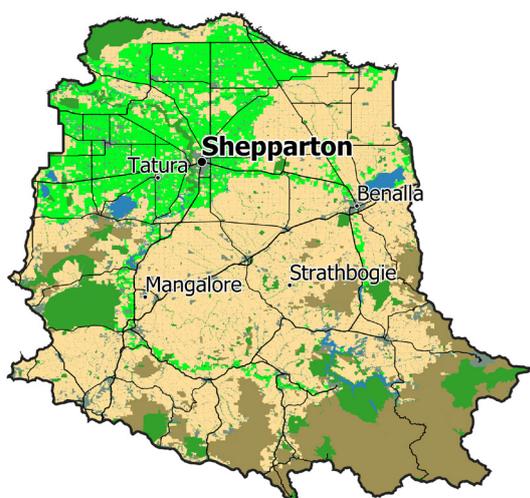




Regional Weather and Climate Guide

In the last 30 years in the Goulburn Broken

-  Annual rainfall has decreased slightly
-  Dry years have occurred 12 times and wet years seven times
-  Rainfall has decreased in the autumn and spring months
-  Winter rainfall has been reliable, summer has been unreliable
-  The autumn break usually occurs by the first week of May around the south east, and not until late May to early June around Shepparton and much of the north west
-  Spring frosts have been more common and have been occurring later
-  There have been more hot days, with more consecutive days above 35 °C



■ Natural Environments
 ■ Low Level Production
 ■ Dryland Production
 ■ Irrigated Production
 ■ Intensive Uses
 ■ Water Bodies

Goulburn Broken at a glance

The Goulburn Broken region covers 2.4 million hectares, of which 68% is under agricultural production. Major land uses include grazing and broadacre cropping – both dryland and irrigated. It is one of Australia’s most productive ‘food bowls’, with vegetables and orchard fruits comprising around one quarter of the value of the Goulburn Broken’s agricultural output. The region contributed around \$2.37 billion to the Australian economy in 2017–18.

A guide to weather and climate in the Goulburn Broken

Primary producers make decisions using their knowledge and expectations of regional weather patterns. The purpose of this guide is to provide insight into the region’s climate and an understanding of changes that have occurred through recent periods. This information can potentially assist primary producers and rural communities make better informed decisions for their business and livelihoods. This guide is part of a series of guides produced for every Natural Resource Management area around Australia.



A climate guide for agriculture
Goulburn Broken, Victoria



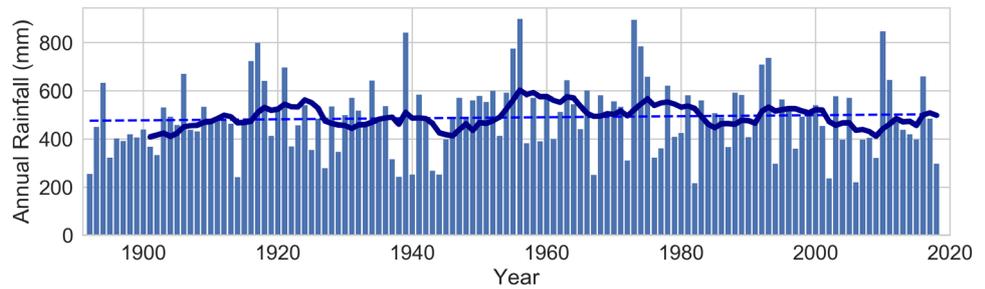


Annual Rainfall

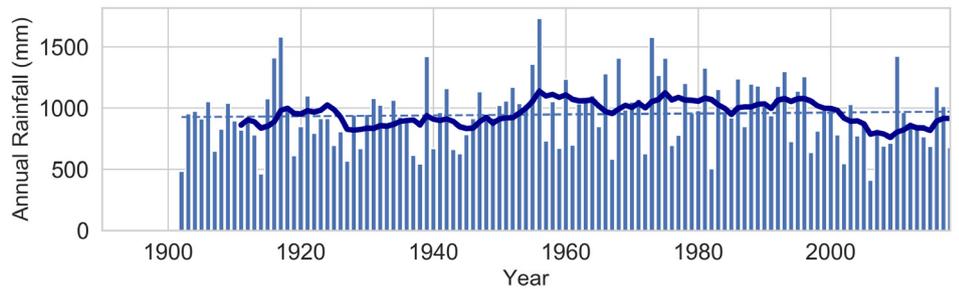
Annual rainfall in the Goulburn Broken has decreased slightly

Annual rainfall in the Goulburn Broken has decreased by around 50 mm (-7%) from about 760 mm to about 710 mm over the past 30 years (1989–2018) when compared to the previous 30 years (1959–1988). The charts show annual rainfall (blue bars), with a 10-year running average (solid blue line) for Mooroopna and Strathbogie. Although there has been a decrease in annual rainfall in the past 30 years compared with the previous 30 years, it is within the range of natural variability. In the past 30 years (1989–2018), dry years (lowest 30%) have occurred 12 times and wet years (highest 30%) have occurred seven times, while the remaining years were in the average range. Note the Millennium drought accounted for eight of these dry years in the recent period. During

Mooroopna Annual Rainfall 1892 - 2018



Strathbogie Annual Rainfall 1902 - 2018



the previous 30-year period (1959–1988), dry years occurred

eight times and wet years occurred 13 times.

For more information on future projections, visit the Climate Change in Australia website > www.climatechangeinaustralia.gov.au

Want to know more about the guides? Try Frequently Asked Questions at > www.bom.gov.au/climate/climate-guides/

Goulburn Broken winter rainfall is reliable; summer is unreliable

Average rainfall reliability maps for the past 30 years (1989–2018) show winter rainfall has been moderately reliable across the region (light blue areas). It usually changes by about 70 mm from one winter to the next, or around 30% of the winter average, which is 240 mm. This is in contrast to spring and autumn rainfall, which has been less reliable (light red and beige areas), especially in the northern part of the region. Although there have been some wet summers in the past 30 years, overall summer rainfall has been unreliable across the region's north (red areas) from year to year.

Winter



Spring



Summer



Autumn



Average Change In Seasonal Rainfall From Year to Year





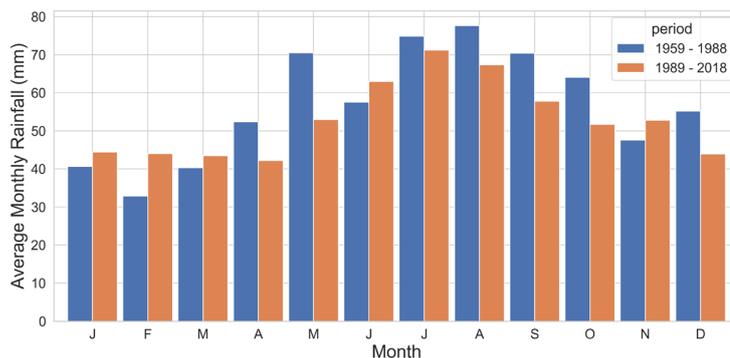
Rainfall Timing

There has been a decrease in rainfall in the autumn and spring months

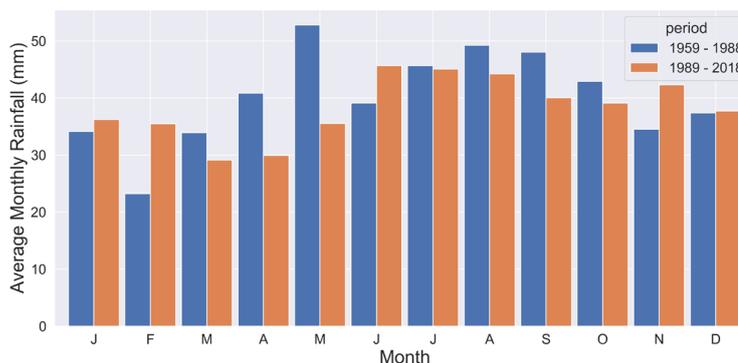
Rainfall in the late autumn and early spring months decreased at Benalla and Tatura between 1989–2018 (orange bars) compared with 1959–1988 (blue bars). In February, and to a lesser degree, June and November, average monthly rainfall totals increased. Other locations around the Goulburn Broken region showed a similar pattern.

Over the past 30 years, average winter growing season rainfall (April to October inclusive) for Benalla was 406 mm; 61 mm lower than the 467 mm average for the previous 30-year period (1959–1988). For Tatura, growing season rainfall has declined 39 mm over the same period.

Benalla 30-year Average Rainfall by Month



Tatura 30-year Average Rainfall by Month



For more information on the latest observations and science behind these changes, refer to the State of the Climate Report > www.bom.gov.au/state-of-the-climate/

Timing of the autumn break in the Goulburn Broken



In the Goulburn Broken region, the autumn break can be defined as at least 25 mm over three days prior to the commencement of sowing. The map shows that over the past 30 years (1989–2018), the break typically occurred from late-April to the first week of May in the south east of the region (blue areas) and not until late May to early June around Shepparton, Tatura and the north west (light blue to light green areas). In the north east of the region around Shepparton and Tatura in the last 30 years, the autumn break has been occurring about one month later than it did in the period 1959-1988.

Weeks after 1 April	3	4	5	6	7	8	9	10
Autumn Break Usually Occurred After...	28 April	5 May	12 May	19 May	26 May	2 June	9 June	16 June



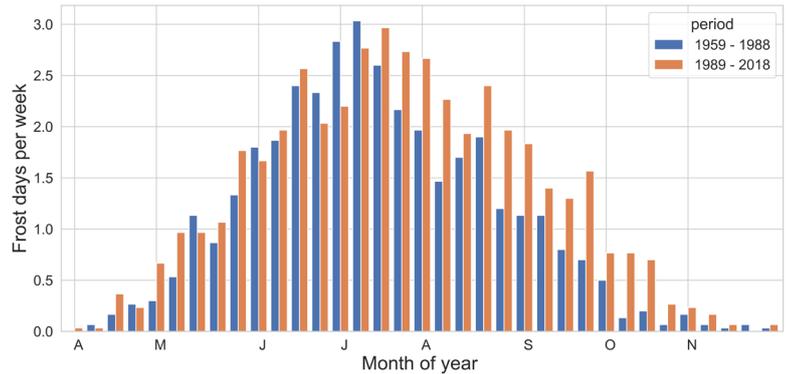


Frost

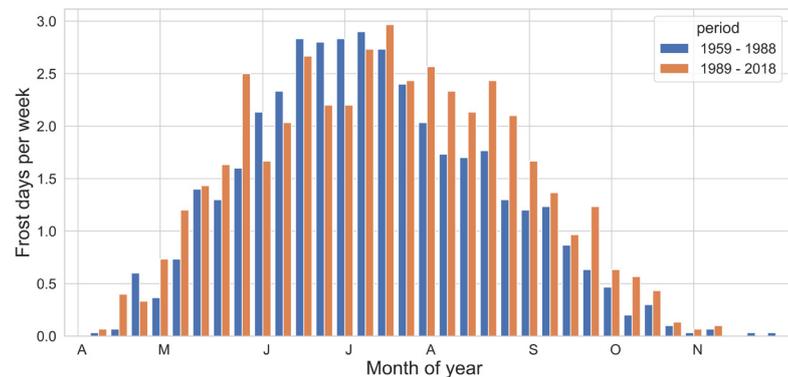
Later and more frequent frosts

The number of potential frosts has increased at Mangalore and Tatura between 1989–2018 (orange bars) compared with 1959–1988 (blue bars). North of Shepparton the frost frequency in spring has increased by more than two additional spring frost nights each year between 1989–2018 compared to 1959–1988. In the ranges south of Strathbogie, the number of spring frosts has decreased by about two fewer frost nights each year. Tatura's frost risk has typically ended by the second week in October, whereas Mangalore experienced frosts through October. November frosts occur infrequently at Mangalore, about once every third year. The latest potential frost night recorded at Mangalore airport was the 30th of November 1996. More frosty nights have tended to occur through dry winter and spring periods, when soil moisture is low and cloud cover infrequent.

Mangalore Airport Frost Occurrence And Likelihood By Week



Tatura Frost Occurrence And Likelihood By Week

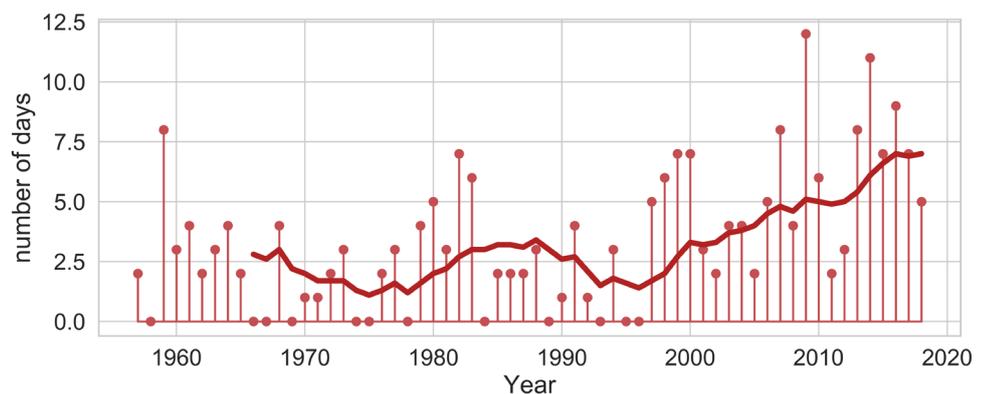


Temperature

The Goulburn Broken has experienced more hot days in the past 30 years

The charts show the annual number of days above 38 °C (red bars), with a 10-year running average (solid red line) for Tatura. Tatura experienced an average of five days per year above 38 °C between 1989–2018, compared to an average of three days per year above 38 °C between 1959–1988. Since 1989, temperatures of 43 °C have been recorded for Tatura three times. In the previous 30-year period (1959 – 1988) the temperature at Tatura reached 43 °C only once, in 1982. Instances of consecutive days above 40 °C have also increased

Tatura Days Over 38 °C



in the past 30 years. In 2009 and 2014, Tatura experienced runs of four days in a row above 40 °C. 2009 was the first four-day run

above 40 °C since temperature records began at Tatura in 1965. The 2009 run included two days above 42 °C.

Regional Weather and Climate Guides are produced as a partnership between Bureau of Meteorology, CSIRO and FarmLink



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