



Dairy in the Hunter 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 Hunter 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.

Hunter Dairy Region

The Hunter dairy region is home to around 40 dairy farms. This region has a temperate climate, with reliable water sources and fertile soils supporting productive pastures and fodder crops. The Hunter dairy region primarily employs pasture-based systems, with some irrigation used to maintain pasture quality. Supplementary feeding with concentrates, hay and silage is common, allowing producers to manage dry conditions and ensuring consistent milk production and quality.

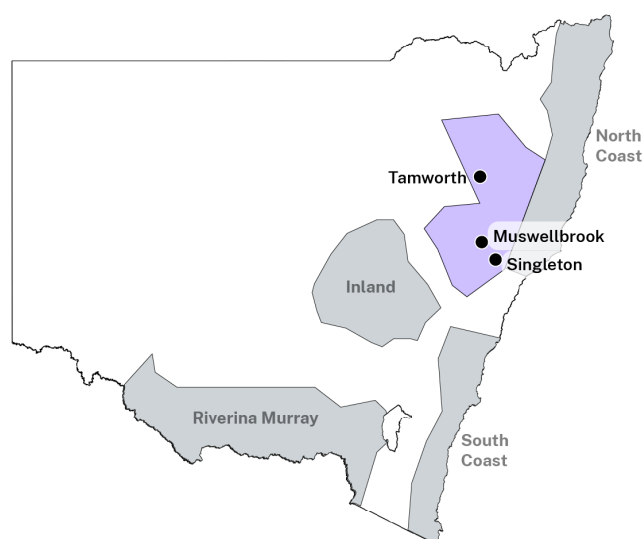


Figure 1. Map showing key dairy growing regions within NSW, with the Hunter Dairy Region highlighted in purple.

Climate and Dairy Cows

In 2050, the climate in the Hunter dairy region is expected to remain moderately to highly suitable for dairy production. Some changes are expected in late spring, summer and early autumn, with the remainder of the year retaining historical levels of climate suitability.

Climate risks and opportunities for cows:



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



Fewer cold days are likely to reduce cold stress in young animals in spring and summer.

Climate impacts: what to expect for the seasons

Autumn

- Minimal decreases in climate suitability for lactation and the dry period are likely in early autumn around Singleton and Tamworth.

Winter

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

Spring

- Minimal increases in climate suitability for calf growth are likely in areas around Muswellbrook and Singleton.
- Minimal decreases in climate suitability for lactation and the dry period are likely in late spring around Tamworth.

Summer

- Minimal to moderate increases in climate suitability for calf growth are likely around Muswellbrook and Singleton and for heifer growth and the dry period around Singleton.
- Minimal decreases in climate suitability for heifer growth, lactation and the dry period are likely throughout the summer months around Tamworth.

What climate impacts on cows mean for the dairy industry

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

Benefits: Fewer cold days in spring and summer could benefit calf health, welfare and growth by 2050. It is crucial to maintain strategies, such as the housing of calves, into the future, as they will continue to provide protection from unseasonal or extreme weather events.

Challenges: Increased heat stress from late spring through summer to early autumn is likely to pose challenges to dairying, with heat-stress impacts starting 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 Hunter dairy region uses pasture systems made up of kikuyu and ryegrass, with some white clover, lucerne, forage oats and chicory. Historically, autumn 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 across the region.

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.

Climate impacts: what to expect for the seasons

Autumn

- Minimal to moderate decreases in climate suitability are expected for forage oats, lucerne, ryegrass and white clover in early to mid-autumn across the Hunter dairy region.

Winter

- Minimal to moderate increases in climate suitability are likely to occur for lucerne and ryegrass during winter around Muswellbrook and Tamworth.
- Minimal decreases in climate suitability are expected for white clover across the Hunter dairy region.

Spring

- Minimal to moderate decreases in climate suitability are likely for forage oats, lucerne, ryegrass, and white clover during spring across the Hunter dairy region.

Summer

- Minimal to moderate decreases in climate suitability are likely for chicory, forage oat, lucerne and white clover during summer across the Hunter dairy 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.

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 Hunter 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 kikuyu and chicory, could support more cool season pasture growth in 2050. These conditions may enable greater production and conservation of feed.

Challenges: Minimal to moderate decreases in climate suitability from mid-spring to mid-autumn for ryegrass, white clover, lucerne and forage oats could reduce spring and autumn grazing options. These changes may shorten the growing window for these pastures, meaning feedbase planning may need to account for autumn establishment, alternative summer feed sources, and maintaining the quantity and quality of feed in the hotter parts of the Hunter.

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@dpi.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.