

Climate change adaptation knowledge for agriculture

What is NCCARF?

The National Climate Change Adaptation Research Facility is a unique venture established by the Australian Government in 2008 to harness and coordinate the capabilities of Australia's researchers, to generate and communicate the knowledge decision-makers need for successful adaptation to climate change. NCCARF fulfils its mission by:

- Building capacity in research and end user communities, principally through its eight thematic *Adaptation Research Networks*;
- Generating knowledge for adaptation through its research programs;
- Effectively delivering knowledge through the NCCARF annual conference, workshops and master classes, reports, policy briefs and information sheets, the website and social media.

Projects in NCCARF's research programs delivering useful results for agriculture

The National Climate Change Adaptation Research Facility manages two research areas, the Adaptation Research Grants Program (ARGP) and the Synthesis and Integrative Research Program (SIRP). Together, these seek to address knowledge gaps and deliver the information decision-makers need to successfully adapt Australia to climate change.

The thematic ARGP, with a \$36 million budget (including cash leveraging) and 96 projects, addresses knowledge gaps identified in National Adaptation Research Plans (NARPs). There are programs in terrestrial, marine and freshwater biodiversity, primary industries, human health, emergency management, settlements and infrastructure, the social, institutional and economic dimensions of climate change, and Indigenous communities and adaptation.

The SIRP, with a \$6 million budget and 40 projects, builds on existing research to directly address knowledge needs of practitioners. The SIRP synthesises across thematic topics and integrates NCCARF learnings with the wider field of adaptation research to deliver timely and specific information tailored to the needs of practitioners. These practitioners are engaged in projects at all stages of development, implementation and delivery.

Research projects in the ARGP and SIRP can be clustered to address the needs of particular locations and critical adaptation challenges. NCCARF is producing a series of fact sheets to show where information can be found in NCCARF's research programs to support decision-making and policy development to address critical adaptation challenges.

This fact sheet addresses the challenge of adaptation for Australia's agricultural sector.

	Principal Investigator	Institution	Final report availability ^{1,2}
FARM MANAGEMENT			
Adaptive capacity and adaptive strategies of broadacre farms experiencing climate change	Ross Kingwell	University of WA and WA Government	31-Mar-2013
EverFarm® - Design of climate adapted perennial-based farming systems for dryland agriculture in southern Australia	Amir Abadi	Future Farm Industries CRC	31-Mar-2013
Will primary producers continue to adjust practices and technologies, change production systems or transform their industry – An application of real options	Gregory Hertzler	University of Sydney	31-Mar-2013
FUTURE LANDSCAPES			
Drought and the future of small inland towns	Anthony Kiem	University of Newcastle	1-Jun-2010
Limits to climate change adaptation for small inland communities affected by drought	Anthony Kiem	University of Newcastle	31-Aug-2011
Australia's country towns 2050: What will a climate adapted settlement pattern look like?	Andrew Beer	University of Adelaide	31-Mar-2013
Adapted future landscapes – from aspiration to implementation	Wayne Meyer	University of Adelaide	31-Mar-2013
FOOD SUPPLY AND SECURITY			
Creating a climate for food security: the business, people and landscapes in food production	Angela Wardell-Johnson	University of the Sunshine Coast	01-Oct-2012
Australian food security: Impact of climate change for risk management: How prepared are food industry leaders?	David Michael	Wondu Business & Technology Services	01-Oct-2012
Urban food security, urban resilience and climate change	Paul Burton	Griffith University	01-Oct-2012

¹Completed final reports are available for download at www.nccarf.edu.au

²Availability dates are estimated using draft report due dates and time for the review process

FARM MANAGEMENT

Adaptive capacity and adaptive strategies of broadacre farms experiencing climate change

Ross Kingwell, West Australian Agriculture Authority

The south-west agricultural region of Australia is projected to experience adverse climate change in coming decades, with many farmers already reporting impacts. Using data provided by farmers, the research team hopes to identify how farmers are adapting to this changed climate. They will study longitudinal farm data, coupled with data from a social/management survey, to identify successful adaptation strategies and the characteristics of a farm, and of a farm manager, that makes them better able to adapt. The research findings are likely to be applicable to similar regions at risk across Australia.

Everfarm - design of climate adapted perennial-based farming systems for dryland agriculture in southern Australia

Amir Abadi, Future Farming Industries CRC

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 will look at the benefits of integrating perennial plants such as mallee eucalypts into dryland agriculture. Researchers will work with farmers to model the economic feasibility of adopting these new techniques on a large-scale.

Will primary producers continue to adjust practices and technologies, change production systems or transform their industry? An application of real options

Gregory Hertzler, University of Sydney

This project aims to determine the climate change thresholds for transformational change in wheat-dominated agriculture across Australia. Researchers will communicate with producers who are managing wheat-dominated farms, then mathematically model options for how they may choose to transform the industry as the climate changes. Once the decisions of growers are understood, they will draw implications for stranded assets, new technologies and the resilience of agriculture undergoing climate change.

FUTURE LANDSCAPES

Drought and the future of small inland towns

Anthony Kiem, University of Newcastle

Australia's vulnerability to climate variability and change has been highlighted by recent droughts. Climate change may increase the frequency, intensity and duration of droughts, requiring robust adaptation strategies. This project assesses two rural Victorian case study sites that have been impacted by the current drought, Donald and Mildura. The objective is to provide a whole-of-government, business and community perspective on adaptation measures being put in place as a result of previous droughts, and areas where future adaptation measures need to be developed following reflection on ways of better preparing for such events.

Limits to climate change adaptation for small inland communities affected by drought

Anthony Kiem, University of Newcastle

Droughts are, and always will be, part of the Australian climate and it is impossible to prevent these natural disasters from occurring. This project will provide, for two case study areas, a whole of government, business, and community perspective on: context and impact of drought on water supply and availability; context and impact of drought on society, economy and mental health; adaptation measures being put in place as a result of the knowledge gained from previous drought experiences (e.g. use of alternate water supplies, water reuse, water savings projects, drought awareness programs, change in town focus from agricultural to tourism or mining etc); and areas where future adaptation measures need to be developed following reflection on ways of better preparing for such events.

Australia's country towns 2050: What will a climate adapted settlement pattern look like?

Andrew Beer, University of Adelaide

The project will test the hypothesis that many inland rural and remote communities are vulnerable to the impacts of climate change and that

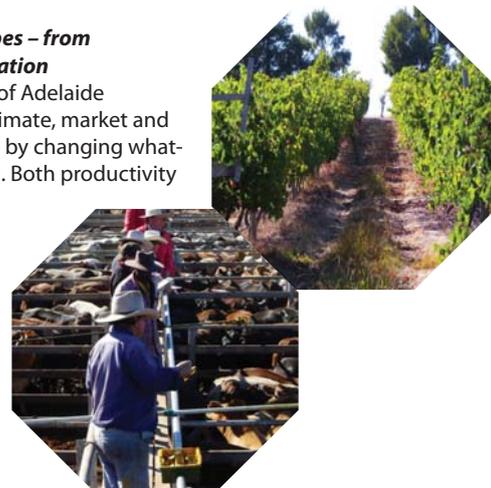
this vulnerability varies by location, industry structure, environment, and remoteness. It will assess whether public sector and community planning and action can reduce the impacts of climate change on the sustainability of settlements and whether some forms of intervention will be more effective than others.

Adapted future landscapes – from aspiration to implementation

Wayne Meyer, University of Adelaide

Regional adaptation to climate, market and social changes is possible by changing what-we-do-where on the land. Both productivity and conservation goals can be achieved by farming to land capability, changing land use to capitalise on the emerging carbon market and identifying land use practices that provide a mosaic of production and conservation uses.

This project will work with two regions in South Australia to develop an experimental process that uses future land use projections to assess different policy and guidance incentives. If the experimental process is successful, it could be adopted for land use planning in other regions in Australia.



FOOD SUPPLY AND SECURITY

Creating a climate for food security: The business, people & landscapes in food production

Angela Wardell Johnson, University of the Sunshine Coast

This project will identify and interview stakeholders including producers, businesses, community and government in agricultural areas in south west WA and south east Qld to identify risks, current productivity and approaches to adaptation related to climate change in agricultural production, and test approaches to strengthening resilience in agriculture in these areas.

Australian food security: Impact of climate change for risk management: How prepared are food industry leaders?

David Michael, Wondur Business & Technology Services

The combination of a drier and more volatile climate, limited arable land, subsidised competition from biofuel crops and a growing population suggests food availability and prices will become more volatile in Australia and offshore. The project examines the preparedness of food industry leaders for riskier operating scenarios, and the implications of climate change for risk management.

Urban food security, urban resilience and climate change

Paul Burton, Griffith University

This project will extend knowledge of the diversity of agriculture in urban areas. It will identify the social, economic and political barriers to urban agriculture and explore the potential for extending its practice in the climate change-affected future. The results of this work will provide a much-needed commentary on the public health, nutritional and environmental benefits of greater urban food production and to make a valuable contribution to the development of the federal government's national food plan.

Other fact sheets in this series cover:

- Local Councils
- Coastal Management
- Water Resources
- Infrastructure
- Vulnerable Communities
- Emergency Management
- Business and Industry
- Policy and Regulation for Effective Adaptation
- Decision Support Tools
- Natural Ecosystems
- Research Investment in States and Territories

For more information on NCCARF research, visit: www.nccarf.edu.au