



**NCCARF**

National  
Climate Change Adaptation  
Research Facility

National Adaptation Network  
SETTLEMENTS AND INFRASTRUCTURE

Proceedings 10th Early Career Researchers'  
National Forum & Workshop,  
Griffith University, Gold Coast Australia  
20-22 July 2015

Australian Climate Change Adaptation Research  
Network for Settlements and Infrastructure



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# ACCARNSI 10TH NATIONAL ECR FORUM AND WORKSHOP PROGRAM

## DAY 1 Monday 20 July 2015: Griffith University , Gold Coast Campus Smart Water Building G51 - Ground Floor

10.00	<i>MORNING TEA ON ARRIVAL</i>
10.30	<b>ECR FORUM WELCOME:</b> Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI</i>
10.45	<b>GUEST PRESENTATION:</b> Climate Justice in the Pacific Professor Brendan Mackey, <i>Director, Griffith Climate Change Response Program, QLD</i>
11.20	Climate change adaptation in the Solomon Islands: Relocating Choiseul Township Rhiannon West, <i>Buckley Vann Town Planning Consultants, QLD</i>
11.40	Public perceptions, responses, and policy support for climate change adaptation in Fiji Shalini Lata, <i>University of New England, NSW</i>
12.00	An insight into the complex structure and impacts of climate extremes in the Philippines Nikos Penaranda, <i>Griffith University, QLD</i>
12.20	Discussion of key themes lead by Professor Brendan Mackey
12.40	<i>LUNCH</i>
1.30	Mainstreaming climate change adaptation into a donor-assisted road project in Cambodia: institutional challenges Bunlong Leng, <i>University of Melbourne, VIC</i>
1.50	Adapting to increasing saltwater: Shrimp farming livelihoods and migration outcomes in the Mekong Delta Vietnam Olivia Dun, <i>University of Wollongong, NSW</i>
2.10	Discussion of key themes lead by Associate Professor Ron Cox
2.30	<i>AFTERNOON TEA</i>
2.50	Is sea level rise accelerating or not? Maria McCrann, <i>Latrobe University, VIC</i>
3.10	Modelling the effect of sea level rise on tropical cyclone storm surge impact Gaelle Sophie Faivre, <i>Griffith University, QLD</i>
3.30	Evaluation of Climate Change Adaptation and Resilience Strategies in the Gold Coast and Sunshine Coast policies Elnaz Torabi, <i>Griffith University, QLD</i>
3.50	Gold Coast's Golden Year of 2018: Indigenous Knowledge, Climate Change Adaptation and Ontological Design Events Tristan Schultz, <i>Griffith University, QLD</i>
4.10	Discussion of key themes lead by ACCARNSI Researcher Assistant Dan Ware
4.30	<b>DAY 1 CLOSE</b>

6.30	<b>GROUP DINNER:</b> Southport Yacht Club, 1 Macarthur Pde Main Beach Booking under name of ACCARNSI
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**DAY 2    Tuesday 21 July 2015: Griffith University , Gold Coast Campus  
Smart Water Building G51 - Ground Floor**

9.15	<i>TEA AND COFFEE ON ARRIVAL</i>
9.30	<b>PRESENTATION:</b> Open Coasts and Climate Change Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI; Leader, NSW Climate Adaptation Research Hub for Coastal Processes and Responses</i>
10.00	<b>PRESENTATION:</b> Enclosed Coasts and Climate Change - Gold Coast Broadwater Professor Rodger Tomlinson, <i>Director, Griffith Centre for Coastal Management, QLD</i>
10.30	<i>MORNING TEA</i>
11.00	Forecasting of storm impacts on a high energy coastline Josh Simmons, <i>University of New South Wales , NSW</i>
11.20	Bringing back the beach: beach recovery following storm erosion Matt Phillips, <i>University of New South Wales, NSW</i>
11.40	Barriers to Adoption of Evaporation Mitigation in Rural Australia Eliza Mooring, <i>University of New South Wales, NSW</i>
12.00	Bayesian Network and System Dynamics Modelling to manage water-related health risks from extreme events Edoardo Bertone, <i>Griffith University, QLD</i>
12.20	Discussion of key themes lead by Professor Rodger Tomlinson
12.40	<i>LUNCH</i>
1.30	<b>FIELD TRIP:</b> Bus to Q1 Skypoint Viewing Platform, Surfers Paradise
2.30	<b>FIELD TRIP:</b> Bus to Narrowneck and Seaway Sand Bypass Jetty
3.30	<b>FIELD TRIP:</b> Bus to Griffith University Smart Water Building G51
3.45	<i>AFTERNOON TEA</i>
4.15	<b>GUEST PRESENTATION:</b> Artificial Reefs and Climate Change Adaptation - Narrowneck Artificial Reef Dr Darrell Strauss, <i>Senior Research Fellow, Griffith Centre for Coastal Management, QLD</i>
4.45	<b>PRESENTATION:</b> Sand Bypass Plants and Climate Change Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI; Leader, NSW Climate Adaptation Research Hub for Coastal Processes and Responses</i>
5.15	<b>DAY 2 CLOSE</b>

**DAY 3    Wednesday 22 July 2015: Griffith University , Gold Coast Campus  
Smart Water Building G51 - Ground Floor**

8.45	<i>TEA AND COFFEE ON ARRIVAL</i>
9.00	<b>GUEST PRESENTATION:</b> NCCARF's National Coastal Adaptation Framework Dr Dave Rissik, <i>Deputy Director, NCCARF, Griffith University, QLD</i>
10.00	A database of Australian climate change adaptation plans Lisette Collins, <i>University of Sydney, NSW</i>
10.20	Coastal Climate Change in Australia: performance at the local level and the idiosyncrasies of local government(s) Tayanah O'Donnell, <i>University of Canberra, ACT</i>
10.40	<i>MORNING TEA</i>
11.10	Adapting the Australian Banking Sector to Climate Change: A paradigm of desire, necessity and inconvenience Zsuzsa Banhalmi-Zakar, <i>Griffith University, QLD</i>
11.30	How to stop your research ending up on a shelf! Lessons learned from collaboration on the NSW Adaptation Research Hub, and how research is supporting NSW coastal policy Heather Stevens, <i>NSW Office of Environment and Heritage, NSW</i>
11.50	Embedding Adaptation - who, what, where and how? Alianne Rance, <i>RMIT University, VIC</i>
12.10	Discussion of key themes lead by Professor Rodger Tomlinson
12.30	<i>LUNCH</i>
1.30	<b>WORKSHOP:</b> National Adaptation Research Plan (NARP) Review Session 1: Current State of Play Facilitated by Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI</i>
2.30	<b>WORKSHOP:</b> National Adaptation Research Plan (NARP) Review Session 2: Filling in the Gaps Facilitated by Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI</i>
3.30	<i>AFTERNOON TEA</i>
3.50	<b>WORKSHOP:</b> National Adaptation Research Plan (NARP) Review Session 3: Group summaries Facilitated by Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI</i>
4.30	<b>WORKSHOP:</b> National Adaptation Research Plan (NARP) Review Reflections and Wrap Up by Professor Rodger Tomlinson
4.50	<b>ECR FORUM CLOSE &amp; VOTE OF THANKS:</b> Associate Professor Ron Cox, <i>Network Convenor, ACCARNSI</i>
5.00	Transport to Coolongatta Airport



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**CLIMATE CHANGE ADAPTATION IN THE SOLOMON ISLANDS: RELOCATING CHOISEUL TOWNSHIP**

*Rhiannon West*

**Abstract:**

Adaptive strategies are important for reducing the vulnerability of Small Island Developing States (SIDS) to climate change in both the long and short term. In 2014 an integrated climate change adaptation plan was prepared for Taro Island, in the Choiseul Province of the Solomon Islands. The plan was prepared under the Australian Government's Pacific-Australia Climate Change Science and Adaptation Planning programme by environmental consultancy BMT WBM in partnership with Buckley Vann Town Planning Consultants and the University of Queensland. Mapping of existing and future hazards, land constraints and community consultation underpinned a vulnerability and risk assessment and informed the development of a suite of adaptation options to improve community resilience to existing and future hazards, including climate change.

The centrepiece of the adaptation plan is the relocation of the Taro Island township to the adjacent mainland and a planning scheme to regulate future development in the existing and new township. The relocation of the township will require major infrastructure investment and will take 20 years or more to realise.

This presentation will discuss the model/process used to develop the adaptation action plan and the lessons could be learned for other Solomon Islands and SIDS communities. It will also discuss 'what's next' for the Choiseul township, in terms of relocation which requires the adoption of the draft planning scheme, liaison and negotiations with customary landowners and infrastructure construction.

Future ethnographic research is planned to document the early stages of implementation of the adaptation plan by the Choiseul Province Government, over the course of one year. This research seeks to document the adaptation experiences of Choiseul Province and contribute to discourse on barriers to adaptation for SIDS, including discussion on matters such as governance, customary land arrangements, access to finance, and other constraining societal and economic vulnerabilities.

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**PUBLIC PERCEPTIONS, RESPONSES, AND POLICY SUPPORT FOR CLIMATE CHANGE ADAPTATION IN FIJI**

*Shalini Lata*

**Abstract:**

Global environmental change or climate change classifies as a key global challenge today. While people (human/societies) are central to the issue, research emphasis till recent times has been on the scientific basis of the issue. Knowing about the science of the issue is important; however, equally important is the human, adaptation, and policy side of the issue. It is widely agreed that people's view or perception of an issue is an important in predicting behavioural intentions and policy preferences.

It is common knowledge now that impacts a changing climate will impact across sectors globally. A particularly vulnerable part is the small island developing states- here adaptation to the impact of climate changes is an imperative. This paper aims to share the results of a first cross-sectional survey on climate change risk perception to inform adaptation in Fiji (in the South-West Pacific). The Fiji Islands, like other Asia-Pacific countries are vulnerable to the effects of climate change owing to its size, location and dependence of its people on coastal and land resources for survival. This paper will firstly, outline the risks facing communities in Fiji especially those occupying the coastal-delta fringes. It will then aim to identify the perception of the issue of climate change (quantitative assessment of people's knowledge, information source and trust, concern, and responsibility for climate change) in Fiji and its application (how perception informs action and policy preferences) in the implementation of successful and sustainable adaptation solutions.

Overall, the findings from this PhD investigation can be applied to communities of the wider Asia-Pacific region who face similar challenges. This will improve environmental management, policy implementation, and climate change risk communication for a sustainable future.



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**ATYPICAL CYCLONE EVENTS: AN INSIGHT INTO THE COMPLEX STRUCTURE AND IMPACTS OF CLIMATE EXTREMES IN THE PHILIPPINES**

*Nikos Penaranda*

**Abstract:**

The climate is a dynamic system that affects us in complex ways. Its most tangible properties can be categorised as: (1) the familiar weather we have built our lives upon for generations (climatology) and (2) those unprecedented weather events that periodically disrupt our activities (climatic variability). Indeed, the very nature of climate is revealed through weather extremes that operate at different spatial and temporal scales and it is those long period climatic changes that impact our way of life. Our ability to adapt to changes in the climate system depends on three components: the nature of the weather event, the intrinsic features of a particular area (hazards) and the characteristics of the resident population (vulnerability and resilience). This study approaches the challenge of adaptability by looking into the nature of extreme weather events. Here, atypical tropical cyclone landfalls in Mindanao (Southern Philippines), a region with a highly vulnerable population, are examined. The study aims to provide a meteorological perspective into the complexity of climate variability and to suggest possible measures in addressing the challenge imposed by climate change in the developing world.

**Bunlong LENG**

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**MAINSTREAMING CLIMATE CHANGE ADAPTATION INTO A DONOR-ASSISTED ROAD PROJECT IN CAMBODIA: INSTITUTIONAL CHALLENGES**

*Bunlong Leng*

**Abstract:**

Vulnerability to climate change and the measures taken to reduce or adapt to it are already well researched. However there is little research on how climate change adaptation is mainstreamed and managed in the large-scaled development assistance of major donors such as Asian Development Bank (ADB). ADB development assistance in Cambodia is largely in climate-sensitive sectors and climate-vulnerable locations. The ADB “business-as-usual” development assistance may actually increase climate change vulnerability or hamper the progress of poverty alleviation, but its development activities can be potentially designed to not only reduce climate change risks but also promote climate resilience. However, there is little evidence to show how ADB has actually mainstreamed climate change adaptation considerations into its development assistance at the project-level and how ADB can become a guiding example for others in demonstrating value for money to cope with the vulnerability and uncertainty of climate change. Building on institutional change theory associated with impact assessment, this paper evaluates the decision-making process in pilot-mainstreaming climate change adaptation into the Provincial Road Improvement Project financed under the ADB Regional Development Assistance and the new global Strategic Program for Climate Resilience Fund. The paper, therefore, provides a contribution to understanding whether ADB or its development assistance can play a leading role in promoting climate change adaptation into its current and future investment projects.

**Olivia DUN**

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**ADAPTING TO INCREASING SALTWATER: SHRIMP FARMING LIVELIHOODS AND MITIGATION OUTCOMES IN THE MEKONG DELTA, VIET NAM**

*Olivia Dun*

**Abstract:**

Over the past decade, debate about the relationship between environmental change and human migration has magnified, being increasingly explored in academic literature, research and policy-oriented projects. Alongside this debate exploration, questions have arisen around how migration is situated as an adaptation to environmental change and whether more migrants can be expected in the future as climate change impacts intensify.

This paper examines how different categories of households (non-migrant, partial-migrant and entire migrant households) from the lower saline-intrusion zone of the Mekong Delta have adjusted to increasing salinization and rapid agricultural change over the past decade or so. Results indicate that limited opportunities for agriculture in increasingly saline-affected areas can result in some households becoming more vulnerable in terms of their ability to obtain food and earn a living from their land, exposure to financial debt, a reduction in household education level, exposure to new health risks, loss of physical assets and general overall ability to escape the trappings of poverty. This, in turn, can trigger independent household or individual migration decisions in the absence of stable livelihood alternatives at the site of environmental change.

While migration is a helpful solution and positive strategy for some households, some poorer migrants can end up in further vulnerable situations in their places of destinations working under unsafe conditions in factories or construction sites; or living in crowded and unsanitary boarding houses. The paper also reflects on the relative success of non-migrating households who adapted, in-situ, to the increasing salinization of the landscape.

**Maria McCrann**

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**IS SEA LEVEL RISE ACCELERATING OR NOT?**

*Maria McCrann, Bandita Mainali, Daniela Ionescu & Hassam Abo El-naga*

**Abstract:**

Sea level rise would be one of the most important effects of Climate Change. It can change our cities, our infrastructure and put at risk many communities. We most definitely need to determine how large the impact of climate change would be in our coastlines. The EPA estimates that 26,000 square kilometres of land would be lost should sea level rise by 0.66 metres, while the IPCC notes that as much as 33% of coastal land are likely to be lost in the next hundred years if the level of the ocean continues to rise at its present rate.

In its Fourth Assessment Report, the IPCC estimated that sea level would rise up to 0.59m by 2100. There are however, mixed sets of information, predictions and measurements. Some scientists claim the sea level rise rate is increasing due to global warming. On the other hand there are scientists affirming that predicted sea level rise is not being observed and on the contrary it might be declining as a response of global cooling. This proposed cooling will pose many challenges to our communities we are not considering at this stage.

My innovative research in climate change is to analyze the fundamental drivers for natural climate change variability as it manifests in sea levels, average total temperature and global rainfall for the purposes of developing a computer model to predict climate oscillations, in Australia, using the combination of solar activity predictions and planetary forces. In this presentation we are undertaking a review of sea level changes over the Holocene period to present time, particularly the sea level rise over the last 40 years and focusing on the fundamental climate change drivers which can cause the sea level to rise and fall.

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## MODELLING THE EFFECT OF SEA LEVEL RISE ON TROPICAL CYCLONE STORM SURGE IMPACT

*Gaelle Faivre, Dan Ware & Rodger Tomlinson*

### **Abstract:**

Across Northern Australia Tropical Cyclones present a major hazard for coastal communities. Improvements to building codes and investments in disaster planning have had demonstrable impact on the resilience of exposed communities however the hazard to life posed by Storm Tide inundation remains a major concern. Projected sea level rise due to climate change over the course of this century suggests that the impact of Storm Tide events will be more significant in the future as higher sea levels expose a wider area to inundation. While knowledge of climate change impacts on the frequency and intensity of Tropical Cyclones has implications for storm tide impacts Climate Change damage assessments frequently assume the relationship between storm tide impacts and sea level rise to be linear.

To examine the effect of sea level rise on Storm Tide Impacts this study presents the results of a storm tide inundation model of Cyclone Yasi run over varying water levels to simulate sea level rise. By comparing the impact of the inundation for the model runs at various water depths the relationship between Storm Tide Impact and sea level rise is identified.

This comparison of the modeled storm surge inundation depth for Cyclone Yasi considers cyclone wind and pressure fields generated with parametric techniques such as Holland et al. (2010) wind field profile. The storm tide was simulated using Mike 21 hydrodynamic software with offshore bathymetry obtained from multiple local, state and federal agencies and adjusted to AHD.

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**EVALUATION OF CLIMATE CHANGE ADAPTATION AND RESILIENCE STRATEGIES IN THE GOLD COAST AND SUNSHINE COAST POLICIES**

*Elnaz Torabi, Michael Howes & Aysin Dedekorkut-Howes*

**Abstract:**

There is an increasing concern about climate change and its impacts on both the natural and built environment. Climate change considerations, although still not fully integrated, have become an important part of disaster risk management (DRM) worldwide.

Australia has witnessed extreme weather events in the past and will witness more with the changing climate. Cities such as the Gold Coast and the Sunshine Coast are highly sensitive cases. These regions are both located in low-lying flood-prone areas and are among the fastest growing cities in Australia with an economy built on tourism and other major industries such as retail and construction. In Australia numerous mitigation strategies to cut greenhouse gas emissions and reduce the speed and scale of its impacts are in place. However, despite the urgency of the matter, climate change adaptation (CCA) has broadly been neglected by all levels of government and treated separately from DRM. Natural hazard planning, therefore, can be considered as an overarching process which is underpinned by the concepts of sustainability and resilience. This paper reviews the institutional context of the Gold Coast and the Sunshine Coast in addressing urban resilience to climate-related disasters. The focus is on the climate change strategies, planning schemes, and disaster management plans as integral parts of planning for natural hazards. The aim is to understand how principal concepts of urban resilience and CCA are reflected through policies at national, state and more specifically at local level and to provide a basis for comparison between the two regions.



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**GOLD COAST'S GOLDEN YEAR OF 2018: INDIGENOUS KNOWLEDGE, CLIMATE CHANGE ADAPTATION AND ONTOLOGICAL DESIGN EVENTS**

*Tristan Schultz*

**Abstract:**

With the 2018 Gold Coast Commonwealth Games in Australia drawing closer, cultural practitioners are being urged to use their communication skills to conceptualise and deliver quality cultural events ready for the games. This presents a timely opportunity and a catalyst to broaden the lines of enquiry between the 'mega-events' Commonwealth Games and Climate Change, along with the nature of cities, Australian Aboriginal Culture and Cultural Events.

To define the problem clearly, these socially transformative phenomena are at once converging, each with contestable world-views both within and outside their own spheres. Yet they are being drawn towards one totalizing ambition: the success of the Games. This research is concerned with raising the level of debate around those measures of success that are ignoring, or adhering to defuturing conditions of structural unsustainability both present in the region and rapidly arriving at the regions feet (including climate change, climate refugees and globalisation to name a few). The urgency of Coastal Planning for Communities facing future climate change challenges can be mediated and 'evented' by/in contestation with the Commonwealth Games, by redirective ontological designed and designing events.

The project is placed within the context of imperatives of sustainment, and employs decolonial frameworks. It contributes across disciplines (the author being of Aboriginal heritage and an accomplished interdisciplinary designer), with a commonality of scrutinizing the historical and futural consequences of Western Colonialism as it historically arrived and futurally continues to ontologically design these various phenomena.

**Josh SIMMONS**

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**FORECASTING OF STORM IMPACTS ON A HIGH ENERGY COASTLINE**

*Joshua A. Simmons, Ian L. Turner, Kristen D. Splinter, Ron J. Cox & Mitchell D. Harley*

**Abstract:**

Due to the concentration of infrastructure and population in the coastal regions of countries around the world and the growing threat of climate change impacts, there has been a widespread focus on developing sophisticated models to predict storm erosion changes to coastal morphology. While projected sea level rise presents a significant hazard in the long term, recent research suggests that changing storm wave climates will have the most significant impact on wave-dominated beaches in the next few decades. In this context, it is vital to monitor coastal erosion risks due to marine storms, and the combination of weather forecasts with coastal numerical models provides a tool to ensure that decision makers are able to make informed decisions on required temporary protection measures. As such coastal models are being incorporated into Early Warning Systems (EWSs) around the world, which are used forecast the impact of predicted weather and wave conditions upon beach morphology. In order to utilise these systems, the accuracy, reliability and applicability of current coastal numerical models must be analysed. This presentation will discuss the application of EWSs, data requirements for accurate forecasting, model optimisation and predictive uncertainty.

**Matt PHILLIPS**

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**BRINGING BACK THE SAND: BEACH RECOVERY FOLLOWING STORM EROSION**

*Matthew S. Phillips, Ian L. Turner, Ron J. Cox, Kristen D. Splinter & Mitchell D. Harley*

**Abstract:**

Understanding the way a beach changes with time as a protective sand buffer to storm erosion is of great value to the planning and management of coastal settlements and supporting infrastructure. A key component of this is how a beach will recover without human intervention following storm erosion. A quantitative knowledge of timescales and rates with key parameters governing beach recovery would inform decision makers in risk assessment of storm clustering and future climate change scenarios. This study uses a decade of daily beach width observations from an ARGUS coastal images station at Narrabeen-Collaroy Beach in south-east Australia. A total of ten beach width recovery periods were distinguished and analysed following substantial storm erosion events associated with single storms and clusters of several storms. A relatively consistent net linear rate of beach width recovery to pre-storm(s) conditions of 0.05 to 0.15 m/day was observed, with typical durations of several months to a year. A more variable and complex rate of beach width recovery was observed at higher resolutions of days to weeks. This study demonstrates the use of long-term field data measurements to better inform a quantitative understanding of beach recovery that is often lacking in coastal risk assessment.

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**BARRIERS TO ADOPTION OF EVAPORATION MITIGATION IN RURAL AUSTRALIA**

*Eliza Mooring & William Peirson*

**Abstract:**

Australia's variable rainfall challenges farmers and their ability to effectively manage water to maintain viable agricultural enterprises. Recent UNSW studies have demonstrated the ability to reduce open water evaporation by seventy percent, presenting an opportunity to make farm water supplies more resilient.

Lack of innovation adoption has previously been attributed to gaps between research and agricultural practice. To date there has been little direct interaction with farmers or appraisal of the socio-economic barriers preventing the adoption of evaporation mitigation practices. Discussions were conducted with agricultural leaders; in collaboration with twenty-one farmers' opinions to enhance this interaction.

Farmers primary concerns during drought are stock welfare and maintaining stock levels; objectives greatly challenged by lack of water. All farmers recognised the significance of evaporation and warmly welcomed the 'concept' of mitigating evaporation; however, its practical implementation requires substantial development. Both leaders and farmers concerns are highlighted below, with regulation deemed the greatest challenge to water management.

1. Government amalgamations have resulted in extension services disappearing.
2. Farmers won't invest in evaporation infrastructure until clarity regarding water ownership is achieved.
3. Greater water distribution networks would enable greater land management and utilisation of grazing areas.
4. The principal barriers identified were establishment costs, practical large-scale implementation, maintenance costs and longevity.

Increasing Australia's agriculture water supply will require substantial development and industry adoption lead time. The ability to witness practical implementation would overcome the principal barriers to the integration of technology into present farming practices. Proceeding to a large-scale field trial is essential and recommended.

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**BAYESIAN NETWORK AND SYSTEM DYNAMICS MODELLING TO MANAGE WATER-RELATED HEALTH RISKS FROM EXTREME EVENTS**

*Edoardo Bertone, Oz Sahin, Russell Richards & Anne Roiko*

**Abstract:**

The occurrence of extreme weather events can negatively impact the ability of water utilities to deliver drinking water of required quality for avoiding health-related risks for the consumers. Since the frequency and magnitude of extreme weather events may increase due to climate change, proactive risk-assessment and decision support tools are necessary to assist in effectively managing and mitigating such events. However, the utility of these tools can be limited due to the lack of comprehensive data and a high degree of uncertainty.

We use a combination of Bayesian Network (BN), System Dynamics (SD) and participatory modelling to develop a risk assessment tool for managing water-related health risks associated with extreme events. The combination of BN and SD modelling offers a number of advantages over other environmental modelling techniques; the capacity of dealing with a high degree of uncertainty, the use of feedback loops and the ability to elicit and integrate quantitative and qualitative data (including expert opinion).

The risk assessment tool is applied to the Prospect water filtration plant system, main source of potable water for the Sydney metropolitan region. Key-stakeholders were engaged in developing and populating the conceptual models that form the basis for the BN and SD models. The completed models will quantify the sensitivity of the system to different types and combinations of extreme events (both natural and anthropogenic). Overall, these complimentary modelling methodologies will assist water treatment operators, water managers and other stakeholders in developing informed mitigation strategies leading to an improved resilience of the system.

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## **A DATABASE OF AUSTRALIAN CLIMATE CHANGE ADAPTATION PLANS**

**Lisette B. Collins**

### **Abstract:**

Local governments in Australia have been developing Climate Change Adaptation Plans (CCAP) since 2008, although there has never been a single National or State-based collation/collations of the plans that have been developed. In light of this gap, the first stage of my PhD research involved creating a unique database of CCAPs developed by local governments from across the country. This presentation will present the findings from that database of CCAPs. Ninety-eight CCAPs were collected from across the country, a mix of individual council and regional efforts with a total of 166 councils (and counting) who have contributed to the development of a plan. Findings from the database show there was notable variation in the identification of risks in climate change adaptation plans across Australia. My research categorises these CCAPs into biophysical-based or socio-political inclusive plans. The latter are plans that make reference to education, vulnerable groups, and/or mental health, with education being the most often referenced and mental health the least referenced. The findings from the database, and analysis of the plans themselves, have implications for how we understand the remit of local governments in Australia when planning for adaptation. The research also presents a new way of conceiving of ‘vulnerability’ in practice.



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**COASTAL CLIMATE CHANGE IN AUSTRALIA: PERFORMANCE AT THE LOCAL LEVEL AND THE IDIOSYNCRASIES OF LOCAL GOVERNMENT(S)**

*Tayanah O'Donnell*

**Abstract:**

Localised case studies of climate change adaptation in action are a useful method with which to explore the practicalities of implementing adaptation measures, including planning for sea level rise. The New South Wales localities of Port Stephens and Lake Macquarie each have a significant amount of residential property at risk of expected consequences arising from increased flood, storm surge and coastal hazards, all exacerbated by sea level rise. These localities are in close geographical proximity and yet at the time of the introduction of the *New South Wales Sea Level Rise Policy Statement* 2009 each had markedly different policy approaches in implementing that policy. This flexibility in policy approaches has both positive and negative outcomes for communities faced with long term and ever-increasing climate risk. This presentation will draw from PhD findings to discuss more broadly the role of law in localised adaptation and the opportunities and challenges arising within and for local government.

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**ADAPTING THE AUSTRALIAN BANKING SECTOR TO CLIMATE CHANGE: A PARADIGM OF DESIRE, NECESSITY AND INCONVENIENCE**

*Zsuzsa Banhalmi-Zakar*

**Abstract:**

Banks are powerful organisations that drive development through their financing activities. Some would argue that with power, comes responsibility – an argument that has infiltrated the banking sector and resulted in the widespread practice of corporate social responsibility among financial institutions. The Australian banking sector is wealthy; it has combined assets of approximately 3000 billion dollars. The ‘big four’ banks (ANZ, NAB, Commonwealth and Westpac) were among to top 75 largest organisations (Forbes) in 2014 and are among the largest financiers of the fossil fuel sector (coal ports, coal power plants, LNG, etc.).

At the same time, Australian banks are also strong advocates of social responsibility publicly, demonstrated mainly by their participation in voluntary environmental initiatives and sustainability disclosure practices. Yet little is known about how the Australian banking sector is adapting to and is dealing with the challenges presented by a changing climate. This presentation tells the evolving story of the desire, necessity and inconvenience of adapting to climate change in the Australian banking sector. Drawing on the literature and findings of a study investigating the climate change disclosure of the Australian banking sector, funded by the Griffith Climate Change Response Program, it highlights the immense challenges faced by the sector and the shortcomings of current disclosure practices.

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**HOW TO STOP YOUR RESEARCH ENDING UP ON A SHELF! LESSONS LEARNED FROM COLLABORATION ON THE NSW ADAPTATION RESEARCH HUB, AND HOW RESEARCH IS SUPPORTING NSW COASTAL POLICY**

*Heather Stevens, Christopher Lee & Bruce Coates*

**Abstract:**

NSW's coastal zone is subject to a range of pressures from changes in climate – this includes sea level rise, erosion and storm surge. Understanding how these changes will affect the coastal zone is particularly crucial for areas that have significant residential development, industry, services or biodiversity.

*The NSW Adaptation Research Hub – Coastal Processes and Responses Node* is a collaboration of coastal experts who have been conducting a series of projects into how the pressures of climate change will impact the NSW coast. This presentation will briefly touch on the key themes of the Node including climate change and estuaries, sediment movement and supply, East Coast Lows, beach nourishment, and mapping of coastal Risk.

However, the research of the Node was developed for a specific purpose – the NSW Office of Environment (OEH) wanted to fill gaps in their knowledge, and support the Stage Two Coastal Reforms, and other developments in coastal policy. This presentation will discuss how OEH identified priority areas of research, and governed close relationships between staff and researchers to ensure that research was informed, and well received. The presentation will discuss if the aim of “*turning research into action*” was achieved.

This presentation will be of interest to anyone who wants to ensure their research doesn't end up another report on a shelf, but is able to influence policy, and be part of the solution!

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**EMBEDDING ADAPTATION – WHO, WHAT, WHERE AND HOW?**

*Alianne Rance*

**Abstract:**

Given the iterative nature of climate change adaptation, the associated practitioner and research space has progressively shifted focus from different means of achieving its collectively held goal: to manage the unavoidable impacts of climate change. We have seen focus on the development and implementation of adaptation strategies, to shifts toward the investigation of what is effective adaptation and the monitoring and evaluation of adaptation implementation as well as actions themselves. We now see a shift in thinking, especially in the Australian local government space where the need for a stand alone adaptation strategy is being questioned with the potential for another ‘bound volume’ to simply sit on the shelf without implementation. We see more focus on mainstreaming or embedding adaptation in the international space also. But what does this mean in the context of Australian local governments, and how can it be achieved? Which councils are already thinking about this process and how are they undertaking it? Is embedding adaptation another buzzword, soon to be replaced, or could it be a real solution to the long-term management of climate impacts where the rubber hits the road?

Through two concurrent projects, investigating ‘embedding adaptation’ in very different council contexts, Loop and Company along with its collaborative partners RMIT University and Arup are applying strategies to embed adaptation with Victorian councils. Through the development of a Train the Trainer program, online content support and a council evaluation tool, means to build the capacity of engaged councils to plan for and respond to climate change in their service delivery and operations or ‘embedding’ is facilitated. This presentation addresses the who, what, where, why and how of embedding adaptation with applied examples from current projects.

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