

# Managing natural resources in a variable and changing climate

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**Location:** Condamine, QLD; northern Victoria;  
Wallatin catchment, WA

## Principal investigator

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## The need

Australia is investing heavily in programs such as the NAP and NHT to improve natural resource management (NRM). A recent report to LWA identified that these programs were not adequately incorporating information about climate variability.

There is also likely to be value in helping farmers and catchment managers make better NRM decisions by using seasonal climate forecasting, as better tactical decisions by these managers is a key component in achieving better strategic outcomes across the catchment. However, there are potential tradeoffs between climate risk management options for natural resource issues and for production. And there is likely to be a range of practical limitations, requiring farmers' knowledge to be brought into the exploration of issues. To provide a broad base from which to generalise, we have engaged with farmer groups in three diverse regions; one in the Condamine catchment and others in south-east Australia and south-west Australia.

There is now firm evidence that, in addition to year-to-year variability, there are also trends in climate factors (e.g. increases in minimum temperatures, changes in the degree of rainfall variability) that result in a trending or non-stationary climate. Good risk managers can no longer afford to dismiss this evidence—risk management strategies need to take both climate variability and climate trends into account to achieve the best possible outcomes.

## How this project fits with MCV objectives

This project will contribute to MCV objectives of increasing adoption of climate risk management by farmers and natural resource managers.

## Project objectives

1. Analyse how climate has been changing in three key agricultural regions
2. Assess how these changes have influenced cropping enterprises (with an emphasis on NRM issues) in those regions including through interaction with changing management
3. Identify key management adaptations that will enable farmers to more effectively manage climate variability as well as future trends in climate arising through climate change or other drivers such as decadal variation
4. Identify priority issues for catchment NRM that could be better managed with enhanced use of information on historical climate variation, seasonal climate forecasts and trends in climate factors and evaluate strategies for these priority NRM issues by incorporating such climate information into decision making
5. Scope the use of information on climate variability and climate trends in setting targets for natural resource condition and management actions
6. Identify key climate change adaptation strategies for catchment-scale NRM issues
7. Compare the analyses at catchment and farm scales to identify commonalities, synergies or barriers in relation to better managing NRM issues in a variable but changing climate



## Methods

- Analyse key climate elements for trends
- Identify what NRM and productivity issues are likely to have been affected by these trends, via workshops and simulation analyses using the cropping systems model APSIM; agree with the farmer groups the NRM issues to be subsequently addressed
- Conduct simulations with farmer groups to look at how their management may have amplified or reduced the impacts of any trends
- Explore how farm management may need to be adjusted if the climate trends continue as a result of ongoing climate change, by analysing management options suggested by the farmer groups; identify tradeoffs between NRM and production outcomes
- For catchment scale issues, run a workshop to assess climate variability/change impacts on the broad range of issues of concern identified by the catchment stakeholders; analyse the effects of trends and variability on these issues

## Desired outcomes

Farmers and catchment NRM planners empowered to make informed management responses to climate variability and climate trend signals through:

- catchment strategies that reduce the risk to natural resources from climate factors and take advantage of opportunities to enhance sustainable land use
- increased clarity in catchment targets and the activities to achieve these by removing some of the climate 'noise'
- catchments that are prepared to manage future climate changes
- farmer groups who are attuned to changes in climate at a range of time-scales, and who have the capacity to use this knowledge in risk management strategies that may enhance both production and NRM outcomes

## Achievements to date

The climate analyses have shown that there is substantial variation in climate trends between the sites: there is no general trend and therefore a site-by-site analysis is needed.

We have established the linkages with farmer groups and completed the workshops on the catchment scale issues.

We have completed initial analyses of the utility of seasonal climate forecasts for NRM achievement. They indicate modest potential improvements in this respect which are in tandem with modest improvements in simulated farm financial performance, suggesting that use of SCF does not fundamentally change the nature of the NRM:production tradeoffs.

## What is left to do?

- Work with farmers to see how they may have amplified or reduced the impacts of any past trends and to assess adaptation options to climate trends and climate variations
- Carry these analyses through to implications at the catchment level

MCV is a collaborative program between the Grains, Rural Industries and Sugar Research and Development Corporations; the Australian Government Natural Heritage Trust and Department of Agriculture, Fisheries and Forestry; Dairy Australia; Meat & Livestock Australia; and Land & Water Australia. The National Farmers Federation and Australian Wool Innovation Limited are associate partners.

For more information on MCV, visit <http://www.managingclimate.gov.au>  
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