



NCCARF

National
Climate Change Adaptation
Research Facility



NEWSLETTER

Director's message

Professor Jean Palutikof, NCCARF Director

September 2011

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Upcoming events:

Climate Change Adaptation Congress, Melbourne, 13-14 October 2011

NCCARF will again support the biennial Climate Change Adaptation Congress to be held in Melbourne 13-14 October 2011. This year's event '*Creating a climate resilient future for Australia*' explores the policy, strategies and business models needed to enable a climate resilient future for Australia. [Click here for more information or to register.](#)

Living With Climate Change: Charles Darwin Symposium, Darwin 12-14 October 2011

This year's Charles Darwin Symposium: '*Living With Climate Change - At Home, At Work, At Play*' will identify key risks for northern Australia, its organisations, natural and agricultural systems and human settlements, look at ways to build resilience and tailor adaptation measures to the unique needs of the Top End. [Click here for more.](#)

Planet under Pressure, London UK, 26-29 March 2012

NCCARF will host the session '*Adaptation to climate change: How, when and where to act when knowledge is incomplete*' at the Planet under Pressure Conference in London next year. For more information visit www.planetunderpressure2012.net.



Food, water and energy for a growing world

I argued at a recent meeting (the Four Degrees Meeting¹ in Melbourne) that an often-overlooked requirement of successful adaptation is for large amounts of energy and water. So, in this Newsletter, I thought I would explore what the recent literature is saying about the potential to

fulfil these growing needs in the future. The big questions around climate change are around water resources (having enough in the right place at the right time), energy production (ensuring a secure supply from non-carbon emitting sources), and growing enough food sustainably for an ever-expanding global population.

Water resources: The report '*Water, Food and Poverty in River Basins: Defining the Limits*' was released at the 14th World Water Congress, in Pernambuco, Brazil, from 25-29 September 2011. It is produced by the CGIAR Challenge Program on Water and Food, and one of the authors is the Australian Simon Cook. The report took close to 10 years to complete, and looks at 10 river basins in developing countries in Africa, Latin America and Asia. Core issues are around the potential to feed an ever growing global population, projected to grow from nearly seven billion today to at least nine billion by 2050. This increased population will need 70% more food than today. Where will the water come from to produce 70% more food when agriculture already uses 70% of the world's freshwater resources?

The answer is that our water use for agriculture is extremely inefficient. In sub-Saharan Africa, for example, most cropland is rainfed and only about 4% of available water is captured for crops and livestock. The authors conclude that with modest improvements it would be possible to produce two to three times more food than at present. Elsewhere the potential gains are smaller. The authors define closed basins, where all the water is used, and these include the Indus, the Yellow and the Nile. Here, the only solution is for what the former UN Secretary General Kofi Annan called "more crop per drop". In the Indus and Ganges, the authors found that 23% of rice systems are producing about half what they could. So, there is tremendous room for improvement, and the prospect of feeding our growing global population

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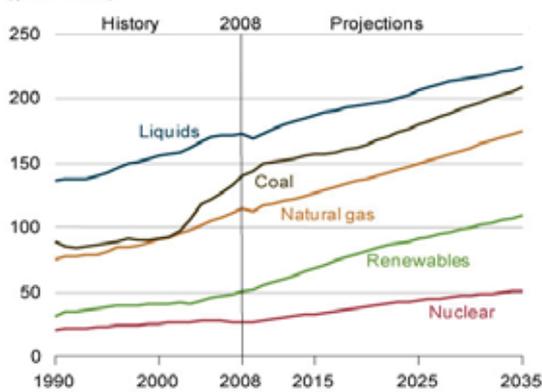
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appears within reach if only we can use water resources sustainably and efficiently.

Energy resources: The US Energy Information Administration released its International Energy Outlook for 2011² on 11 September, which contains projections up to 2035. In their Reference Case (no legislation for greenhouse gas emissions mitigation), worldwide energy consumption grows by 53% between 2008 and 2035, mostly driven by strong economic growth in the developing nations especially China and India. Although renewable energy production increases sharply from 10% of the total in 2008 to 15% in 2035, fossil fuels continue to be the dominant energy source at 78% of the total (see Fig below) Carbon dioxide emissions increase by 43%.

Clearly, therefore, mitigation policies are going to be a vital factor in ensuring a shift towards a low-carbon economy, and are essential if dangerous climate change is to be avoided. Changes in national policy regarding nuclear power following the disaster at the Fukushima Daiichi nuclear plant in Japan will have an effect which at the present time is hard to predict. Germany, for example, on 30 May 2011, announced a plan to shut all nuclear reactors by 2022, whilst still cutting greenhouse gas emissions by 40% and increasing the contribution of renewable energy from 17% to 35% at that date. The bottom line is that, with careful husbandry of global resources, we can produce the food we need to feed a growing population, and non-polluting energy to sustain a world well-adapted to climate change. But it will be an enormous challenge.

Figure 15. World energy consumption by fuel, 1990-2035 (quadrillion Btu)



¹ 'Four Degrees or More? Australia in a Hot World', Melbourne, 12-14 July 2011.

² <http://205.254.135.24/forecasts/ieo/world.cfm>

NCCARF research user survey:



What do you need to know?

What do decision-makers most need to know to adapt to climate change, and what is the best way for them to access this information? While researchers are working to develop information about the impacts of climate

change adaptation on our social, built and natural environment, decision makers are called on to deliver business and policy decisions today, based on available knowledge.

Understanding what research users need to make planning and policy decisions will enable NCCARF to deliver research in the most useful, accessible and effective way. Information delivery may include a combination of fact sheets, tools, guidelines, websites, reports, journals and workshops. Effective communication means moving beyond a one-size-fits-all approach and targeting the needs of different sectors.

NCCARF has launched a survey to gauge user needs across sectors, beginning with delegates at the Australian Institute of Landscape Architects Conference in August. We will conduct the survey at a variety of events. To complete the survey online visit www.nccarf.edu.au/needs-survey.

Industry snapshot: what do landscape architects want to know about climate adaptation?

NCCARF conducted a pilot survey of 103 landscape architects from around Australia. The information this industry most wanted to guide planning and decision making in their practice included:

- Sea level rise predictions (14%)
- Localised predictions of impacts for their areas (12%).
- Case studies and examples of successful design projects (10%)
- How water regimes would change, particularly rainfall and flooding patterns (10%)
- Future temperature ranges and heat island impacts (5%)

Other information needs identified include: regional climate information and spatial data; information on social impacts; clear statistics around a range of impacts and predictions; information on extremes and thresholds; guidelines for adaptation; ways to communicate impacts and adaptation (particularly to clients); impacts on transport; risk assessments; historical data; carbon calculators; policy information and impacts on transport.

Marine Adaptation Principles now online

When a group of marine managers, conservation managers, adaptation experts and industry representatives gathered to share stories about marine adaptation at a Cairns workshop recently, NCCARF captured it on film. You can now watch and listen to a range of people present perspectives on adaptation in the marine sector through a series of short videos available on the NCCARF website at: www.nccarf.edu.au/marine_principles. A report on outcomes of this workshop hosted by GBRMPA and NCCARF will be published online in coming weeks.

Adaptation research news

Primary Industries study launched

A new project funded through NCCARF's Primary Industries adaptation research grants program will look at the benefits of integrating perennial plants such as mallee eucalypts (right) to transform dryland farming.



Expected higher temperatures and reduced rainfall are

likely to reduce crop yields and livestock productivity in Australia unless we develop alternative farming techniques. This project *'Everfarm design of climate adapted perennial-based farming systems for dryland agriculture in southern Australia'* is led by Amir Abadi and Bob Farquharson of the Future Farming Industries CRC.

It will evaluate whether integrating perennial plants into dryland agriculture could be the key to help farmers adapt to climate change, while improving profitability and productivity.

The project will bring together four alternative farming systems that include:

- Integrating 'new woody crops' - belts of eucalypt trees that store carbon, prevent erosion, and provide shelter and a cash crop.
- Screening Australian native and introduced shrubs for their potential to provide drought-resistant fodder.
- Using perennial plants during the non-crop phase of cereal production systems to improve soil and water management, deliver nitrogen and control weeds and diseases.
- Planting high-performance stock feed based on newly-developed perennial pasture varieties with improved drought tolerance.

Researchers will work with farmers to model the economic feasibility of adopting these new techniques on a large-scale.

Research funds available

NCCARF has opened a research call for projects that address 13 key priorities from six of the National Climate Change Adaptation Research Plans.

These questions are high priorities for which further research is required to fill key information gaps not yet addressed through projects funded in previous rounds. Grants totalling \$3.25 million are available for research into Primary Industries; Emergency Management; Settlements and Infrastructure; Freshwater Biodiversity; Terrestrial Biodiversity; Social, Economic and Institutional Dimensions of Climate Change.

Proposals are invited from public or private research institutions, individuals or consortia of researchers. For more information see www.nccarf.edu.au. Applications close 7 October 2011.

Research fellowship announced



Dr Wade Hadwen has been awarded the next NCCARF Visiting Research Fellowship.

Wade is a researcher in the Australian Rivers Institute at Griffith University, and an aquatic ecologist with a strong research interest in examining how aquatic ecosystems respond to human pressures. More recently, Wade has been involved in climate change adaptation projects that have examined ecological, social and economic aspects of climate change impacts and adaptation decision making. While at NCCARF, Wade will work on a local government project to promote whole-of-council adaptation decisions that reduce the chance of 'maladaptation' actions that have negative consequences down the line. He will work with planners, engineers, transport and environment professionals at Sunshine Coast Council to identify specific constraints and barriers that influence whole-of-council decision making, and explore general lessons that will lead to better outcomes for other Australian councils.

Indigenous Communities funding call opens



The National Climate Change Adaptation Research Plan (NARP) for Indigenous Communities has been released, along with \$2 million in funding to address the priorities in the NARP.

Led by Professor Marcia Langton, (University of Melbourne), the NARP considers the adaptive capacity and adaptation knowledge needs of Aboriginal and Torres Strait Islander communities to climate change impacts.

Research proposals are now invited for a share in the \$2 million research funding. **Applications close 28 October 2011. Download the NARP and application guidelines at www.nccarf.edu.au**

Contact Ann Penny a.penny@griffith.edu.au for more information.

News from the Adaptation Research Networks

Human Health

The network has welcomed visiting fellow Dr Sotiris Vardoulakis, based the National Centre for Epidemiology and Population Health where the network is hosted at ANU. Sotiris is a Specialist Environmental Scientist at the Centre for Radiation, Chemical and Environmental Hazards, at the UK Health Protection Agency, and an Honorary Senior Lecturer at the London School of Hygiene and Tropical Medicine (LSHTM).

His research interests and activities in the field of public and environmental health cover the impacts of climate change on health, climate change adaptation in urban areas, assessment of public and environmental health interventions, air pollution monitoring and modelling, environmental exposure and risk assessment, air quality management and environmental sustainability in high and low income countries. Over the next 12 months Sotiris will work with colleagues from the network on a variety of related projects.

Network convenor Professor Tony Capon recently gave evidence to a state parliamentary inquiry into Environmental Design and Public Health in Victoria. At the inquiry, he stressed the need for effective responses that help to transform our urban environment to transition towards a low carbon way of living. Making the point that low-carbon ways of living are healthy ways of living, he drew the committee's attention to the many 'co-benefits' for health from action on climate change.

A proof copy of the transcript and formal submission can be found on the Parliament of Victoria website: <http://www.parliament.vic.gov.au/standing-committee-on-environment-and-planning/committee-inquiries/article/1520>

More Network news: www.nccarf.edu.au/humanhealth

Marine Biodiversity and Resources



The Second National Marine Climate Change Adaptation Network Graduate School was held from the 5-6 September 2011, at the University of

the Sunshine Coast. The event introduced 24 research postgraduates and early career researchers to climate change adaptation in marine biodiversity and living marine resources.

The graduate school provided a base theoretical context to marine climate change adaptation, practical examples

of adaptation in action and demonstrated the importance of effective communication in engaging with marine stakeholders on climate change adaptation issues.

Speakers included Associate Professor Neil Holbrook, Professor Tim Smith, Dr Julie Davidson, Dr Gretta Pecl, Dr Sarah Jennings, Associate Professor Marcus Haward, Dr Stephen Myers, Mrs Liese Coulter, Dr Paul Marshall (from Great Barrier Reef Marine Park Authority) and Lowri Pryce from OceanWatch Australia Ltd.

Alongside the graduate school, the Marine Adaptation Network held its debut public forum: *Climate Story – from Impact to Adaptation*. Focused on climate and the marine environment it was presented by leading Australian research scientists in climatology, ecology and social science: Associate Professor Neil Holbrook, Dr Gretta Pecl and Professor Tim Smith.

Topics covered were 'making sense of climate change and uncertainty,' 'impacts to marine biodiversity and living marine resources,' and 'marine and coastal adaptation.' Set in a relaxed atmosphere at the Forest Glen Holiday Resort on the Sunshine Coast, the forum attracted 40 members of the general public.

More Network news www.arnbr.org

Water Resources and Freshwater Biodiversity

Wetlands workshop November 22-23, 2011 at the Sydney Masonic Centre

The NSW Network node will host a workshop 'Response of wetlands to rewetting following extensive drought'.

This workshop will present field observations and research findings from scientists and managers following major wetting episodes experienced throughout the Murray-Darling Basin in 2010-11. It will focus on the impacts of drought; recovery and response observations; and lessons learnt about water and land management during and following drought. The program includes keynote presentations and a number of 'speed sessions' highlighting major findings and management implications from a broad range of speakers.

Expressions of interest are invited to present speed sessions. Please submit a brief (100 word) abstract for a five minute presentation based on research or management case-studies to rivers.wetlands@environment.nsw.gov.au by 5 October 2011. This event is free to attend and supported by the Network, the Environmental Water Management Specialist Network, the National Water Commission and the NSW Department of Premier and Cabinet. A flyer for the event, including confirmed keynote speakers, is available at <http://www.nccarf.edu.au/water/node/25>.

Settlements and Infrastructure

The Climate Change Adaptation Research Network for Settlements and Infrastructure will again sponsor the Australian Transport Research Forum (ATRF) jointly hosted by the South Australian Department for Transport, Energy and Infrastructure and the University of South Australia at the Hilton Hotel, Adelaide, 28-30 September 2011. The ATRF is recognised by the public and private sectors as the main transport planning and policy forum in Australasia bringing together policy makers, advisers, researchers and practitioners from all transport sectors to share and build upon the latest research and initiatives. Register for this conference at www.atrf11.unisa.edu.au.

Call for Abstracts:

6th ACCARNSI Early Career Research Forum

The 6th ACCARNSI National Forum and Workshop for Early Career Researchers (ECR) will be held at the University of the Sunshine Coast in Maroochydore QLD from Monday 21 November to Wednesday 23 November. The event will provide a unique opportunity for Early Career Researchers in Climate Change Adaptation for Settlements and Infrastructure to engage with fellow researchers from other Australian institutions and facilities. Participants will discover the broad range of climate change adaptation research under way in Australia.

The Call for Abstracts for this event is now open. More information can be found on the ACCARNSI website <http://www.nccarf.edu.au/settlements-infrastructure/>.

Honours and masters research grant scheme

Final year UNSW Environmental Engineering student, Lincoln Quilliam was awarded an ACCARNSI Honours and Masters Research Grant earlier this year for his project 'Climate Change Adaptation for Easter Island'.

Lincoln's Honours project was an overview of climate change impacts and adaptation for Easter Island – the most isolated inhabited island on earth. Lincoln assessed the magnitude of projected climate change and adopted a consultative risk-based approach to assess impacts and offer adaptation options.



ACCARNSI scholarship recipient Lincoln Quilliam

Lincoln travelled to Easter Island to meet with government, private and community organisation leaders, including the Mayor, Governor, Chilean Navy and Marines, National Parks, Lands Office, Ministry for Public Works, fishermen, elders and environmental action groups. As well as explaining the projected climate changes he discussed the greatest risk impacts, and gave seminars to the public which National Parks rangers translated into Spanish.

Lincoln will present on the project at Coasts and Ports 2011 in Perth. The findings will be submitted to the Rapa Nui Journal, and delivered to government and private organisations on Easter Island and the Chilean government.

Lincoln now works with GHD's Coastal Engineering Sector but hopes to return to Easter Island to monitor the implementation of the adaptation options he offered.

More Network news: www.nccarf.edu.au/settlements-infrastructure email accarnsi@unsw.edu.au

Primary Industries (PIARN)

The Primary Industries Adaptation Research Network held the first in a new series of webinars during July, with co-convenors Mark Howden and Peter Grace giving the online audience an insight into what Australian agriculture might look like under four degrees or more of global warming.

Presentations from the webinar are available online. The next webinar will be announced in September.

As part of its ongoing efforts to bring together researchers with diverse backgrounds, PIARN hosted a roundtable discussion in late July involving members of the PIARN leadership group, representatives from government and industry, and experts from across the adaptation and primary industries research disciplines. The discussion focused on defining primary industries adaptation research, determining research approaches and considering the appropriate interfaces with mitigation research. The discussion will feed into revisions of both the National Climate Change Adaptation Research Plan and the Climate Change Research Strategy for Primary Industries (CCRSPi).

PIARN hosted a workshop at the World Congress on Conservation Agriculture in Brisbane on 29 September, looking at the interface between climate change adaptation and mitigation strategies in agriculture. The workshop invited contributions from leading scientists across a range of agricultural enterprises to talk on the synergies and conflicts between adaptation and mitigation.

PIARN theme leaders Wayne Meyer and Steve Tyerman have produced an information sheet about adapting Australian primary industries to changes in water supply. It covers climate change impacts on water supply in dryland and irrigated agriculture, and adaptation options for both sectors. Download the publication from the PIARN website.

For more primary industries news, see the PIARN newsletter. More Network news www.piarn.org.au

Emergency Management

The Network has been involved in the review of the National Climate Change Adaptation Research Plan (NARP) for Emergency Management and Implementation Plan.

Network convenor Professor John Handmer led the review, which involved an assessment of the original document in terms of existing and emerging knowledge. This became the basis for a gap analysis to identify those areas inadequately addressed in the original NARP and to incorporate new approaches to particular issues relevant to adaptation in the sector. One issue identified was the convergence of emergency management with disaster risk reduction.

There has been comprehensive engagement with stakeholders to enable them to advise on priority information requirements, research capacity and investment sources. The review process is almost complete and when approved the revised NARP will be distributed and made available on the NCCARF websites.

Literature Review

A literature review of recent research has been conducted in conjunction with the NARP revision.

The review provides brief commentary and recent literature for each of four overarching strands of research within the NARP, which are

1. Understanding risk
2. Community and organisational resilience
3. Adaptive strategies, and
4. Regional implications

The review will also be available on the NCCARF website.

More network news <http://emergencymanagement.org.au>

Social, Economic & Institutional Dimensions

Adaptation College

The Network is currently organising the annual workshop and Adaptation College.

The workshop 'Climate Adaptation and Extreme Events - Law & Policy' will be held on 23-24 November at ANU, Canberra. The Adaptation College will focus on the same topic as the workshop.

College Fellows will attend a fieldtrip led by Professor John Handmer (RMIT) and Professor Steve Dovers (ANU) to consider the legal and institutional dimensions of the Canberra 2003 bushfires.

The Indigenous Communities theme National Adaptation Research Plan has been released for public consultation, including three information sessions held in Canberra, Darwin and Cairns. The consultation closed on 26th August. The team is now addressing the comments made during the consultation and finalising the NARP, with the

final document due in October. A call for funding will follow the finalised NARP, with information sessions to be held in all major centres. More Network news www.nccarf.edu.au/social-economic-and-institutional-dimensions

Terrestrial Biodiversity

The network is compiling information on the latest impacts and adaptation to climate change for Australian Terrestrial Biodiversity. The information will be used to produce a Terrestrial Biodiversity Report Card scheduled for early 2012. The network is also compiling Adaptation Case Studies that showcase research with direct management recommendations for certain species and ecosystems. These Case studies will update members on what research is currently occurring, and what can be done to increase resilience of terrestrial biodiversity.

The network has now run four workshops on specific topics relevant to adaptation for terrestrial biodiversity and publications from these workshops are now starting to be released. The first publication to be released is from the Genetic Translocation workshop. This paper provides a framework for assessing the genetic benefits and risks associated with genetic translocation and provides guidelines for managers. The paper is now available free on line at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1752-4571.2011.00192.x/abstract>. The network will continue to update members as more publications become available.

More Network news: <http://hosting2.arcs.org.au/terrestrialbiodiversity>

Contact the networks:

Terrestrial Biodiversity co-convened by Professor Stephen Williams (JCU), and Professor Lesley Hughes (Macquarie). Contact: Coordinator Yvette Williams yvette.williams@jcu.edu.au

Water Resources & Freshwater Biodiversity convened by Professor Stuart Bunn (Griffith). Contact: Coordinator Sam Capon climate.water@griffith.edu.au

Marine Biodiversity & Resources convened by Associate Professor Neil Holbrook (UTas). Contact: Coordinator Clare Brooker arnmbr@arnmbr.org

Human Health convened by Professor Tony Capon (ANU). Contact: Coordinator Peter Thomas arn.humanhealth@anu.edu.au

Settlements & Infrastructure convened by Associate Professor Ron Cox (UNSW). Contact: Coordinator Tamara Rouse accarnsi@unsw.edu.au

Primary Industries convened by Professor Snow Barlow (Melbourne) Contact: Coordinator Alison Turnbull piarn-coordinator@unimelb.edu.au

Emergency Management convened by Professor John Handmer (RMIT). Contact: Coordinator Frank Yardley frank.yardley@rmit.edu.au

Social, Economic & Institutional Dimensions convened by Professor Jon Barnett (Melbourne). Contact: Coordinator Tina Soundias tinias@unimelb.edu.au

Networks on the net:

Visit www.nccarf.edu.au/adaptation-research-networks

Adaptation in Action: Sharing knowledge to adapt

Melbourne 26-28 June 2012

Planning is now underway for NCCARF's third annual major climate change adaptation conference.

Planned for Melbourne for June 26-28 2012, the conference will again feature the latest climate change adaptation science, practice and examples of adaptation in action from across Australian sectors and industries. More information on themes, sessions and speakers will be available soon, followed by an open call for abstracts. Register for more information at www.nccarf.edu.au/conference2012



Scan with your smartphone
for conference information

Contact NCCARF

Director's Office

Professor Jean Palutikof
Director
Email: j.palutikof@griffith.edu.au

Maree Lauder
Personal Assistant to Director
Tel: 07 5552 9333
Email: m.lauder@griffith.edu.au

Sarah Boulter
Research Fellow
Tel: 07 3735 6594
Email: s.boulter@griffith.edu.au

Research Planning Unit

Richard McKellar
Deputy Director Research Manager
Tel: 0466 130 485
Email: r.mckellar@griffith.edu.au

Frank Stadler
Research Team Leader
Tel: 07 5552 7268
Email: f.stadler@griffith.edu.au

Daniel Stock
Research Fellow
Tel: 07 5552 7225
Email: d.stock@griffith.edu.au

David George
Research Coordinator
Tel: 07 5552 7235
Email: d.george@griffith.edu.au

Knowledge Adoption Unit

Liese Coulter
Knowledge Communication Manager
Tel: 07 5552 7735
Email: l.coulter@griffith.edu.au

Jeannette Langan
Knowledge Communicator
Tel: 07 5552 8891
Email: j.langan@griffith.edu.au

Ann Penny
Networks Coordinator
Tel: 07 5552 7548
Email: a.penny@griffith.edu.au

Donovan Burton
Stakeholder Engagement
Tel: 0435 041 385
Email: d.burton@griffith.edu.au

Nicholas Coupland
Digital Media Officer
Tel: 07 5552 27215
Email: n.coupland@griffith.edu.au

Administration and Synthesis and Integrative Research

David Rissik
Deputy Director General Manager
Tel: 07 5552 8247
Email: d.rissik@griffith.edu.au

Jenny Watson
Business & Operations Manager
Tel: 07 5552 7239
Email: j.watson@griffith.edu.au

Kerry Fitzgerald
Administration Officer
Tel: 07 5552 7326
Email: k.fitzgerald@griffith.edu.au



New to the NCCARF Research Team

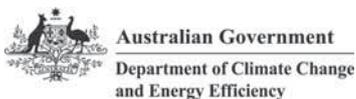
Dr David George has joined NCCARF as a Research Coordinator.

David holds a PhD from University of Queensland in the field of agricultural climatology and education. He has experience in climate and agricultural research, development and extension, throughout eastern Australia, south and south-east Asia, sub-Saharan Africa and

Mexico. He has developed and delivered applied climate courses to clients including farmers, and others in the vocational, and tertiary education system, and evaluated learning and education practices. This work has improved knowledge and skills of farmers, professionals and agribusiness to manage climate variability and change.

David will work closely with researchers around Australia to coordinate NCCARF's Adaptation Research Grants Program and Synthesis and Integrative Research Program.

NCCARF partners:



National Climate Change Adaptation Research Facility

Griffith University Gold Coast Campus
Qld Australia 4222
Tel: 07 5552 9333
Fax: 07 5552 7333
www.nccarf.edu.au

If you have comments, feedback or news items you would like included in the next NCCARF Newsletter please contact Jeannette Langan j.langan@griffith.edu.au

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