Dairy

Dairy in the Inland region of New South Wales: preparing for a changing climate

Climate change is likely to offer both opportunities and challenges for dairy production in the Inland region by 2050.

Developing industry-informed climate planning information

Climate change is altering the production conditions for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate to prepare for the challenges and opportunities it may bring.

Through the Climate Vulnerability Assessment, we are increasing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The assessment has determined climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture, dairy and important cross-cutting biosecurity risks to inform sound planning, risk management and adaptation decisions.

The Climate Vulnerability Assessment was designed to highlight potential industry-level changes by 2050. For dairy production, climate suitability across NSW was assessed for the calf, heifer, lactation and dry period stages of production and for six species of pastures. The climate suitability index used describes the extent to which climatic conditions satisfy the requirements of pasture growth or animal growth.

Dairy industry in NSW

Dairy is a significant agricultural industry in NSW, with NSW being the second largest dairy-producing state in Australia, producing over 1 billion litres of milk in the 2024-25 financial year, representing 12.8% of Australian production. In 2025 there were 443 licenced dairy farms in NSW, with an average milking herd size of 343 head.

Inland Dairy Region

The Inland region has approximately 20 dairy farms. This area experiences a variable climate, often facing harsh climate extremes, Farming practices in the region range from pasture-based systems to a more intensive system. Due to the climate conditions, many farms depend on irrigation and supplementary feeding to ensure that cows receive a balanced diet of forage and concentrate.

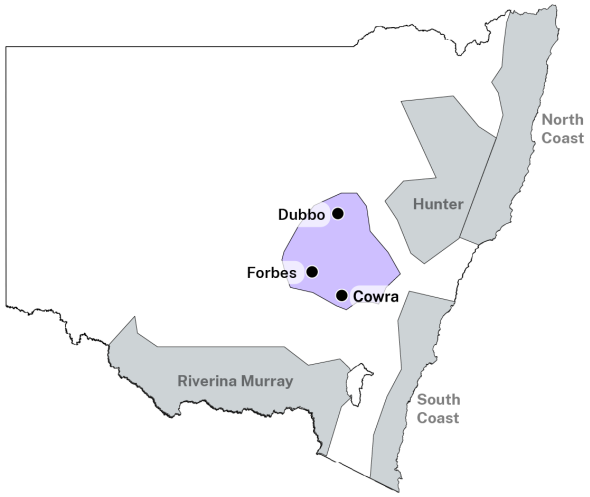

Figure 1. Map showing key dairy growing regions within NSW, with the Inland Dairy Region highlighted in purple.

Climate and Dairy Cows

In 2050, the climate in the Inland dairy region is expected to remain moderately to very highly suitable for dairy production. These findings indicate that climate conditions will continue to be suitable for dairy cows.

Climate risks and opportunities for cows:

A combination of **higher temperatures and changes in humidity** are likely to increase heat stress for cows in late spring, summer and early autumn months.

Climate impacts: what to expect

Autumn

- Minimal decreases in climate suitability for the dry period are likely in early autumn across the Inland dairy region, and for lactation near Dubbo in mid-autumn.

Winter

- Negligible changes in climate suitability are likely across all life stages, as moderate to very high climate suitability is retained across the region.

Spring

- Minimal decreases in climate suitability for lactation and the dry period are likely in late spring across the region, and for heifer growth near Forbes.

Summer

- Minimal decreases in climate suitability for heifer growth and the dry period are likely throughout the summer months across the region, and for lactation near Cowra.

What climate impacts on cows mean for the dairy industry

The projected changes, spread over production stages, seasons and locations, translate into a range of implications that could create both benefits and challenges for dairy production in the Inland dairy region by 2050.

Benefits: Very high climate suitability is likely to be maintained for heifer growth, lactation and the dry period through winter, supporting cow health, welfare and productivity. Moderate suitability is likely to be maintained for calf growth, so existing calf housing and management should continue to protect young animals from unseasonal or extreme weather events.

Challenges: Increased heat stress from late spring through summer and into early autumn is likely to pose challenges to dairying, with heat-stress impacts beginning earlier in the year and persisting for longer. Existing heat-stress management practices need to be continued, and potentially expanded or adjusted to address future impacts.

Climate and Pastures

The Inland dairy region primarily relies on lucerne, ryegrass and forage oats, with white clover also contributing to the feed base. Kikuyu and chicory are used less extensively. Historically, spring has provided climate conditions that support the greatest number of pasture species, but by 2050, climate suitability is projected to decline for multiple pasture species.

Climate risks and opportunities for pastures::

Higher temperatures and changes in rainfall patterns are likely to alter growing conditions for some pasture species from late spring through summer and into early autumn.

Higher temperatures in winter may support more lucerne and ryegrass growth, creating more opportunities for cool-season pasture growth and conserved feed.

Climate impacts: what to expect

Autumn

- Minimal to moderate decreases in climate suitability for forage oats, lucerne, ryegrass and white clover are likely in early to mid-autumn across the region.
- Minimal increases in climate suitability for ryegrass near Cowra and Forbes are likely in mid-autumn.

Winter

- Minimal to moderate increases in climate suitability for lucerne and ryegrass are likely in winter across the region, with similar increases around Cowra for chicory.

Spring

- Minimal increases in climate suitability for kikuyu are likely in spring around Cowra.
- Minimal to moderate decreases in climate suitability for forage oats, lucerne, ryegrass and white clover are likely in spring across the region.

Summer

- Minimal to moderate decreases in climate suitability are likely for chicory and lucerne across the Inland dairy region during summer, and for forage oats and ryegrass around Cowra
- Minimal increases in climate suitability are likely for kikuyu near Dubbo in late summer.

What climate impacts on pastures mean for the dairy industry

The projected changes, spread across pasture species, seasons, and locations, translate into a range of implications that could create both benefits and challenges for dairy production in the Inland dairy region by 2050.

Benefits: Increases in climate suitability during winter for lucerne and ryegrass, combined with the retention of historical levels of climate suitability for chicory, forage oats and white clover, could support more cool-season pasture growth in 2050, potentially enabling greater levels of conserved feed.

Challenges: Minimal to moderate decreases in climate suitability for ryegrass, lucerne, chicory, forage oats and white clover from spring through to autumn could reduce grazing options. These changes may increase reliance on irrigation, supplementary feeding and conserved fodder to maintain the quantity and quality of feed in the region.

Irrigation water requirements

Pastures are likely to use more water due to higher temperatures, which influence the total amount of irrigation water required to maintain pasture growth. The dairy industry may need to improve water storage and water use by adopting more efficient irrigation practices or new technologies to maintain pasture growth.

How to adapt to a changing climate

Adaptation for cows

Dairy farmers and industry have been adapting to climate variability and changing conditions for many years. Dairy Australia's resources for managing heat stress, including the 'Cool Cows' report, provide current, practical guidance for managing heat stress, and these practices will continue to support heat-resilient dairy systems into the future. Adaptation options include:

- Provide shade and use sprinklers to help cool cows.
- Ensure that cool clean drinking water is available and easy to access.
- Adjust feeding and grazing schedules to cooler times of the day.
- Modify milking times to avoid the hottest part of the day.
- Minimise walking and yard time during the hottest part of the day.

Long term strategies:

- Adjust the timing of calving patterns to avoid the hot summer months.
- Select for more heat-tolerant animals using the heat-tolerance Australian Breeding Values.
- Increase shade across the farm by planting trees or investing in permanent shade and cooling infrastructure.

Forecasts for managing heat stress

Resources are available which provide forecasts of heat conditions, helping you to make informed decisions for managing heat stress:

- Heat stress and THI forecasting tools to guide daily decisions.
- Bureau of Meteorology heatwave forecasts.

Use these tools to implement timely heat manage strategies and to protect herd performance throughout the hotter months.

Adaptation for pastures

As climate change alters the timing of pasture growth, dairy farmers can continue to build on existing management practices to maintain the volume and quality of feed. These can include:

- Selection of pasture species suited to future seasonal patterns.
- Adjust sowing times to match changes in autumn and spring to improve establishment.
- Align calving and lactation with peak pasture availability, as spring growth may be shorter and autumn growth delayed.
- Increase the use of conserved fodder to help buffer feed supply during months of reduced pasture growth.

FOR MORE INFORMATION

Visit https://www.dpi.nsw.gov.au/dpi/climate/climate-vulnerability-assessment for more information and full access to reports and data.

Please get in touch with vulnerability.assessment@dpird.nsw.gov.au

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Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset contains projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling. Low confidence in projected changes due to differences between the models is noted where applicable, and care should be taken when interpreting the results presented here.

The Climate Vulnerability Assessment was designed to highlight potential industry-level changes. The project's assessments used an intermediate and a high emissions scenario (RCP4.5 and RCP8.5, respectively), but other future pathways of greenhouse gas emissions could occur. The inclusion of climate variables important to dairy production was based on published research, expert knowledge and data availability.