New rural industries – making the most of future climates

New Rural Industries for Future Climates
by B. Cullen, P. Thorburn, E. Meier, M. Howden and S. Barlow. RIRDC Pub. No. 10/010

This RIRDC report highlights a range of opportunities for the development of new rural industries to assist Australian farmers adapt to the challenges of climate change. The report finds new rural industries provide the potential for a transformational shift in the way we adapt to future climates.

At a Glance

• Higher temperatures, increased evaporation, more variable rainfall and increased extreme climatic events are predicted to impact on agricultural output in Australia.

• These climatic changes have the potential to alter the mix of agricultural industries in Australia.

• A number of current agricultural industries are expected to be strongly challenged by predicted climate change. However, climate change is also expected to open up new opportunities for a range of new rural industries.

• Crops that may be more suited include olives, jojoba, pomegranates, capers, dates, mustards, tree crops and Australian bush foods.

• This publication outlines many of these new rural industries suited to Australia’s changing climate across six different climate regions, and provides advice to farmers on diversifying their operations.

• Many of these new industry options have a competitive advantage over existing agricultural industries in warmer and drier future environments, due to their drought tolerance, salinity tolerance, water use efficiency and resilience to low irrigation water availability.

• Diversifying on-farm operations by producing a range of crops planted at different times is an effective way to reduce the risk associated with extreme climatic events.
Australia’s changing climate
Some degree of global warming is seen as inevitable regardless of the actions we take today with scientists predicting future temperature increases. Agriculture is particularly vulnerable to this predicted rise in temperature. It could potentially reduce the amount, the quality and reliability of produce, and the natural resources agriculture depends on. To survive and thrive under these changing conditions, farmers need a greater diversity of agricultural enterprises adapted to a wider range of climates.

What did the report look at?
This report investigates the opportunities available to Australian farmers to diversify their operations in areas where current agricultural industries may be strongly challenged by future climates. It also looks at the traits required for new industries to succeed in future climates, and identifies industries that could be well suited to predicted future climates.

How was the report undertaken?
Researchers identified six broad regions that encompassed a range of climates and agricultural production systems. These were:
• Murray Darling Basin
• Marginal cropping fringe of southern Australia
• Southern Australia high rainfall
• Western Australia high rainfall
• Northern Australia
• North Eastern Australia
Researchers analysed recent climate and future climate projections to determine the vulnerability (or otherwise) of agricultural industries in each of these regions.

Locations of the towns for which climate data is presented.

The date palm is suited to areas where there is a large quantity of lower quality water available, and could potentially use recycled water. The date plant is tolerant of high and low temperature extremes, and requires long, hot, dry summers for ripening and harvest.
What does the report tell us?

- Northern Australia is expected to be less affected by climate change in the future compared to southern Australia. However, the north is expected to experience increased temperatures and increased evaporation which highlights the need for water efficiency in new crops.

- Southern Australia, including the Murray Darling Basin, is expected to experience a combination of higher temperatures, changes to rainfall patterns and an increased possibility of extreme climatic events such as length of drought conditions.

- High value irrigated crops requiring large quantities of water will need to produce a high value product to ensure their financial sustainability as the amount of irrigation water decreases.

- Resilient irrigated crops which require less water and can tolerate periods when irrigation cannot be supplied will be better suited to expected future climate scenarios. Examples of resilient irrigated crops include olives, jojoba, pomegranates, capers, Australian native bush foods (such as quandong, bush tomato, desert lime), cacti, dates and annual crops.

- Dryland farming systems will also be suited to future climate scenarios. These include crops such as mustards, crambe, quinoa, tepary bean, Australian native grass crops, eucalypts for oil and extensive animal industries such as goats and kangaroos.

- Well adapted industries will require the following plant traits:
  - Water use efficiency – high water use efficiency plants will make better use of available water resources
  - Heat tolerance – to cope with increased frequency of hot days and heatwaves
  - Drought tolerance – the ability to tolerate or avoid drought through the use of seasonal growth patterns or plant characteristics such as deeper root systems
  - Frost tolerance – even with warming, frost is likely to remain an issue in the southern Murray Darling basin, in part associated with longer dry periods
  - Lower chilling requirements (vernalisation) – warming may reduce the number of cold periods, restricting production of crops that have a vernalisation requirement.

- The report concludes that the development of new industries is an essential component of the adaption of Australian agriculture to meet the challenge of climate change.
Olive – a crop for future climates

As part of the study, a long-term comparison was undertaken of the water use efficiency and farm income of olive and conventional irrigated fruit crops. It showed that at similar irrigation allocations, there were consistent returns in terms of gross value of production per megalitre. However, returns differed significantly when irrigation allocations were reduced (see graph below). For example, at 50 percent water allocations, the gross value of production per megalitre applied for the olive orchard was double that of the conventional irrigated fruit crops. The comparison helps to highlight the extent to which resilient irrigated crops, such as olives, will be suited to the lower and more variable irrigation water regimes expected in future climate scenarios for southern Australia.

What are the challenges?

While this report focused on identifying the range of rural industries potentially suited to future climates, it also looked at some of the factors that may impact on farmers’ ability to diversify their operations. These include cost, investment in new machinery, lack of skills, pests and disease, and the need for more economic analysis into new rural industries.

Useful resources

- Critical Success Factors for New Rural Industries – Publication number 09-002
- Emerging Animal and Plant Industries – Their Value to Australia (2nd edition) Publication number 09-004
- New Crop Industries Handbook – Publication number 04-125

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