled format. More discussion time + more presentation time + better synchronisation of presentations + strict adherence to time limits

### Details of responses:

**Q:** What aspects of the workshop could be improved upon?

**A:**

- Could discussions lead to real opportunities for research collaboration? How could the network assist to collaborate research outcomes, (particularly for those away from the core institutions)?
- Should be more selective on presentations. Many of these presentations have already been heard at other conferences – there were very few that presented new research.
- A workshop is a two-way participative forum with the aim of producing an output that reflects that interaction. Unfortunately, the workshop resembled more a conference or symposium, and therefore did not meet the expectation of a more collaborative learning environment.
- Movement to and from the parallel sessions disturbed some participants/presentations. Registering for sessions online before the workshop may help prevent this.
- More time should have been allowed for smaller group discussions.
- There should be more participants/papers coming from the developing countries. Also, there should be more focus on coastal and marine areas as their governance is complex.
- The deliberative processes, interactive forums and panel discussions could be improved.
- More time should be allowed for networking.
- There should be better engagement of the Adaptation College Fellows.
- There should be more presentations on policy and practice, less on research.
- There could be more practical examples/field trips.
- There could be more group discussions, eg “World Cafe” style, to aid discussion and problem solving. There should be clearer objectives for the workshop to ensure that presenters focus on the research/implementation space instead of discussing research methodology and research projects.
- Future workshops should focus higher quality and more relevant presentations – there needs to more scrutiny.
- Overall, the innovative schedule of two parallel yet not parallel sessions worked well.

However, problems arose if both rooms didn't start at the same time causing people to leave in the middle of the presentation in order to not miss the one next door. In the future, both rooms need to be better synchronised, or there could be small breaks. After some presentations the discussion was over after 20 minutes but moderators felt obligated to keep it going for the prescribed 30 minutes.

- The idea of presenting all papers was a very inclusive approach and showed the range of work going on. Having two presentations then discussion was a great improvement on other workshops. A further improvement could be to include a deliberative session on themed topics so a round table discussion can be had on each theme (with attendees rotating around the themed tables).
- Chairs should focus on facilitation and only add a few comments to steer the discussion, rather than take a role of responding to comments made from the floor. This would make the discussion flow better.
- The workshop design and running format could be improved- there were too many presentations in total and the time allowed for each presentation allowed only an overview of the research. While many of the presentations were interesting many of them did not address the theme of "Adaptation and Governance". Guidance for and selection of abstracts may have benefited from requiring presenters to address this issue directly rather than repeating research projects/presentations verbatim. Similarly, the facilitated discussion and other activities could have utilised the expertise of those attending much more - to start to articulate research and policy implications, future needs etc.
- It was surprising given the Adaptation Research Network theme that social research and expertise were not utilised more in the design of the workshop.
- The format could be improved to allow for more in-depth engagement between participants; the venue should allow for flexible small group processes and there should be structured networking opportunities.
- The workshop would have been better with a smaller selection of high quality presentations in one room, with more interactive panel sessions.
- There is room for greater connectivity between participants, in terms of it being more of a workshop and less a series of presentations. I think breaking out into groups and the idea of a "world cafe" approach are important for improving the synergy.
- There was a need to focus on the 'so whats?' from the papers presented - moving the dialogue and agenda of climate change adaptation forward.
- There should be more opportunity for interaction, networking and discussion. Some of the papers had already been presented at other NCCARF forums, whereas others were discussing research yet to be done. There should be more balance between research and practice.
- The last day was a lost opportunity to contribute to a synthesis of the research work. It would be great to set aside the time after the presentations to meet in small groups around key themes to look at the overall direction of the research work and identify cutting edge work and also key gaps, etc.
- The workshop was full of research papers and did not include high level governance issues. Government policy makers should have been targeted to present at this workshop.
- The way in which the workshop was structured could be improved to enable more discussion and interaction. This could be achieved through innovative approaches to workshopping, using systems thinking techniques such as conversation mapping, etc.

## Appendix 2: Abstracts

### 1) Climate governance: bringing it down to scale

*Jim Falk, Australian Centre for Science, Innovation and Society, University of Melbourne*

Both climate adaptation and mitigation governance strategies are confounded by issues of scale. For example, the problem is global but the process of adaptation and mitigation must in the end be carried out by human scale organisations, communities, and ultimately by individuals within them. How can action across these multiple scales be actualised? Even the relevant international governance organisations present as a complex evolving tangle of institutions of different scales functions, constituents and styles. This paper will examine this focussing on a recent initiative in Srinagar, Kashmir on the one hand, and an international climate mitigation and adaptation research program of the Association of Pacific Rim Universities (AWIICMAS) and the related Global Water Initiative on the other. The analysis will be set within the framework of a recently published book: Joseph Camilleri and Jim Falk, "Worlds in Transition: Evolving Governance Across a Stressed Planet", Edward Elgar, UK, 2010 (see also <http://worlds-in-transition.com>).

### 2) Questioning the Assumptions: The Role of Vulnerability Assessments in Climate Change Adaptation

*Fiona Miller, Department of Resource Management and Geography, The University of Melbourne*

There is a growing recognition amongst policy makers and practitioners that an explicit understanding of vulnerability to climate change is necessary to ensure adaptation policies and actions are effective, equitable and sustainable. It is generally assumed that adaptation actions are orientated towards vulnerability reduction. Yet, Nelson et al. (2007) argue that adaptation measures often fail to address persistent and intractable vulnerabilities, thus undermining their success and sustainability. A number of challenges prevent adaptation activities from contributing to vulnerability reduction; some of these relate to the nature and quality of vulnerability assessments themselves, whilst others concern how well assessments link with or are integrated into adaptation actions. This paper argues that without a clear understanding of who is most vulnerable to climate change, where they are located and the underlying reasons for their vulnerability there is a danger that adaptation to climate change may be inappropriate and misdirected – an issue of growing concern in light of the increased availability of funds and resources for adaptation. The paper presents a review of current approaches to vulnerability assessment from different disciplinary perspectives. It highlights some key issues that are considered central to ensuring the knowledge and experience of vulnerability assessments translate into progressive adaptation actions. Such issues include the purpose, scale, and nature of stakeholder engagement. Preliminary findings from ongoing research into the linkages between vulnerability assessment and adaptation in the health and water sectors in two countries of Southeast Asia are referred to in the paper. As such, the paper departs from much of the academic literature on vulnerability, which has been more concerned with how to define and assess vulnerability, by seeking instead to address the challenges associated with reducing vulnerability in practice. The paper concludes by arguing that there is a need to question the assumption that adaptation actions automatically contribute to the reduction of vulnerability to climate change, and that unless an explicit understanding of vulnerability is at the heart of adaptation actions there is a danger that social inequalities and harm may be exacerbated.

### 3) Climate Change: employment and social implications

*Peter Glynn and Ros Taplin, Faculty of Business, Technology and Sustainable Development  
Bond University*

Climate change and its associated environmental challenges will have a considerable impact on the world of work and its participants. For these challenges to be met, it is important that policy and actions in response deliver economies and enterprises that are efficient, socially just and environmentally sound.

The link between climate change and the labour market was recognised by the governments and others when they allowed the inclusion of provisions for a "just transition" in the negotiating text for the now unrealised UNFCCC Agreement for COP15. The International Trade Union Confederation (ITUC) in its

statement to COP15 articulated its belief that climate change was an issue for the workplace and that it was therefore <sup>1</sup>an issue for collective bargaining.

Governments across the globe have already committed to low carbon emission programs and in many cases significant reduction targets. Carbon trading and taxes are starting to, and will continue to have a pervasive effect on market and business behaviour. Consumers are demonstrating more preference for products that are “green”. Issues that are explored in the paper and supports by case studies from the Asia Pacific Region include:

- consultation and social dialogue with other social partners (including the property industry) and communities
- programs for skills development and training for workers in the area of new cleaner technologies, and
- the role of collective bargaining
- green and “decent” job creation.

Some of these are issues for government, some for the board room and some for the shop floor. Divisions of responsibility will need to be resolved. Inevitably, business will play an integral role in parallel to its role in implementing the policies and programs of government to reduce emissions. The presentation will conclude that implementation of the climate change responses must be sensitive to the priority of business to drive economic growth and investment if it is to deliver its commitment to employment and social policy initiatives.

#### **4) The role of deliberation in managing public responses to climate change**

*Simon Niemeyer and Kersty Hobson, Centre for Deliberative Democracy and Global Governance, The Australian National University*

The impact of environmental change on individuals’ intentions, values and actions are key to future adaptive trajectories across several scales. But the actual nature of that response is hard to predict, much less determine how they could be managed. In response to this problem, this paper reports on findings from recent research that aimed to explore cultural, social, and possible behavioural responses to future climate change in Australia and the potential for deliberative governance as a solution to the problems that are posed. This project—called ‘Climate Change and the Public Sphere’—developed regionally modeled climate scenarios that were then used to elicit responses as part of 100 individual interviews using Q-sort opinion charting to map the changing differences under different scenarios. This was followed by a deliberative event involving a sub sample of 35 participants drawn from two distinct sampling areas (one rural, one urban) in the Australian Capital Region. This paper outlines how participants currently perceive and expect they would potentially react to climate change, as well as how they think they and others can and will respond to its future effects and their expectations of government. It also reports on the results of the deliberative forum and the potential for a deliberative approach to governance might improve adaptive outcomes.

#### **5) Governance of international climate change adaptation finance: early experiences of the UNFCCC Adaptation Fund**

*Åsa Persson, Stockholm Resilience Centre and Stockholm Environment Institute*

Adaptation to climate change is increasingly seen as a legitimate public policy concern in many countries, in addition to purely private responses to climate change. Adaptation has also become a legitimate public policy concern at the international level, not least manifested by the recent multilateral and bilateral financial flows targeting adaptation needs in vulnerable developing countries. For example, the Adaptation Fund under the UNFCCC earlier this year called for and approved the first round of project proposals. In the world of Official Development Assistance (ODA), several donors have earmarked funds for adaptation projects and programmes. For years, the governance of these multilateral funds, as well as relevant ODA flows, has been debated. While developing country parties frame it as an issue of restitution and argue that funds should therefore be used at the discretion of the recipient, developed country parties prefer to frame it as an additional focus of conventional ODA and argue that the use of funds should accordingly follow the principles of the Paris Declaration on Aid Effectiveness. Arguably, it is not until now, when the money has actually started to flow, that a *de facto* definition of eligible adaptation activities is made and that governance arrangements are (implicitly) institutionalised in practice. Regardless of the framing of international adaptation finance, any democratic government actor would wish to use available public means for those most in need and where public benefit is

greatest. Using the first round of project proposals submitted to the Adaptation Fund as empirical material, this paper examines how and to what extent adaptation is portrayed as a public good, hence justifying public spending. What is considered private and public benefit respectively and how is the issue of eligibility addressed, by the project proponent and Adaptation Fund Board respectively? Furthermore, the paper discusses whether it is relevant to apply theories of commodification in this context and how potentially emerging 'markets' for adaptation projects could be studied.

## **6) Evaluation of Investment Options Mitigating Catastrophic Losses under the Impacts of Climate Change**

*Chi Truong and Stefan Trueck, Department of Economics, Macquarie University Sydney*

It is of significant concern that climate change will exaggerate the frequency and severity of extreme events such as floods, storms, droughts and bushfires. As the value of properties under risk increases due to economic growth, also the probability of catastrophic events may be amplified by climate change impacts. Thus, there is a need for local governments to invest in adaptation measures in order to reduce potential losses from these catastrophic events. However, economic models that help local governments to evaluate those investment projects are currently lacking. Two challenges are faced when evaluating these projects. First, it is difficult to quantify the risk due to the lack of observations on catastrophic events at the local level. Second, investment costs are often lumpy and the investment decisions are irreversible, so that the investment strategy based on the NPV criterion is not optimal. Under the uncertain growth of the stock of assets and the uncertain impacts of climate change, the optimal timing of investments into adaptation strategies that reduce catastrophic risks is of major importance. This paper presents a simple economic framework to quantify climate change risks and a real option approach to illustrate the optimal timing of investment strategies for local governments.

## **7) Responding to Climate Change in Australia: Subnational Initiatives**

*Betsi Beem, Department of Government and International Relations, School of Social and Political Sciences, University of Sydney*

Climate change has been framed as an international problem that requires an international response. This research argues that while climate change is indeed a policy problem that is international in scope, its solutions may be achievable at a number of governmental levels from international, to national, and local. One of the world's largest emitters, the United States, has yet to sign any binding international agreement, yet change is afoot. Barry Rabe (2004) documents how States in the US have taken the lead in implementing climate change mitigation and adaptation policies in response to US not signing the Kyoto Protocol. Similarly, Michelle Betsill and Harriett Bulkeley (2004) find that there are a number of cities across the United States that have implemented rigorous carbon reduction schemes, often informed through engagement with the International Council for Local Environmental Initiatives Cities for Climate Protection program. In Australia, there have been similar efforts at council and state levels to introduce climate change mitigation and adaptation policies. However, there is little empirical or analytic research that documents these developments or explains variation across political units. This research has the following aims:

1. Develop a comprehensive database documenting the range of policies that are in place across Australian subnational levels of government.
2. Analyze the extent of variation across those political units.
3. Develop a theoretical model to explain that variation and test the following explanations:
  - a. Engagement w/ international orgs such as ICLEE (transnational orgs and diffusion of policies/learning/science)
  - b. Level/type of economic development (post materialist argument)
  - c. Metropolitan / rural (post materialist)
  - d. Level of risk perceived
  - e. Pressure from local environmental organizations (bottom up)
  - f. State level development engagement (top down)
    - i. State legislative context
    - ii. State bureaucratic context
    - iii. State level local government associations' engagement with climate initiatives
  - g. National level policies (top down)
    - i. National legislative context
    - ii. National bureaucratic context
    - iii. National scientific context (CSIRO)

## **8) Less Engaged? Climate Scientists and adaptive governance**

*Martin Rice and Ann Hendersont Sellers, Macquarie University, Department of Environment & Geography*

The hypothesis examined here is that climate scientists have become less relevant, or even irrelevant, to adaptive governance. We explore if climate scientists have become less relevant to adaptive governance development and, if so, why this situation has arisen. By undertaking a review of the climate challenge, current governance settings, and some national research efforts (in the UK and Australia) and a novel proposal regarding the use of the IPCC as a global governance tool, we try to discover under what, if any, circumstances climate science is valued in the development of governance. These discussions lead us to the conclusion that targeted climate research can be genuinely valuable for future governance. We, therefore, invite consideration of how climate researchers might be (re)integrated into adaptive governance development to the benefit of all.

## **9) Climate Change Adaptation in the context of failing socio-ecosystems**

*Douglas Bardsley, Geographical and Environmental Studies, The University of Adelaide*

There is a concerning fallacy at the heart of the debate on climate change adaptation policy and governance – that our societies are so close to developing and implementing effective management responses to current environmental issues, that adaptation to future climate change will largely involve relatively minor re-adjustments on the margins of functioning systems. Examples are drawn from the author's research on risk to socio-ecosystems in Australia and internationally to argue that, in reality, the gaps between the goals of environmental management and the current outcomes are already significant, such that in many cases, only a pretence of effective environmental management exists. Such gaps are not trivial and must not continue to be discounted when considering the new, potentially massive risks associated with future anthropogenic climatic change. To develop effective climate change adaptation will require researchers and decision-makers to recognise the fallacy embedded in trying to adjust to climate change – the contemporary discounting of the failures or limitations of current environmental management. Otherwise, responses to climate change risk will remain on the margins of societal activities, rather than guiding the necessary fundamental re-conceptualisations and re-organisations of socio-ecosystems. Work analysing environmental policy outcomes suggests that, in planning for risk, a broader transition is required that responds to an understanding of our environments as places of relative uncertainty, variability, change and limited resources. To engender the requisite ownership of environmental risk by stakeholders, research to inform adaptation decision-making can support decision-makers to undertake in-depth critiques of management systems across different scales. Such social learning approaches to respond to the governance of risk can support improvements in policy and management that lead to increased resilience within environmental systems, both to respond to specific climate change risks, as well as to develop systems that allow for broader outcomes of socio-ecological sustainability.

## **10) Contextual Climate Change Adaptation issues for Indigenous Australia**

*Siri Veland, Department of Environment and Geography, Macquarie University*

Critical power inequality and significant cultural specificities compound challenges to adaptive governance and decision-making in Indigenous contexts. Enhancing understanding of governance relating to Indigenous peoples requires engagement beyond traditional local to national scales, also in climate change adaptation contexts. As government agencies and communities prepare adaptation strategies, Indigenous hazards management and governance risk becoming out-defined as Indigenous Australia is treated as 'local communities', rather than concurrent jurisdictions with particular cultural contexts. This paper draws on experience from coastal Northern Territory in Australia, showing that 'local' immediate concerns do not involve climate change per se, but relate to issues of health, schooling, representation, culture and employment, which all link with cultural bias and language marginalising Indigenous persons. Adaptation risks reinforcing existing inequities as scarce governance resources are employed through a one-size-fits-all approach to service delivery. Rather than insisting on climate change being central concern, this research explores contextual adaptation issues, and argues for a rights-based approach to climate change adaptation. Governance of remote Indigenous communities already struggles to provide adequate physical and organizational infrastructure, to which climate-related damage will add burden. In the context of hazards and emergencies, paternalistic interventions may be reimposed, urging remote communities deemed 'unsafe' (as result of older

government policies) to relocate, as was seen with Mona Mona community in Queensland in 2008. Slow-onset climate change impacts may translate adaptation to become 'coping' with increasingly poor infrastructure, forcing people to choose between relocation and increasingly dilapidated conditions. Approached contextually, adaptation can become a diplomatic tool by which Indigenous groups can grow competence and power to negotiate better governance (settlement locations, representation, land tenure, environmental management, etc.) in the manner of Stanner and Coombs. Tackling the 'wicked problems' requires engaged transdisciplinarity to create novel discourses by merging Indigenous and non-Indigenous knowledge systems.

#### **11) Do we have tools for adaptive governance and management of Climate Change Impacts?**

*Judy Lawrence, NZ Climate Change Research Institute, Victoria University of Wellington*

Adaptive governance and management have been used by local government in New Zealand since its origins in managing water and waste water services for communities and unpredictable events such as floods and other natural hazards. These tools used have been largely in an incremental nature – pipe sizes increased as populations have grown; higher stop banks as floods have become more frequent and increased in size with the clearance of land for agriculture. By contrast, risk reduction and avoidance tools through spatial planning have been used far less extensively. As a consequence, settlements and their intensity have increased in at-risk areas at the coast and on flood plains, and there is evidence that property values do not fully reflect the risks from current hazards. Future dynamic change in risks associated with climate change impacts, and their uncertainties, will pose additional challenges to adaptive management. This presentation will outline the tools available for adaptive management in the New Zealand context, how they have or haven't been used, their relative success or otherwise, and their potential for addressing climate change impacts and uncertainties. Findings will be drawn from case studies undertaken as part of an interdisciplinary research programme on community vulnerability, resilience and adaptation to climate change based in the Hutt Valley and Auckland, investigating challenges related to flooding and sea level rise. The case studies illustrate in particular the governance issues related to successful implementation of adaptive management and risk reduction/avoidance. For example, issues such as electoral time cycle, understanding of climate change and where decision makers get their information from, development pressures, legal liability, perception of risk and timing of climate change impacts will all be explored, with the aim of identifying key entry points for strengthening adaptive management in the context of climate change.

#### **12) From knowledge to action for climate change adaptation: promoting resilience and adaptive management within NSW natural resource management**

*Alex Gold, The Institute of Environmental Studies, University of New South Wales*

Designing strategies to allow for successful adaptation of natural resources and landscapes to the impacts of climate change is of high importance to decision-makers. At the same time, the predicted impacts of climate change at local and regional scales relevant to decision-makers are often accompanied with uncertainty. Research suggests that decisions of high socio-ecological importance plagued with high levels of uncertainty deserve an adaptive management approach. However, global attempts to apply adaptive management have met with limited success. In collaboration with Hawkesbury-Nepean Catchment Management Authority (HNCMA) in New South Wales, adaptive management was used as a framework for the HNCMA climate change adaptation strategy. NSW CMAs are legally required to apply the Standard for Quality Natural Resource Management, which promotes the achievement of catchment goals through adaptive management. Inflexible laws and regulations are often cited as barriers to adaptive approaches. However, the Standard's mandate for adaptive management has fostered awareness within the HNCMA of the importance of collective knowledge generation, explicit recognition of uncertainty, and flexible planning for climate change. Innovative tools and ideas such as scenario planning, resilience-based ecosystem stewardship, and thresholds of potential concern have been suggested as ways to create learning opportunities from uncertainty. Despite the requirements of the Standard, some institutional barriers that have plagued attempts at adaptive management elsewhere remain. Nonetheless, organizational change cannot happen overnight, and the Standard has allowed seeds to be planted for an adaptive approach to climate change adaptation at the HNCMA.

#### **13) Marine biodiversity conservation governance: a draft set of conditions**

*Julie Davidson and Michael Lockwood, School of Geography and Environmental Studies  
University of Tasmania*

Australian governance for the conservation of marine biodiversity is characterised by multiple institutions deploying measures such as multi-zoned marine protected areas and a complex of regulatory instruments. How well equipped is this regime to mount effective responses to the projected impacts of climate change on marine ecosystems? And if there are deficiencies, what types of governance reform are needed? A useful first step in answering these questions is to identify governance design conditions that would provide a basis for judging regime quality and effectiveness. In this paper, we make a start on this task by offering a draft set of conditions for the governance of marine biodiversity in the context of climate change.

In general, desirable governance conditions would support mutually beneficial interactions between social, economic and biophysical elements such that the resilience of the complex social-ecological system is not undermined. We therefore draw on key concepts and insights from resilience theory such as the adaptive cycle, the panarchy and basins of attraction to inform our thinking. We elaborate the components of resilience as a principle of adaptive governance, showing why and how flexibility, continuity, reflexivity and responsiveness are relevant to the transformational capacity needed to avoid a system flipping into an undesirable state. Under conditions of accelerated change, a governance regime possessing these characteristics should be able to accommodate and manage tensions between continuity and renewal; and sustain core purpose while allowing for innovation. We also point out that judging the desirability of particular system states has evident normative characteristics, so that principles of legitimacy, inclusiveness, fairness and connectedness are all involved in deciding preferable future regimes.

#### **14) Regional Climate Change Adaptation - biodiversity and emergency management**

*Kim Byrnes, Peel Development Commission, Western Australia*

The Peel Climate Change Adaptation Project was an initiative of the Peel-Harvey Catchment Council and funded by the Commonwealth Department of Climate Change and the Peel Development Commission. Working with five local governments in the region, the project raised awareness of potential climate change impacts on the region and the implications for local governments. Two priority themes, Biodiversity and Emergency Management, were identified via a survey of local government staff. Following risk assessment workshops, development of regional 'visions' and the development of policy options, strategies were developed to assist in local government adaptation to climate change (with reference to the priority themes).

The process identified a number of barriers to local government adaptation. Information availability, staff knowledge and competing resource demands all hindered adaptation ability. A perceived lack of state and federal leadership also contributed to attitudinal barriers to local government adaptation.

#### **15) Challenges of governing uncertainty through adaptation: a case study from South East Queensland, Australia**

*Johanna Mustelin, Griffith Climate Change Response Program, Griffith University*

Climate change adaptation has come rather recently to be a focus and responsibility of local governments worldwide. Although the theoretical frameworks for adaptation are increasingly being recognized and developed, there is still little actual knowledge on how adaptation as a social and institutional process takes place. What local governments need is knowledge on how to tackle adaptation to climate change in a way that is comprehensive and efficient but also understandable to the public they are liable to. This relies on the communication of science but also on the way institutional actors themselves understand and govern climate change adaptation.

This paper presents empirical data from the South East Queensland region in Australia, where adaptation to climate change is being integrated into decision-making and policies. Data from 22 semi-structured interviews with key stakeholders is used to provide an emerging picture of what actually motivates and constrains adaptation decision-making. The findings stress the fact that the everyday governance of adaptation is first of all messy. A variety of drivers and processes are identified, which hinder adaptation including uncertainty of local impacts in terms of timescale and magnitude of climate change, different perceptions of risk and prioritisation of adaptation actions, and personal beliefs of participatory policy-making processes. It is argued that understanding the practicalities of institutional adaptation is crucial in order to generate useful knowledge of the barriers and enablers for effective adaptation.

The research is part of the South East Queensland Climate Adaptation Research Initiative, a partnership between the Queensland and Australian Governments, the CSIRO Climate Adaptation



National Research Flagship, Griffith University, University of the Sunshine Coast and University of Queensland. The Initiative aims to provide research knowledge to enable the region to adapt and prepare for the impacts of climate change.

#### **16) Adaptive Planning to the Physical Impacts of Climate Change in NSW Local Governments**

*Nadine White, Southern Cross University*

Planning adaptive responses to the physical impacts of climate change (PICC), including sea level rise, coastal erosion, increased incidences of drought, extreme weather events and more, is central to stemming the environmental impact and consequently the social and economic impact of climate change. Effective policy responses of governments to these impacts require effective adaptation plans. In Australia, all levels of government have a role through regulation and policy in adapting to climate change. However it is at the local government level where much of the responsibility is expected to fall. This paper presents the results of original research conducted in New South Wales, Australia, on the planning response of local governments for adapting to the PICC. The study investigates the perceptions of local government planners, collected through a voluntary, anonymous questionnaire, regarding the actions taken within their local government area to plan for the PICC, the effectiveness of that response, and what further actions they perceive should be undertaken in the future. The results show a high perceived vulnerability of local government areas to the PICC but a broad lack of confidence in planning measures. One quarter of respondents thought their council had taken no steps at all to plan for the PICC. Furthermore, 61.8 percent of councils are believed to have taken less than three steps to plan for the PICC. The overall efficacy of steps that had been taken received a low rating from the planners. The results indicate that more needs to be done to plan for the physical impacts of climate change, including conducting risk assessments, policy development and collaboration between councils. This applied evaluation research is conducted within a postpositivist paradigm and is analysed through the theoretical framework of adaptive management.

#### **17) Communities and local government collaborating on climate change action: a Victorian case study of deliberative democracy**

*Kath Fisher, Southern Cross University and Michelle Croker, Dept of Sustainability and Environment*

Local councils need to engage their communities in decision making about how to respond to the changes to their physical environments, lifestyles and local economies likely to result from climate change. The challenge for local government is how best to do so in a context of confusion and polarisation about the causes and possible long term impacts of climate change and where traditional methods of community consultation are dominated by vested interests and the 'usual suspects'. Deliberative democratic processes such as citizens' juries offer randomly selected, representative groups of citizens the opportunity to engage with credible and well-researched information as well as to discuss concepts, issues and solutions in an environment free of coercion. Citizens' juries are ideal when decisions have to be made about complex issues that involve conflicting values and interests. Furthermore, they have the capacity to empower citizens to work in collaborative partnerships with government decision makers to respond to complex challenges such as climate change. This paper presents a case study of collaboration between state and local government that engaged local community members in decision making about climate action planning in two regional councils in North East Victoria. Randomly selected citizens formed two separate citizens juries (representing each community) to hear from a range of experts and perspectives, converse with one another to reflect and think critically about the options and put forward recommendations to their local council on "How can we work together to respond to the challenges of a varying climate?" The jurors officially presented their recommendations to their respective councils at subsequent council meetings. The presenters will describe the process, outline the main outcomes and reflect on the benefits and challenges of using deliberative processes to engage communities in climate action.

#### **18) Social Networks: The consequences for governance arrangements in south-west Victoria**

*Patricia Fitzsimons, Department of Primary Industries*

Institutions play an important role in organising, evolving and enabling networks of people to adapt to climate change. Research undertaken in the Victorian Department of Primary Industries considered the role of regional networks and their relationship to governance arrangements that are emerging in response to climate change adaptation. The research considered the interactions and decision making processes of regional institutions associated with the dairy industry in south west Victoria. An

institutional approach provides an opportunity to focus on the informal structures and mechanisms that govern the behaviour of individuals. The insights gained from this research were based on the analysis of a social network questionnaire. The questionnaire was completed by a wide range of institutions playing an important role in organising and enabling adaptation to climate change. Institutions were identified from a wide range of areas such as: education, land management, catchment management, strategic planning, finance, milk processing and dairy farming. The questionnaire focussed on four key questions: sources and type of information sought on climate change; the topics and frequency of communication; collaborations occurring on climate change adaptation; and institutions of trust and influence in the region. The key findings highlighted an increasing interest in building collaborative efforts to respond to climate change by building trust and engendering an environment conducive to innovation and flexibility. The research developed a typology of institutional arrangements that have evolved in the south west whilst highlighting a tendency to associate and bond with trusted sources of information and institutions perceived to have influence, most often part of the same type of institution. Also highlighted, was the important role provided by newly emerging institutions, in particular, the South West Climate Change Forum, which bridges the divide between community/government and industry sectors to create a trusted source of information and influence.

**19) Climate Change Mitigation and Adaptation at Local Governments in NSW**  
*Awais Piracha, School of Social Sciences, University of Western Sydney*

Climate Change is probably the most important and the most urgent issue faced at all levels of governance in the 21<sup>st</sup> century. Climate Change is occurring through the build up of greenhouse gases in the atmosphere on global scale; however its impacts are often felt locally in vulnerable, low lying and densely populated regions. In Sydney NSW, a significant proportion of the population resides in coastal locations, with impacts of climate change literally on their doorstep. Inland councils are also at risk due to rising temperatures and increasing intensity and frequency of natural weather events. Analysing key documents, policies, and environmental planning instruments, this research examines responses and the strategic directions of local councils in the Sydney Metropolitan region, in regards to climate change. Mitigation and Adaptation action are essential to combating the present and future impacts, and thus are the key to managing climate change. One such example of a mitigative response is through the Cities for Climate Protection (CCP) program. This research in particular looks at the action on climate change mitigation and adaptation at local level through the prism of CCP which seems to have wide traction with local councils in NSW. In this research, case studies of two coastal and two non-coastal councils provide insights into the development of climate change responses. Analysing their responses helps determine the usefulness of various policies, instruments and programs. Analysis and comparison of the case studies has revealed a number of interesting findings along the themes of state government (of New South Wales) and local councils (in NSW) interactions and the understanding, desire, capabilities and action of (small) councils in addressing this huge challenge.

**20) The development of a measure of the adaptive capacity of organisations in a regional setting: challenges and practical issues.**  
*Lorraine Bates, Social and Behavioural Sciences, CSIRO Ecosystem Sciences*

Strategies to address vulnerability to climate change often vary depending on the specific sector of the social-ecological system of interest and scale of the assessment, from local, to regional, to national. A related concept, adaptive capacity, is well represented in the literature and is conceptually attractive. However, determining how best to measure adaptive capacity at different scales and across multiple sectors presents some challenging theoretical and practical issues. While consideration of biophysical, geographical and temporal scale in social-ecological systems is important, cross-scale interactions in social systems are also critically important. Interactions between institutions and organisations are observable at multiple levels from individual interchanges to organisational exchanges, with most resource management decisions made in a complex multi-level governance context. This paper explores some of the theoretical and practical issues of developing and implementing a measure of adaptive capacity within an organisational setting. The study will occur over the next three years in two case study areas: the Hunter Valley and adjacent coastal council region in NSW and the Swan/Canning region in Western Australia. The project will examine how adaptive capacity influences organisational responses, and how the inter-organisational linkages facilitate or impede strategic planning and action on adaptation. Different options for testing the validity and reliability of the measure are canvassed, including the validity and reliability of measures at individual and organisational levels. Developing theoretically sound, valid and reliable measures of adaptive capacity which relate to social networks

across organisations can assist with answering important research questions; for example 1) Does high adaptive capacity in organisations predict more collaborative links with similar organisations?; 2) Are there structural signatures evident in the networks that differentiate between effective strategic planning and implementation?; 3) Does adaptive capacity diffuse across organisations from those with more adaptive capacity to those with less adaptive capacity (social influence) or do organisations with high adaptive capacity tend to cooperate with each other (social selection); and 4) Do regional umbrella groups facilitate collaborative links and enhance adaptive capacity within and between organisations? Developing this measure of adaptive capacity is an important first step to understanding how various attributes of organisations relate to effective regional collaborations and strategies in responding to climate change.

## **21) Climate change action planning workshops - a local council initiative**

**Amy Lovesey**, *Local Government Association of NSW*

The Local Government and Shires Associations of NSW (the Associations) are encouraging local councils to strategically address climate change risks to limit their liability, budget for impacts, minimize disruption to council services and fulfill their duty of care to communities. The Associations are currently supporting councils by offering climate change action planning workshops. Clarence Valley Council; Bland Shire Council; The Hills Shire Council; and The Wellington, Blayney and Cabonne Strategic Alliance have undertaken workshops with the Associations to commence drafting climate change action plans using the Climate Change Action Planning for Local Government Workshop Package. The Workshop Package was a useful resource for these councils. However the councils did face some constraints for their action planning process. Common challenges included the time required to develop a well considered climate change action plan, securing a sufficient number of staff members to participate in the workshops and ensuring staff remain engaged in the process of developing an action plan. The council officers responsible for coordinating the action planning process have needed to address divergent viewpoints and competing demands on staff resources. The planning process was most productive where these officers possessed confidence, commitment and skill in organizing workshops, facilitating groups, researching and presenting climate change information and building support from senior staff. The workshops provided a solid foundation for the formation of working groups that had enhanced their understanding of climate change issues (particularly regionally specific issues) and explored their own and others viewpoints through open discussion. Additional progress by these councils has included regional collaboration, risk assessments, formulation of a climate change policy and funding for a new position. The project was funded by the NSW Environmental Trust which is also providing funding to the Associations for workshops with five regional councils in NSW in 2010-2011.

## **22) Liability, Planning and CC - Local government in Gridlock**

**Melanie Bainbridge**, *Western Australian Local Government Association*

The legal and policy implications of climate change in the planning area are complex and not well understood by Local Governments. Current indications are that Local Governments who have a shared responsibility for planning decisions with State counterparts are likely to bear some legal, political and financial burden as a result of planning decisions that do not take climate change into account. Research into this area, which highlights the legal implications and the policy responses for Local Government, could provide significant value with respect to enhancing the capacity of Councils to ensure that planning decisions are made based on best possible information. The Western Australian Local Government Association has been working with the Office of Climate Change, Department of Planning, Freehills Legal and Essential Environmental, for the past 18 months, on a Climate Change and Planning project with a focus on ensuring best practice climate change management is embedded in the planning process at all levels and that all 'stakeholders' understand their shared responsibility in this 'space'. This 'case study' will follow the formation of a Local Government advisory group on planning, climate change and liability, and the process it followed to assist in the development of applicable Local Government Planning policy, and implementation strategies to make sure Councils meet their articulated policy outcomes. This presentation will centre on the legal and policy work that the Association has undertaken, and will explore how it is applicable from a multidisciplinary and cross-jurisdictional perspective.

### **23) Integrated planning for a sustainable Shepparton community**

*Karlie Tucker, RM Consulting Group*

Councils are at the forefront of climate change impacts. If it becomes hotter and drier then local businesses suffer with effects on jobs and the community; if there are more intense storms then councils have to pick up the pieces. Climate change will increase demands for services at the same time as increasing council's costs. RMCG was commissioned to develop an integrated response to the challenges of climate change and reduced water availability in the Shepparton region. This project is part of the Federal Government's *Strengthening Basin Communities* project and is titled *Integrated planning for a sustainable Shepparton Community*. The project focused on four main issues:

- **The regional economy** – How will reduced water and hotter temperatures affect fruit or dairy production? What knock-on effects will there be for the manufacturing, food processing and transport sectors? What does this mean for jobs and population growth?
- **Regional infrastructure and services** – How will storms and heatwaves affect critical infrastructure such as roads, bridges and drains and key services such as electricity, gas and water supply?
- **Local community infrastructure** – How will storms and heatwaves affect community buildings such as libraries, town halls and kindergartens and community assets such as parks and gardens?
- **Council's capacity** – How well prepared and resourced is the council to respond to and manage these challenges?

In each case we worked with regional agencies to identify the priority risks and to assess the impacts of climate change on their particular service or function. We combined this risk assessment with evidence from past extreme weather events to identify how agencies have responded to extreme events in the past, what costs they have incurred and what changes they have made to their operations as a result. We then identified critical thresholds (whether related to timing or magnitude) that, if breached, will exceed the region's capacity to cope. Events of particular note in the Shepparton region were the 1993 floods, the recent years of successive drought, the February 2009 heatwave and the March 2010 windstorms. Stakeholders found this approach a more practical way to assess climate change impacts than using complex projections on future climate impacts. The final stage of the project is to produce a plan that will focus in particular on the role of the council in implementing any changes.

### **24) Breaking down the "one-size-fits-all" approach to rural and regional policy in the face of climate change: enhancing policy initiatives through multi-level governance**

*Katherine Daniell, The Australian National University*

In regional and rural Australia we can presently observe the Commonwealth Government involved in a series of policy initiatives which inherently involve the need for multi-level governance approaches in order to be effective. Multi-level governance processes can be defined as systems of "continuous negotiation among nested governments at several territorial tiers" (Marks 1993) where authority is not only dispersed vertically between levels of administration, but horizontally across different sectors of interest and spheres of influence including states, markets and civil society. To date the Commonwealth has greatly determined the structure and processes of its initiatives which inherently required the involvement and collaboration of state and local governments, regional bodies and community groups. However, there are inevitably limitations with this 'one size fits all approach'. In taking government in September 2010, Julia Gillard announced a new era in governance, noting that no longer would a one size fits all approach work, particularly in regional and rural Australia. At the same time, the government finds itself engaged in now rolling out policies where the existing structures in place have been developed on a basis of one size fits all. Specifically these are policies that are intended to enable farmers to adapt to an increasingly arid climate and the associated challenges rural communities face in achieving sustainability in the face of urban drift, climate change and declining agricultural outputs. Using case study material from drought policy and regional development, this paper examines the challenges that current approaches to policy development and implementation face in a diverse landscape such as Australia and in turn considers how an approach which embraced the principles of multi-level governance could be used to enhance these current and longer term policy initiatives.

### **25) An integrated approach to the development of CCA strategies in Torres Strait, QLD.**

*Claire O'Neill, The University of New South Wales*

The development of anticipatory climate adaptation strategies is currently facing many challenges. One such challenge reflects the frequent misalignment of stakeholder priorities for adaptation, specifically between decision-makers and local communities. These issues are illustrated in this presentation

through a case study situated in the Torres Strait. This example highlights past disconnects between the demonstrated needs of the local communities, and the comprehension about these needs shown by the government authorities that are responsible for planning their adaptation policy. This case study is used to explore the current tensions that have arisen in recent years due to this misalignment, and to suggest solutions to mitigate these problems. One issue that is considered significant relates to the level of scientific uncertainty regarding the potential impacts of climate change in the region. The challenges posed by this uncertainty are exacerbated in more remote regions, such as the Torres Strait, where less scientific data are available; suggesting that communities which are more dependent on their natural environment will, in some ways, be more vulnerable to climate change than urban dwellers. This presentation will also explore how local knowledge, or as in the case of Torres Strait, Indigenous knowledge, has the potential to help fill in the gaps in existing scientific understanding and facilitate enabling of policy development that is more locally relevant, culturally appropriate and effective. However, the tension between local knowledge holders and outside 'expert' knowledge adds a significant layer of complexity to the political nature of adaptation funding and resource allocation.

## **26) Coastal Management Processes in Australia: conceptual & adaptive processes**

*Laura Stocker, Sustainable Policy Institute, Curtin University*

The Coastal Collaboration Cluster is a new research group supported by two CSIRO Flagships: the Wealth from Oceans Flagship and the Climate Adaptation Flagship. This new Cluster will analyse coastal zone management processes in Australia and develop conceptual and adaptive approaches that will enable

better science uptake by governance, thereby contributing to a more resilient and sustainable coastal zone. The Cluster is composed of five Themes studied across seven universities. The Themes are: governance, socio-cultural context, knowledge systems, and adaptive learning. The various themes will be integrated by a keystone Theme. The seven universities are: Curtin, Adelaide, Deakin, Flinders, Sunshine Coast, Tasmania and Wollongong. In this paper we describe the conceptual and methodological underpinnings of the Coastal Collaboration Cluster with a special focus on the Governance theme based in Western Australia. We discuss the knowledge-governance interface, complex adaptive systems and boundary organisations as conceptual frameworks for our research into coastal adaptation, and anticipatory action research as a methodology.

## **27) Climate Change Adaptation and multilevel governance in Australia**

*Pedro Fidelman, ARC Centre of Excellence for Coral Reef Studies, James Cook University*

Adaptation is one of the main approaches being employed to address the impacts of the changing earth's climate system. Adaptation is a process by which individuals, groups and organisations seek to cope with the effects of climate change. It can involve both building adaptive capacity (i.e., increasing the ability of individuals, groups, organisations to adapt to changes) and implementing adaptation decisions (i.e. transforming adaptive capacity into action). Whereas the process of adaptation is not new; the idea of incorporating future climate risk into policy-making is. Priority research in this area includes understanding institutional responses (e.g., policies, legislation, decision-making processes etc.) to climate change, and what lessons can be learned from different institutional arrangements. This paper examines how Australian governments (at local, state and federal levels) are adapting to climate change, in the context of the Great Barrier Reef. It documents numerous examples of adaptation strategies adopted by governmental actors that apply to the Great Barrier Reef. These strategies are examined in terms of its type, purposefulness, triggers, and spatial and temporal scope. The concept of multilevel governance (i.e., governance at multiple levels of political organisation) and institutional interplay (i.e., the interactions between and among institutions at and across multiple governance levels) are explored, to highlight the importance of considering multiple and nested levels of governance in adaptation policy.

## **28) Barriers and bridges to the effective engagement by local government of key stakeholders in coastal climate change policy and plans**

*Neil Lazarow, Centre for Coastal Management, Griffith School of Environment, Griffith University*

Our understanding of the coastal environment, new participants and evolving dimensions continue to test institutional arrangements and the capacity of scientists, decision-makers, politicians and other coastal stakeholders. This begs new approaches. This paper describes the results of an investigation into the challenges and opportunities for public involvement in the management, use and conservation of coastal resources in Australia, with lessons from overseas, including through the development of

coastal adaptation strategies for local government. A study was carried out from 2004-2009, using a multi-discipline and multi-method approach based in the social sciences to investigate: the challenges for incorporating local or lay knowledge into planning and decision-making for integrated coastal management (ICM); the economic impact and value of coastal resources; and to understand how coastal communities compete politically. The research was progressed through seven Australian and three international case studies and focused strongly on the drivers and responses to engagement in ICM. The investigation found a number of institutional challenges that hindered or prohibited the progression of effective community involvement in the public policy process. These include but are not limited to: inability to effectively coopt non-government actors; challenges to the concept of sustainability; high transaction costs relative to the scope, capacity and interest of government; lack of effective mechanisms; institutional marginalisation through the political process; loss of corporate knowledge, low internal capacity and capacity to develop meaningful policy; low capacity for institutional learning; and inadequate timeframes. Solutions to complex environmental problems require the 'long-term integration of economic, social and environmental policies' (A. Ross & Dovers, 2008, p. 245). This tests the policy making capacity of governments on a number of fronts, however, there are significant opportunities to improve practice and outcomes around: strategic planning; a clear articulation of responsibilities; improved capacity building; monitoring and evaluation; and the use of innovative tools to assist with the resolution of ICM conflicts.

### **29) Social cultural determinants of coastal decision making for climate change adaptation**

*Carolyn Hofmeester, Sustainable Policy Institute, Curtin University*

For most Western Australians living near or holidaying on the coast enacts dreams of carefree, healthy lifestyles and aesthetic pleasures that are accessible to all. For others the coastal environment has strong economic values in generating wealth from property development and ownership. However, climate change is threatening the dominant socio-cultural values of the coast and generates concern, doubt, resistance as well as transformative potential within our community. This social turbulence is already evident in political and community responses to climate change, observed most visibly in the popular media and political discourse. Climate change has thus become as much a social/behavioural phenomena as a biophysical one. Effective and timely responses to climate change require strong governance. Given the "wickedness" of the climate change problem, the governance system must be capable of dealing with less than full scientific certainty, multiple layers of complexity in time and scale as well as the competing values of the coast. In this context, and given the increased urgency of climate change action, the point at which scientific knowledge becomes sufficiently "powerful" to influence climate action is salient. Drawing on the field of discursive psychology and social constructionism together with an innovative multi-layered discourse analysis method, this research examines the role of knowledge, power and worldviews in complex policy making for coastal adaptation. The development of a new model for coastal governance that is more reflexive and relational will be a key outcome of this research with a view to implementation in vulnerable regions of the South-West.

### **30) Adaptation to climate change in practice: learning from local government case studies**

*Edward Boydell, Fenner School of Environment and Society, Australian National University*

This paper examines adaptation to climate change in the context of local government practice. Increasing attention is being paid towards the practical dimensions of implementing adaptation. An emerging body of research examines adaptation from the perspective of learning-processes that operate from individual to organisational levels, providing practice-relevant insight into pathways for implementation. I argue that adaptation can be understood as an emerging practice in itself. A situated learning approach was engaged to develop empirically-based insight into the ways this practice emerges from activities and social processes in the context of local government. Drawing on pragmatism and theories of learning and practice, this perspective is used to explore a case study of three local governments in coastal Sydney, New South Wales. These councils are beginning to develop practical measures for climate change adaptation, and are among those involved in the 'Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises' project by the Sydney Coastal Councils Group (SCCG), CSIRO and the University of the Sunshine Coast. The findings suggest that although local governments have only recently begun to attend to climate change impacts and adaptation, it is the interest and motivation of individual actors that has driven the agenda forward. I identified nine key responses to climate change, which were influenced by policy and external research, internal factors within councils, and interaction with the community. Although a number of these activities were *ad hoc*, they were starting to coalesce into a strategic direction of adaptation. Connecting

climate change adaptation, learning, and practice placed the actions of local government staff at the centre of this inquiry. It acknowledged that their experience provides important and legitimate insight into the organisational context that shapes adaptation. Greater understanding of adaptation practice and trajectories of change are vital for enabling, supporting and enhancing action to address climate change.

### **31) Monitoring & reporting climate change adaptation in local governance (Sydney Coast)**

*Timo Leiter, Institute of Environmental Studies, University of New South Wales*

The Sydney Coastal Councils Group (SCCG) has recently completed a research project on climate change adaptation (CCA), leading to six recommendations for improving adaptive capacity in local governance (Smith et al., 2008). My research will focus on one of them, namely monitoring & reporting CCA. Monitoring facilitates learning and is therefore an important component of adaptive management, which enables managing socio-ecological systems in light of complexity and uncertainty by advocating the principle of “Learning to manage by managing to learn.” Yet Smith et al. (2008) have found “*no evidence of systematic monitoring and evaluation*” of CCA in SCCG member councils. Meanwhile, a recent study by Boydell (2010) on SCCG members reports that local governments are often seeking advice and following best practices of other councils which highlights both the need for and potential of learning through systematic monitoring and reporting and the associated sharing of relevant information across councils. This might also assist efforts to lobby state government, as lack of guidance from higher levels of government constitutes a key barrier to CCA (Smith et al., 2008). However, attempts to formalise learning processes are facing tough challenges as local councils are already struggling with diverse state monitoring and reporting requirements and its chronically limited resources. Smith et al (2008) therefore suggest incorporating CCA reporting into existing council reporting such as the State of the Environment report. As part of my research I will collaborate with a selection of SCCG member councils to explore ways to foster learning through enhanced monitoring and comparison, results of which might also be used to report back to the community. Overall the research seeks to identify ways for a consistent monitoring and reporting of CCA, thereby contributing to a more effective CCA practice.

### **32) Integrating Climate Change Adaptation into Coastal Planning and Development in NSW, Australia**

*Alicia Bergonia, Institute of Environmental Studies, University of New South Wales*

Integrating climate change adaptation into coastal planning and development is one of the most critical challenges facing coastal communities in the 21st century. Climate change is causing accelerated sea level rise and occurrence of extreme events which expose communities to widespread environmental and physical damages (Aston et al. 2008, Sheperd 2005, Greve et al. 2000, Fitzgerald 2008). These impacts are likely to interact with current unsustainable coastal management practices such as urbanization and increasing coastal population. The resulting vulnerability creates enormous implications to current and future emergency response, health care and community services.

This paper examines the challenges on mainstreaming climate change adaptation into policy and planning processes. It argues that there is a need for institutionalizing proactive and sustainable responses to climate change which address not only the potentially rapid and high-risk nature of coastal impacts, but also the interaction of multiple stressors causing coastal vulnerability. A mechanism which facilitates adaptive management processes must be in place where scientific community interacts with policy and decision-makers, as well as the community in the framing of effective adaptation strategies and sustainable coastal management system. Effectively planned adaptation is fundamental in providing incentives and tools for households, communities and the private sector to adapt to climate change (World Bank 2008). All three levels of government (federal, state and local) have primary but varied responsibilities in the formulation and institutionalisation of adaptation strategies.

### **33) Rethinking ‘local’ for adaptation to sea level rise**

*Anne Leitch, ARC CoE Coral Reef Studies, James Cook University Townsville*

The local scale is regarded as important for adaptation to climate change because of its proximity to the impacts of climate change as well as the community, local context, knowledge and learning. At the local scale, local government is a key organising institution and the responsibility for climate change is often devolved to this level of governance. Yet as a hybrid institution and organisation that receives its power and autonomy from both the state government as well as the community, local government faces many challenges in supporting adaptation.

This paper uses resilience thinking, combined with environmental planning theory, to explore a set of claims commonly proposed in the literature as the basis or need for climate change adaptation at the local scale.

We examine these claims against local government experience to manage adaptation to sea level rise using three case studies of local governments: two in the Great Barrier Reef region in Queensland and one in northern New South Wales. We conclude that while local scale is important to provide the local context for climate change adaptation, decisions at the local scale can suffer from their own 'localness' as small decisions tend to result in fragmentation and some issues such as conflict and compensation are difficult to manage at the local scale.

### **34) More Flexible Governance for Climate Change Adaptations – Not Fixed Targets**

*Lawrence Yu, EcoHaus*

Building regulations in Australia aims to provide nationally consistent, efficient and cost effective technical building requirements. The Building Code of Australia, a performance based system, describes the outcomes or levels of performance to be achieved. While this system has been effective in regulating past issues, a performance based approach may not be appropriate for addressing climate change adaptations. This is because climate change presents a number of unique challenges.

Firstly, the impacts of climate change vary significantly for different locations around Australia. Therefore, effective adaptation targets must be location specific. Therefore, a large range of performance targets must be developed to account for the variation of climate impacts, which will lead to complex and consequently inefficient regulations. Secondly, setting appropriate performance targets is problematic because the extent of the problems is uncertain. A range of climate scenarios is possible depending on mitigation actions today and in the future. A fixed performance target cannot be effective in addressing a range of climate scenarios. Performance targets may lead to maladaptations by either being inadequate or too stringent.

Therefore, implementing performance targets today to address climate change adaptations will likely lead to inconsistent, inefficient and ineffective outcomes. An alternative solution is the establishment of a national adaptation benchmark for buildings so that the resilience of buildings to climate change impacts are measured and can be compared by stakeholders. The aim of the benchmark system is to drive buildings to implement adaptation strategies by rewarding buildings with high levels of adaptations with recognition and market differentiation. The advantage of method is that it will circumvent the need of determining minimum performance targets at the onset. Instead, market forces will determine the level of adaptations at the onset and the results achieved can then be used as the basis for minimum performance targets in future.

### **35) Adaptive governance and climate change: the challenge for cities**

*Wendy Steele and Paul Burton, Urban Research Program/ Griffith Climate Change Response Program, Griffith University*

In Australia, cities are inexorably bound up with climate change: they are the sites of most energy consumption and will have to adapt most if lower carbon lifestyles are to be achieved and we are to adapt successfully to unavoidable climate change. The ways in which cities work and perform is the product of increasingly complex systems of urban governance often linking different tiers of government. Spatial planning is an important component of urban governance and this paper explores its role in developing effective climate change adaptation strategies. Some have argued that at present in Australia there is "no clear spatial vision of how a low carbon urban system should be designed, developed and delivered in an integrated way across our city regions" (ATSE, 2010, p.23). More specifically the paper critically reviews the challenges faced by the metropolitan regime of spatial planning in South East Queensland, where growth pressures, economic dependence on mining and scepticism about the science of climate change create a hostile environment in which to develop effective and robust climate adaptation policies and practices.

### **36) Impacts of drought, low flows and reduced allocations**

*Carla Mooney, Water Planning Tools Project, Griffith Law School, Griffith University*

Water allocation planning is the key mechanism for decision making about the use or 'sharing' of water between competing uses of surface and groundwater systems across Australia. Both the procedure for planning and the content of plans are provided by various State legislative regimes. These regimes have been significantly influenced by national policy including the National Water Initiative (NWI) and



legislation such as the *Commonwealth Water Act 2007*. Decisions made within this context can have significant implications for the natural environment as well as the individuals, communities and industries dependent on the water resource. Our recent study, originally intended to assess the social impacts of different levels of water availability for a new SA River Murray Water Allocation Plan (RMWAP), quickly shifted to a study of the impacts of drought, low flows and reduced water allocations. The recent drought in SA closely resembled a worst case climate change scenario and was therefore a unique opportunity to examine the effect of an unplanned reduction in River levels and water allocations on farmers, dependent industries and communities along the River. We took a holistic view of the value of water and considered not only direct economic interests but also a broad suite of other social and cultural values. Our study revealed both significant and sometimes unexpected impacts as well as some capacity to adapt to change. Critically, it would appear that in our case study area the reduction in water availability has intensified the pattern of demographic change, including aging of the population and a shift away from smaller communities, which has been evident across rural Australia for some years. Our findings call into question the appropriateness of water allocation planning being the fulcrum on which decisions likely to have profound and long term impacts on regional Australia should be resting. The need for strategic and integrated planning to maximise environmental outcomes and minimise social dislocation from a contraction in water availability - the inevitable result of more sustainable water management and climate change, is strongly indicated.

### **37) Dealing with a Drying Lake: The use of observed impact research to inform climate change adaptation policy**

*Elissa Waters, Spatial Analysis & Research, Dept Planning & Community Development, Victoria*

The development of strong policy and governance for climate change adaptation requires information on the way local communities deal with change. In October 2009 The Victorian Department of Planning and Community Development conducted a qualitative research project that aimed to investigate the experiences and responses a community undergoing significant environmental change. The research was conducted in the northern Victorian town of Lake Boga where the likely future impacts of climate change are already emerging as tangible environmental changes for the community. In 2008 the lake that was the major source of recreation and tourism for the area dried up completely. In a series of 35 in-depth interviews, information was gathered that gives detail to this community's attitudes, experiences and responses to the lake drying.

The development of this research aimed to explore two key questions:

- How are communities currently responding to key environmental changes?
- How can we record and present this information in a way that captures the attention of decision makers in the numerous policy areas relating to climate change adaptation?

This paper will explore the findings that emerged from the study including adaptation barriers and opportunities, the role of values and culture, migration impacts and governance issues in times of change. The paper will also outline the development of the research methodology which resulted in an innovative approach to applied policy research in the context of the emerging issues of climate change adaptation and governance.

### **38) Short-rotation energy cropping as a climate change adaptation strategy for the NSW Central West**

*Alex Baumber, Institute of Environmental Studies, University of New South Wales*

Bioenergy production from short-rotation woody crops such as Blue mallee (*Eucalyptus polybractea*) have been proposed as climate change mitigation strategies due to the renewable energy they can produce and the carbon they can sequester. However, such short-rotation energy crops can also play a role in climate change adaptation in areas such as Condobolin, on the margin of the New South Wales sheep-wheat belt. If annual cereal crop production declines under projected shifts in rainfall and temperature, new farming systems based on low-rainfall perennial crops such as mallee may be required. Revegetation involving woody perennial plants has also been identified as a key regional mechanism for protecting soil and conserving biodiversity. Short-rotation energy cropping systems could offer a means of achieving many of these outcomes while enabling landholders to maintain an income from the land.

A group of landholders around Condobolin have been exploring bioenergy options involving plantations of Blue mallee (*Eucalyptus polybractea*), partly inspired by the nascent Oil Mallee industry in Western Australia, as well as by mallee field trials carried in their own district. The successful matching of commercial and environmental goals in plantation establishment depends on many technical and

economic considerations, as well as a number of social and environmental factors. This paper reports on the results of landholder interviews which explore each of these factors and test some of the assumptions that commonly underpin economic and policy analysis concerning land use change.

### **39) Adapting to new economic opportunities arising from climate change: tree planting for carbon sequestration in rural New South Wales**

*Jacki Schirmer, Fenner School of Environment and Society, Australian National University*

Discussions on human adaptation to climate change often focus on helping communities adapt to the negative impacts of climate change, such as impacts on agricultural production or human migration patterns. Strategies intended to mitigate climate change, such as tree planting for carbon sequestration, sometimes provide new economic opportunities, but also present their own adaptation (as well as adoption) challenges. While these strategies have potential to help individuals adapt to climate change, their ability to achieve this will depend on the capacity of these individuals to adopt and adapt to the new practices involved. The implementation of these strategies, meanwhile, can change social and economic structures in rural communities, with potentially wide ranging implications. Tree planting for carbon sequestration is a commonly discussed, and often controversial, response to climate change, and therefore a useful practice to examine to understand the adaptation challenges presented by climate change mitigation strategies. We explored landholder perceptions of tree planting for carbon sequestration in rural New South Wales, Australia, aiming to understand the factors that help and hinder rural landholders in both adopting this practice, and adapting to its presence in their community. We identified a range of factors influencing landholders' ability to adapt to the new opportunities presented by tree planting for carbon sequestration. These included willingness to consider adopting a new economic activity, their perceptions of its appropriateness as a response to climate change and its impact on their current economic activities. In addition, a range of characteristics of tree planting programs influence how easily they can be adopted by landholders. We conclude that when encouraging climate change adaptation via the introduction of new economic activities it is essential to ensure these activities are compatible with the skills, capacity and existing economic activities of target communities, as well as to design effective extension programs encouraging adoption.

### **40) Climate change adaptation financing in the Global South: Deriving guiding principles and the imperative for change from Bangladesh's experience**

*Philip Ireland, Macquarie University*

Climate change adaptation for vulnerable people in the Global South has been identified as a priority by Australia and a range of other governments. Recent years have seen the emergence of a range of different governance mechanisms for financing which include the United Nations Framework Convention on Climate Change (UNFCCC), NGOs, and Multilateral Development Banks (MDBs). To date, funds proposed by MDBs, such as the World Bank's Climate Investment Funds, appear to be a default option for the majority of donor governments. Emerging from this context, this paper examines this trend, and finds that MDBs are currently not an appropriate financing mechanism for adaptation - and that a range of other opportunities exist.

Using the case study of Bangladesh we explore MDBs' development activities, focussing on their engagement with environmental issues. In this paper we examine a range of MDB-coordinated activities, including the Flood Action Plan and coastal resource management programs. We demonstrate that Bank environmental assessment, planning, and processes were inadequate in these instances, and, at points, negligent. In addition, these examples pose serious questions around the capacity of MDBs to effectively govern climate change adaptation programs that will simultaneously benefit the most vulnerable communities and protect fragile ecosystems. Bangladesh's experience with MDBs, and the environmental impacts of their work, provides a range of insights that should be taken into account when contemplating adaptation financing governance.

Emerging from this investigation, we explore some of the key principles that should be considered when selecting appropriate climate financing mechanisms. In light of the case study we examine contemporary MDB reforms, and assess the merit of financing proposals put forward by these institutions. We then evaluate a range of alternative adaptation financing opportunities, particularly the UNFCCC Adaptation Fund. We contend that, in the short to medium term, donor governments should prioritise financing mechanisms with mandates that reflect appropriate principles and seek to direct resources towards vulnerable communities and ecosystems.

#### **41) Climate Change Adaptation and Governance in the Coastal District of Bhola in Bangladesh** *Nahid Sultana, Institute of Environmental Studies, University of New South Wales*

Bangladesh is one of the most climate vulnerable countries in the world and will become even more so as a result of climate change. Floods, tropical cyclone, storm surges and droughts are likely to become more frequent and severe for the coastal belt in the coming years. These changes will threaten the significant achievements Bangladesh has made over the last 20 years in increasing incomes and reducing poverty, and will make it more difficult to achieve the MDGs. In the worst case scenario, unless existing coastal polders are strengthened and new ones built, sea level rise could result in the displacement of millions of people –“Environmental Refugees” from coastal regions, and have huge adverse impacts on the livelihoods and long-term health of a large proportion of the population. The coastal zone (CZ) of Bangladesh covers 19 districts facing or having proximity to the Bay of Bengal and the exclusive economic zone (EEZ). Among others, “Bhola” district is prominent in high vulnerabilities in terms of insecurity of food, income, water, health and poverty. A combination of geographical and social conditions contributes to the high death toll of Bhola district due to increase of frequency and intensity of tropical cyclones and storm. The blend of the community based adaptation of climate change and the governance of national and local level towards proper implementation of Coastal Zone Policy (CZPo) and Coastal Development Strategies (CDS) of Integrated Coastal Zone Management Plan (ICZMP) is the prime question rises now for the district like Bhola to improve livelihood and build more awareness towards climate change. Among others National Rural Development Policy (2001), National Agricultural Policy (1999), and Environmental Policy, should be put in to greater review if they have accentuate the development of the coastal communities and climate change issues. Any adaptive measures in the coastal areas should be focused on the perspectives of potentially affected people so as to ensure successful implementation and long term operation.

#### **42) The (Political) Resistance to Recycled Water: The Case of South East Queensland** *Alison Browne, Lancaster Environment Centre, Lancaster University*

In 2008 the Queensland Government brought online the ‘South East Queensland Grid’ – an interconnected water supply system constructed to address water security for a region historically concerned with flooding and oversupply. Corridors of pipelines were intended to provide an interconnected system of existing, new and reactivated dams, a desalination plant on the Gold Coast, and three sites producing purified recycled water. As the SEQ grid was about to come ‘online’, it rained - hard. The 2008 rains officially broke the drought. In this context of plenty it was decided that recycled water would be used to supplement the SEQ grid only when the dams were at 40% capacity. This is despite scientific evidence at the time that indicated water security of SEQ would be increased if recycled water was used as an ongoing source of supplementation.

This case study will focus on the way that consistent research, media and political focus on the risks and uncertainties associated with the use of recycled water, systematically moved attention away from other significant issues embedded in the implementation of the SEQ grid system. This includes issues such as: water loss and leakage, and high carbon involved in systems moving large scales of water across 1000’s of kilometres; the high carbon intensity of the desalination plants used to consistently supplement the system; how a level of ‘artificial consumption’ is often required for ‘offline’ infrastructures even when not supplementing the drinking water supplies; and the lack of encouragement of permanent individual and local level adaptation, instead the promotion of a ‘crisis response’ by expecting consumers to move back to a higher per capita consumption except in times of extreme drought. The political and scientific barriers to adaptation are explored through these different levels and characterisations of ‘risk’ implicit in this context.

#### **43) Is desalination a sensible climate adaptation measure for Sydney?** *Phoenix Lawhon-Isler, Institute of Environmental Studies, University of New South Wales*

Adaptation to climate change is a major challenge for urban water management in Australia, adding a layer of complexity to efforts to cope with population pressures and drought management. In water management, adaptive capacity means being able to cope with and adjust to uncertain future developments and potentially catastrophic disturbances like severe droughts. While the goal of adaptive management is to maintain resilience (flexibility and ability to withstand change) within ecological and social systems, when institutions themselves are resilient to innovation, the opposite effects can occur. Resilient institutions contribute to the ‘lock-in’ situation, in which existing infrastructures, consumer behaviours, and engineering practices and norms serve to stabilize each other. This study examines the

choice of desalination as a climate adaptation measure in Sydney, and asks whether desalination is actually maladaptation which perpetuates this 'lock in' situation and results in greater vulnerability to climate change.

In Australia, desalination has been embraced as a rainfall-independent and therefore 'climate proof' water source. The high level of certainty it provides to policy makers makes it an attractive option for climate adaptation. But there are drawbacks to this policy. Firstly, desalination distracts from the need to build adaptive capacity and resilience into urban water systems through an integrated, whole-of cycle approach. It also reflects a misguided pursuit of elimination of climate risk as a goal attainable through technical means rather than an ongoing process of adaptation of both technical and social systems to build resilience. Desalination reinforces the institutional tendency to rely on supply-side solutions, which in turn encourages wasteful consumption habits, and reduces incentives to adapt water use behaviours. The study concludes that desalination plants may be doing more harm than good for Australian cities by locking in unsustainable patterns of water management and narrow climate adaptation trajectories.

#### **44) Implementing national adaptation programmes in Kiribati: Initial barriers and opportunities**

*Natasha Kuruppu, Parramatta City Council*

In many Least Developed Countries and Small Island Developing States, such as in Kiribati, formal national adaptation programmes are currently being operationalised through United Nations Framework Convention. Given the infancy of such initiatives, limited scholarship exists that examine the practical dimensions of the implementation process. This study aims to characterise some of the initial barriers and opportunities associated with implementing national adaptation programmes in Kiribati with a specific focus on the implications for water management. The analysis is based on the body of literature related to the impact of foreign aid and its effectiveness. The results indicate that some of the barriers are long-standing international barriers to aid effectiveness and others are specific to international adaptation programmes and the climate change issue. These included: declining confidence in the international climate negotiations and the Framework Convention process; the need to address mitigation even in countries where adaptation is a priority; the role of grassroots and bottom-up vulnerability analyses in determining the success of national adaptation efforts; the importance of building dedicated capacity and inter-ministerial coordination for steering adaptation at the national level; and confusion, competition and complementarities resulting from different international adaptation initiatives for one country. Although adaptation funding has introduced innovative approaches to development planning in Kiribati, longstanding barriers to aid effectiveness such as poor coordination, limited efforts to reorient internal practices and 'look good' community participation initiatives remain largely unchallenged and may slow the progress of adaptation actions on the ground. It emerges that adaptation, particularly within the water sector depends on integrated approaches and adaptive capacity across multiple scales from the local to national and international.

#### **45) Transcending the Past: Renovating Climate Change Policy in Small Pacific Island States, Tonga**

*Taniela Faletau, Institute of Environmental Studies, University of New South Wales*

**Objective:** The study of Environmental Management through effective planning and policy to better facilitate the sustainable provision of natural resources. In the face of climatic change this is critical for the developing Island states of the Pacific where external pressures for economic development take precedence over ecological consequences.

**Hypothesis:** With prudent management, planning, and effective policy enactment and enforcement, island states like Tonga can benefit from socio-economic development that integrates both economic demand for development and the need to preserve the environment in a sustainable manner.

**Context:** The Kingdom of Tonga historically is a class structured society. The 1875 Constitution confirmed the King's liberation of commoners from chiefly authority, as well as legalising private land tenure. The following Land Act of 1927 then prescribed strict rules for land acquisition through the Minister for Lands who is the sole representative of the Crown in all matters concerning land and sea in the Kingdom. Tonga's current environmental and resource management framework as a consequence is founded in the 1875 Constitution and the Land Act. This basically sets out the constitutional and administrative structure that established the modern land and marine tenure as practiced today. More importantly, political perceptions, the supporting institutions, and the resource management structure that was initially formulated were a reflection of this past and of priorities at the time. Consistent with deductions of 'Environment and Development' theory, elevation of the economy and raising the standard of living to a more affluent level was of utmost priority. The complication created here is that

the country's priorities have shifted with time, assisted by the increasing global focus on sustainable development and the environment. However in light of overwhelming economic pressures to develop, the current environmental framework with its inherent legacies although evolving through recent national reform can be deemed inept and still lacking the capacity to adequately address arising environmental issues. Successful research will fundamentally contribute to the reform process and aid the Tongan Government in ensuring that potential development initiatives are provided the proper sustainable vision, direction and guidelines in light of a changing paradigm. The framework developed will more importantly be knowledgeable in objectively integrating information from all disciplines into enhancing management of the environment from a critical and rational perspective.

#### **46) Climate Change Adaptation Policy and Governance in New Zealand**

*Ros Taplin, Mirvac School of Sustainable Development, Bond University*

Adaptation in response to climate change impacts is achieved by developing activities that potentially lessen climate change impacts on existing processes, practices and policies at all levels of society. Adaptation, being locally specific, is influenced by regional and global climate change. Thus, successful adaptation requires individual as well as collective action at the community, national and international level. Being an island nation with unique biodiversity, New Zealand is susceptible to global climate change impacts due to its low population density, a long coastline, varied geomorphology and an economy reliant on the primary production sector. While New Zealand's current adaptation strategy focuses on key areas of vulnerability to climate change impacts and consists of legislation and information materials, implementation however, requires a holistic approach in adaptation decision-making including understanding of civil society perspectives and participation of all stakeholders. This paper examines aspects of New Zealand's adaptation policy development process and the country's international policy participation on adaptation issues. This paper discusses key adaptation areas that New Zealand needs to address and the challenges of decision-making on these. Prospects for future adaptation in New Zealand and the role of governance are also addressed.

#### **47) Climate Change Adaptation in the Southern Areas of the Straits of Malacca: An Assessment of the Coastal and Marine Governance in Malaysia**

*Mohazri Syed Hazari, Alam Sekitar Malaysia Sdn. Bhd. (ASMA), Shah Alam, Malaysia*

The existing governance framework for climate change adaptation for Malaysia's coastal and marine areas is still absent, mainly due to the fact that it does not have any specific policy on climate change. Most of the provisions for adaptation in coastal and marine areas are vaguely embedded in Malaysia's existing policy, regulation and management framework. This paper assesses the existing coastal and marine governance in Malaysia for climate change adaptation, especially to global warming and the sea level rise. Focus is given to the southern area of the Straits of Malacca (Tg. Piai and Sg. Pulai Estuary). Firstly, this paper defines the concept of *climate change adaptation* in coastal and marine areas, taking into account Malaysia's perception. Secondly, a brief description is presented on the vulnerability of Tg. Piai and Sg. Pulai Estuary to global warming and sea level rise. Thirdly, it briefly assesses the existing environmental related governance framework in Malaysia related to the Straits of Malacca, concentrating on the vulnerable areas. Since there are numerous definitions exist for the term *governance*, this paper loosely defines the term as Malaysia's existing policy, regulatory and management framework. Fourthly, this paper outlines the climate change adaptation issues at the vulnerable areas by analysing the issues related to the coastal and marine areas as described in the reports that formed the basis of Malaysia's *Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC)*.

Finally, this paper presents key climate change governance options for the vulnerable areas.

#### **48) Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA): the experience from Indonesia**

*Riyanti Djalante, School of Environment and Geography, Macquarie University*

Recently there have been a number of calls advocating closer collaboration between disaster risk reduction (DRR) and climate change adaptation (CCA). Conceptual similarities and differences, as well as barriers and opportunities for convergence have been put forward by a number of scholars. But despite the synergies and opportunities, linking the two approaches is difficult in policy and practice. DRR and CCA linkage is particularly important in Indonesia due to its extremely high vulnerability to hydro-meteorological disasters. It is observed that while DRR policies are more of influenced by internal

situations in Indonesia, CCA policies are developed due to strong influence of international policies development in addressing climate change. The 2004 Aceh tsunami as well as other recent disasters in Indonesia has significantly put DRR policies development high in the government policy agenda, while Indonesia's signature to the UNFCCC in 1992 mark a very significant milestone in policy development of climate change mitigation and adaptation. The author utilise Biermann et al., (2009) "The Fragmentation of Global Governance Architectures: A Framework for Analysis" to examine how fragmentations issues in DRR and CCA policies in Indonesia come to play and evolve across national levels and how the policies can be strategically and synergistically evolve down to the sub-national levels. Two arguments presented in this paper: First, because CCA is still in its early stages of planning and implementation in Indonesia, it should build as much as possible on existing strategies and tools developed for DRR to avoid duplication in institutions, policies, funding and processes, and to achieve better integration. Second, sub-national government authorities tasked with implementation are lagging behind their national counterparts in terms of planning and developing DRR and CCA, and therefore efforts need to be stepped up in building the skills and financial support directed at the lower levels of governance.

#### **49) The Role of Local Government in Agricultural Adaptive Response to Climate Change: a case study in Gansu China**

*Li Wang, Institute of Environmental Studies, University of New South Wales*

The detected global and regional increases in temperature and changes in the precipitation patterns have approved impacts on the agricultural production. The farm-level adaptation is thus important for the sustainable agricultural development in the climate change scenario. A wide variety of adaptation policy and strategies has been served for reducing the severity and cost of climate change in last decades. It's accepted that policy and governance options are in response to climate change by constitutionally facilitating both mitigation and adequate adaptation. The planned agricultural adaptation policy options are to deal with modifying the impacts or vulnerability of natural system to climate change and its effects. This paper employs the empirical research methods to inspect the role of local government in the public policy decision-making process with respect to a suite of changing climatic conditions (including variability and extremes), crops production and local farmers' agricultural income. Climate data, agricultural adaptation policy options and local governance procedures are also examined in Zhuanglang County in arid Northwest China. The results reveal that Chinese local government (county and township levels) plays a significant part in stimulating adaptation initiatives within agricultural sectors and local communities. The resources, technologies and instrumental climate data structurally equip the local government agencies to respond successfully to climate variability and change through complex policy actions. For progress on integrating "top-down" policymaking and "bottom-up" grassroots knowledge to the agricultural adaptation, there's a call for farmers' participation in the decision-making and local governance movement.

#### **50) Climate Change Migration issues and lessons from Carteret Islands**

*Johannes Luetz, Institute of Environmental Studies, University of New South Wales*

People displaced by climate change-related environmental degradation face numerous hardships. Sometimes the changes can be so sudden, severe, degenerative and/or self-reinforcing that permanent relocation and resettlement are unavoidable. Under international law, refugee protection is strictly reserved for those forced to flee across an international border as a result of war or persecution. Such people usually have the possibility of return if and when things get better. But when people lose their homes, lands or indeed countries as a result of climate change-related problems (e.g. islands disappearing under the sea) all hope of eventual return is lost. Without political forethought large scale displacements of people are likely to destabilise nations internally, aggravate existing tensions between states, and cause unnecessary suffering in both forced migrant "origin" and "destination" regions. While academics, researchers and journalists have talked and written extensively *about* climate migrants, few of them have talked *to* them. Communities where climate change-related displacement is happening or likely to occur in the future ought to be moved from the fringes to the centre of the "Climate Change Migration Management" debate if holistic, equitable and enduring resettlement solutions are to be arrived at. No matter how assertive future greenhouse gas reduction efforts may be, inertia of the climate system means that the coming decades will see climate change-related pressures exacerbated to the detriment of Small Island States. Islanders increasingly pushed out from their islands by population growth, rising sea levels and freshwater decline can be conceived as a "live" miniature lab for the study of opportunities and success factors for equitable resettlement. Learning today's lessons can

inform duty bearers in the international community to prepare for an influx of climate exiles prior to their looming displacement. This pilot study seeks to identify pertinent issues and lessons learnt from the Carteret Islands, one of the first evacuation sites of low-lying islands now rendered uninhabitable by rising sea levels.

**51) Community Networks, Coping Sectors and Changing Tides: A Case Study of Climate Change Adaptation Governance in Nadi River Basin, Fiji Islands**

*Alvin Chandra, School of Earth, Atmospheric and Environmental Sciences, University of Manchester*

Nadi, Fiji Islands is a productive and commercially growing town in Pacific Islands with an expanding number of tourism developments. Like other SIDS, it is relatively vulnerable to climate change, as evident from the increasing frequency of floods, storm surges and cyclones. This research identifies and analyses climate change vulnerability and adaptation to manage flood risks in the Nadi River Basin. Fuzzy Cognitive Mapping (FCM) and semi-structured interviews were conducted with stakeholders belonging to six stakeholder groups. Stakeholder groups agree that physical, social, economic, political and environmental factors make the basin more vulnerable to regular flooding. Some community groups such as the catchment farmers, villagers and squatter settlements are more vulnerable as they continue to develop and derive livelihood from natural resources that are at greater risk to extreme climate related hazards. They also possess less coping resources such as insurance, technology and opportunities for participation in risk reduction programmes. This research suggests that for workable and effective adaptation measures, all sectors (state and non-state actors), must consider integrating climate change in the planning processes, encouraging community participation, securing the vulnerable groups, embracing multi-level governance systems, promoting knowledge and awareness and encompassing adaptive management and learning across all levels of decision-making. Adjustments to policy measures and insurance schemes are also being proposed which better seeks to offer benefits to local communities. These have the potential to enhance capacities to adapt to floods and improve ecosystem integrity for resilience.

**Tuesday 16th November**

**8:30am** Arrivals, registration, refreshments  
**8:45am** Welcome and overview  
**9:00am** Professor Jean Palutikof, Director of NCCARF

**Room G07: John B Reid Theatre**

**9:30am** **Jim Falk** Climate governance: bringing it down to scale  
**9:45am** **Fiona Miller** Questioning assumptions: role of vulnerability assessments in CCA  
**10:00am** *Discussion*  
**10:30am** **Asa Persson** Governance of international climate change adaptation finance (UNFCCC)  
**10:45am** **Chi Truong** Investment options mitigating losses under impacts of CC  
**11:00am** *Discussion*

**11:30am** **Break**

**12:00pm** Lunch

**12:30pm** Panel Discussion (Room G07)

**1:00pm** **Douglas Bardsley** CCA in the context of failing socio-ecosystems  
**1:15pm** **Siri Veland** Contextual CCA issues for Indigenous Australia  
**1:30pm** *Discussion*  
**2:00pm** **Julie Davidson** Marine biodiversity conservation governance: a draft set of conditions  
**2:15pm** **Kim Byrnes** Regional CCA - biodiversity and emergency management  
**2:30pm** *Discussion*

**3:00pm** **Break**

**3:30pm** **Kath Fisher** Comm+loc Gov collab on CC:Vic case study of deliberative democracy  
**3:45pm** **Patricia Fitzsimons** Social networking consequences for gov arrangements in SW Victoria  
**4:00pm** *Discussion*  
**4:30pm** **Amy Lovesey** Climate change action planning workshops - local council initiative  
**4:45pm** **Mel Bainbridge** Liability, Planning and CC - Local government in Gridlock  
**5:00pm** **Karlie Tucker** Integrated planning for a sustainable Shepparton community  
**5:15pm** *Discussion*

**6:00pm** Panel Discussion (Room G07)

**6:30pm** Drinks

**7:00pm** Dinner

**Room G06: Colonial Bank Theatre**

**9:30am** **Break**

**10:00am** **Peter Glynn** Climate change: employment and social implication  
**10:15am** **Simon Niemeyer** The role of deliberation in managing public responses to climate change  
**10:30am** *Discussion*

**11:00am** **Betsi Beem** Impact of broad governance issues on local decision making  
**11:15am** **Martin Rice** Less Engaged? Climate Scientists and adaptive governance  
**11:30am** *Discussion*

**1:00pm** **Break**

**1:30pm** **Judy Lawrence** Do we have tools for adaptive governance and mgmt of CC Impacts?  
**1:45pm** **Alex Gold** From knowledge to action for climate change adaptation  
**2:00pm** *Discussion*

**2:30pm** **Johanna Mustelin** Challenge of gov. uncertainty through A: SE Queensland  
**2:45pm** **Nadine White** Adaptive planning to physical impacts of cc in NSW Loc Gov  
**3:00pm** *Discussion*

**3:30pm** **Break**

**4:00pm** **Awais Piracha** CC Mitigation & Adaptation at Local Govs in NSW  
**4:15pm** **Lorraine Bates** Dev. Measure of adaptive capacity of orgs in a regional setting  
**4:30pm** *Discussion*

**5:00pm** **Katherine Daniell** Enhancing policy initiatives through multi-level governance in the face of CC  
**5:15pm** **Claire O'Neill** Development of CCA strategies in Torres Strait, QLD  
**5:30pm** *Discussion*



**Wednesday 17th November**

**8:30am** Arrivals, registration, refreshments

**Room G07: John B Reid Theatre**

**9:00am** **Laura Stocker** Coastal Management Processes in Oz: conceptual & adaptive processes  
**9:15am** **Pedro Fidelman** Barrier Reef: CCA and multilevel governance  
**9:30am** *Discussion*  
**10:00am** **Edward Boydell** A to CC in practise: learning from local gov case studies  
**10:15am** **Timo Leiter** Monitoring & reporting CCA in local governance (Sydney Coast)  
**10:30am** *Discussion*

**11:00am** **Break**

**11:30am** Panel Discussion (Room G07)

**12:00pm** Lunch

**12:30pm** **Lawrence Yu** More Flexible Governance for Climate Change Adaptations – Not Fixed Targets  
**12:45pm** **Wendy Steele** Adaptive governance and climate change: the challenge for cities  
**1:00pm** *Discussion*  
**1:30pm** **Alex Baumber** Short rotation energy cropping as CCA strategy for NSW Central West  
**1:45pm** **Jacki Schirmer** Tree planting for carbon sequestration in rural NSW  
**2:00pm** *Discussion*  
**2:30pm** **Alison Browne** Political Resistance to Recycled Water: SE Queensland  
**2:45pm** **Phoenix Lawhon-Islser** Desalination a sensible climate change adaptation measure for Syd?  
**3:00pm** *Discussion*

**3:30pm** **Break**

**4:00pm** **Roslyn Taplin** CCA Policy and Gov in New Zealand  
**4:15pm** **Syed Mohazri** Assessment of Coastal and Marine Governance in Malaysia  
**4:30pm** *Discussion*  
**5:00pm** **Johannes Luetz** Climate Change Migration issues and lessons from Carteret Islands  
**5:15pm** **Alvin Chandra** Case Study of CCAG in Nadi River Basin, Fiji Island  
**5:30pm** *Discussion*

**6:00pm** Panel Discussion (Room G07)

**Room G06: Colonial Bank Theatre**

**9:00am** **Break**

**9:30am** **Neil Lazarow** Barriers to effective engagement of stakeholders in Coastal CC Policy  
**9:45am** **Carolyn Hofmeester** Social cultural influences on coastal decision making for CCA  
**10:00am** *Discussion*  
**10:30am** **Alice Bergonia** Integrating CCA into coastal planning and development in NSW  
**10:45am** **Anne Leitch** Rethinking local for adaptation to sea level rise  
**11:00am** *Discussion*

**12:30pm** **Break**

**1:00pm** **Carla Mooney** Impacts of drought, low flows and reduced allocations  
**1:15pm** **Elissa Waters** Drying Lake: observed impact research to inform CCA policy  
**1:30pm** *Discussion*  
**2:00pm** **Phil Ireland** CCA Financing in Bangladesh: Guiding principles & change imperatives  
**2:15pm** **Nahid Sultana** CCAG in coastal zones of Bangladesh  
**2:30pm** *Discussion*

**3:00pm** **Break**

**3:30pm** **Natasha Kuruppu** Kiribati: Implementing adaptation programmes: barriers and opportunities  
**3:45pm** **Taniela Faletau** Renovating CC Policy in Tonga  
**4:00pm** *Discussion*  
**4:30pm** **Riyante Djalante** CCA and Disaster Risk Reduction in Indonesia  
**4:45pm** **Lily Wang** Gansu China: Agricultural Adaptive Response to CC  
**5:00pm** *Discussion*

**5:30pm** **Break**

**Thursday 18th November**

**8:30am** Arrivals, registration, refreshments

**Room G07: John B Reid Theatre**

**9:00am** Workshop Wrap-up: Plenary Discussion Panel

**10:30am** Break

**11:00am** Outcomes and future directions re: the Social, Economic and Institutional Dimensions Network

**12:30pm** End