

Key findings:

Drought and the Future of Rural Communities:

Drought impacts and adaptation in regional Victoria, Australia

The event

The Big Dry, or Millennium Drought, has affected southeast Australia (SEA) since the mid-1990s. Although there has been a return to wet La Niña conditions, it will be several seasons before conditions will return to 'normal'.

This drought had serious impacts on water availability, agricultural production (due to decreased irrigation allocations), biodiversity (due to prolonged changes in habitats), and bushfire regimes. Two case studies (Mildura and Donald) were chosen to investigate the socio-economic impacts of drought, past and present drought adaptation measures, and the future adaptation strategies that will be required to deal with projected increases to the frequency and magnitude of drought events.

Scale of the disaster

The recent Big Dry drought was associated with an annual average rainfall decrease of 17% for Mildura and 10% for Donald. In comparison, for Mildura (Donald) the Federation Drought (1895-1902) had a 31% (23%) decrease and the World War II Drought (1937-1945) a 19% (17%) decrease in average annual rainfall.

The reduced availability of water during the Big Dry drought had significant, wide-spread secondary effects:

- Farmer debt in the Mildura region increased from \$15 million in 2000-01 to \$275 million in 2007-08;
- The number of farmers receiving 'exceptional circumstances' assistance increased from ~9,000 in 2002-03 to more than 25,000 in 2007-08;
- Farmers' average income reduced by \$29,000 between 2005 and 2007;
- The number of farms with negative income increased from 24% to 42% between 2005 and 2007;
- There was a loss of employment in agriculture, contributing to a more widespread community loss of employment and services.

Characteristics that resulted in the damaging impacts of the event

In terms of annual rainfall deficits, the Big Dry drought was similar to previous droughts. However, the Big Dry drought was particularly damaging because:



Vines near Mildura

- The majority of the annual rainfall deficit was due to the failure of autumn rainfall, a crucial period for winter-grown crops;
- The Big Dry drought affected the whole Murray-Darling Basin. So, for places like Mildura, reliant on irrigation water from the Murray River, the 'rainfall drought' has coincided with an 'irrigation drought';
- Demand for water, for both agricultural and non-agricultural use, is much higher than in previous droughts
- The global economic situation (i.e., the Global Financial Crisis, poor commodity prices, closure of the Australian Wheat Board 'single desk') has exacerbated the climate-related impacts;
- Drought policy, and associated water trading rules, are in a state of flux and so high uncertainty exists.

Adaptation: during and after the event

There is an urgent need for more accurate (not to be confused with precise) and reliable seasonal to multidecadal climate forecasts that are relevant at the farm-scale.

Research is needed to determine what constitutes a 'good' climate forecast for farmers and rural communities (e.g., What variables? What format? What level of accuracy and/or lead time is useful and what is not? What temporal and/or spatial resolution?).

Unfortunately, significant uncertainties currently exist around the climate science and modelling needed to produce the sort of forecasts farmers say they need.

It should be noted that, especially for rainfall forecasts at the farm-scale, this uncertainty will remain for the foreseeable future. Therefore, while there is a need to reduce uncertainty around climate forecasting, where

possible the more urgent, and more achievable, objective should be to robustly quantify this uncertainty, to develop tools to support decision making under uncertainty, and to build resilience (i.e. ability to re-configure without crucial loss) such that rural communities are capable of adapting to the climatic variability that exists in Australia.

Farmers are adept at dealing with uncertainty, so long as they are aware of what the bounds of that uncertainty are and have ongoing, consistent and proactive (as opposed to short-term, changing and responsive) drought, water, and agricultural policy to support them.

Vulnerability: pre and post event

The social and economic issues facing inland (rural) communities are not just a product of drought – to understand them as such would underestimate the extent of the problems and inhibit the ability to coordinate the holistic, cross-agency approach needed to address them.

The messages relating to uncertainty around climate forecasts are equally applicable to uncertainty around economics, commodity prices, social demographics, and water trading policies.

It is not the uncertainty itself that is frustrating for farmers, rather it is that the uncertainties seem to be in a state of flux – and it is all happening at the same time!

Lessons learnt

- There is great advantage in further comparative, case-study based research into climate change impacts and adaptation. Recording the actual experiences of drought and other climatic extremes is vital to advancing our knowledge of how to respond and adapt to such conditions, and how this might vary between different locations, sectors and communities.
- Further efforts to revise the language and understandings of drought are crucial. These efforts need to address the changing environment and climate by shifting from notions of ‘drought-as-crisis’ towards acknowledging the variable availability of water and the potential for increases in the frequency of multi-year periods of drought.
- The value of water to our economic, social and environmental well-being should be recognised in a more meaningful way. More effort must also be made to revalue the farming enterprise as critical to our environmental, economic and cultural well-being.
- People living and working in rural areas are becoming tired and sceptical of “yet another” drought or climate change research project. They have been involved in many and seen few positive outcomes. Further efforts are needed to coordinate ‘outcome-based’ research activities – a practice that not only provides the benefits of interdisciplinary and interagency knowledge, but also respects those we are working with by not overburdening them with separate and disconnected research interventions.
- While a lot of drought and climate change adaptation research has been, and continues to be,

Managing the event: successes and failures

There is more ‘failure’ than ‘success’ in terms of managing drought in Australia, particularly relating to drought and water policy and ensuring that rural communities receive the support they need. Although the research revealed that most farmers were “doing ok” it is clear that significant improvement is needed in terms of water policy and drought adaptation strategies to ensure the future of rural communities.

Successes:

- Community spirit and support, people with the money and knowledge to be innovative and implement new science and technology can still do well

Failures:

- Removal of the Australian Wheat Board single desk, deregulation of various agricultural industries, reduced funding and staff for government agencies that previously supported rural communities (e.g., Victorian Department of Primary Industries)
- Small-block exit grants, exceptional circumstance payments, and water trading were very controversial and seen by some as a success and by some as a failure with respect to assisting rural communities adapt to drought.

conducted, the well documented facts, key themes and recommendations continue to emerge with little evidence of effective implementation. Urgent investigation is required into: (a) why the already documented solutions and priorities have not been implemented (b) determining the barriers that are preventing implementation; and (c) how these barriers can be overcome.

About this study

This study is one of a suite of Historical Case Studies of Extreme Events conducted under Phase I of the NCCARF Synthesis and Integrative Research Program.

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