

Drought Forecasts, Projections and Decisions

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SARDI, Climate Applications

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Government
of South Australia

Department of Primary
Industries and Regions

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Irrigated horticulture

Many sources of water

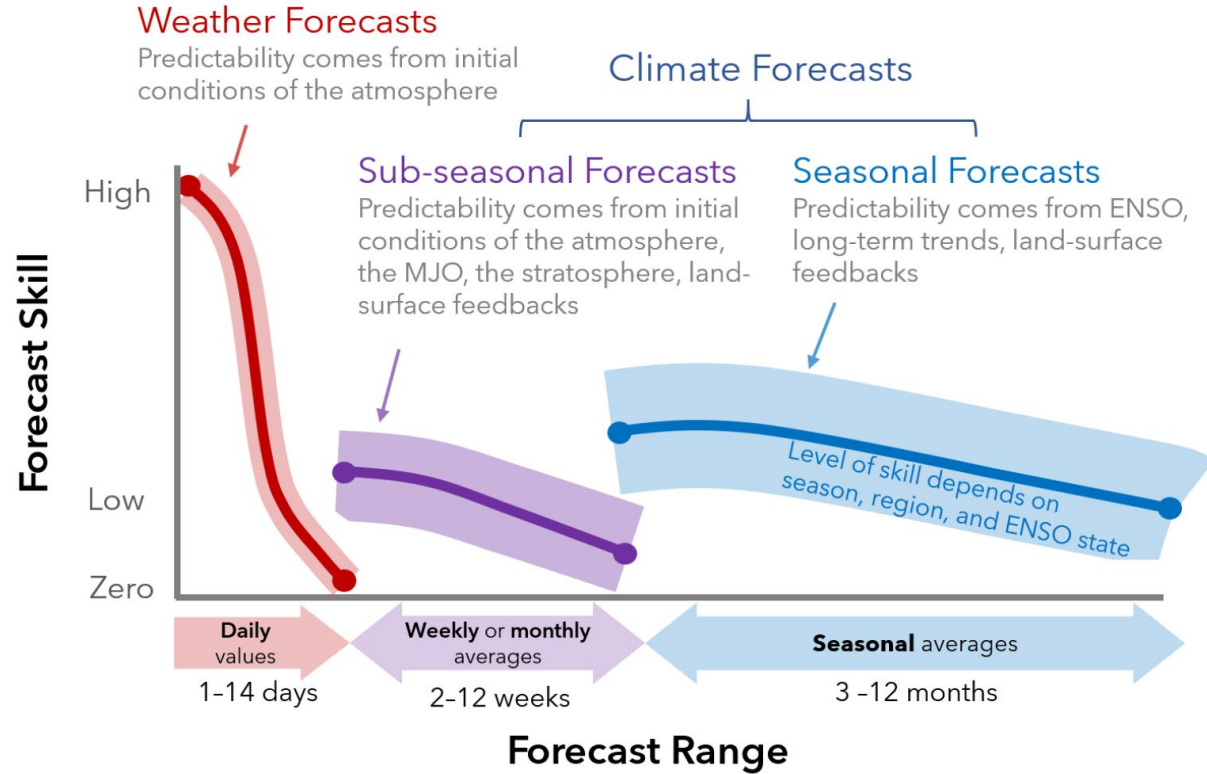
Climate change / drought threatens most of them

1. Water imported into the region by rivers and pipelines
2. Water that falls in the region and stored in farm dams
3. Rainfall stored in the soil (also important to leach salt from the soil)
4. Groundwater

Exception ?

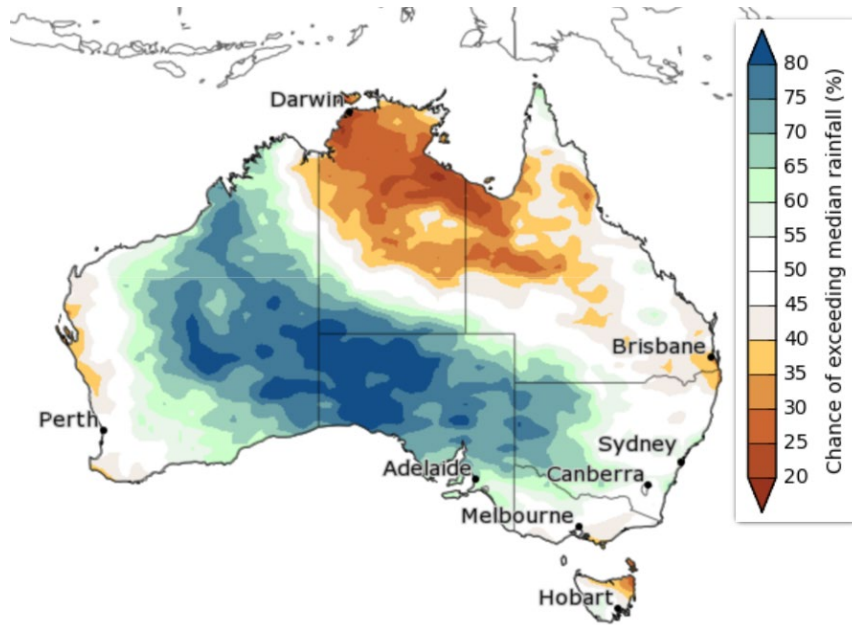
5. Urban waste water





[Weather and climate forecasts - coloradoriverscience.org](http://coloradoriverscience.org)

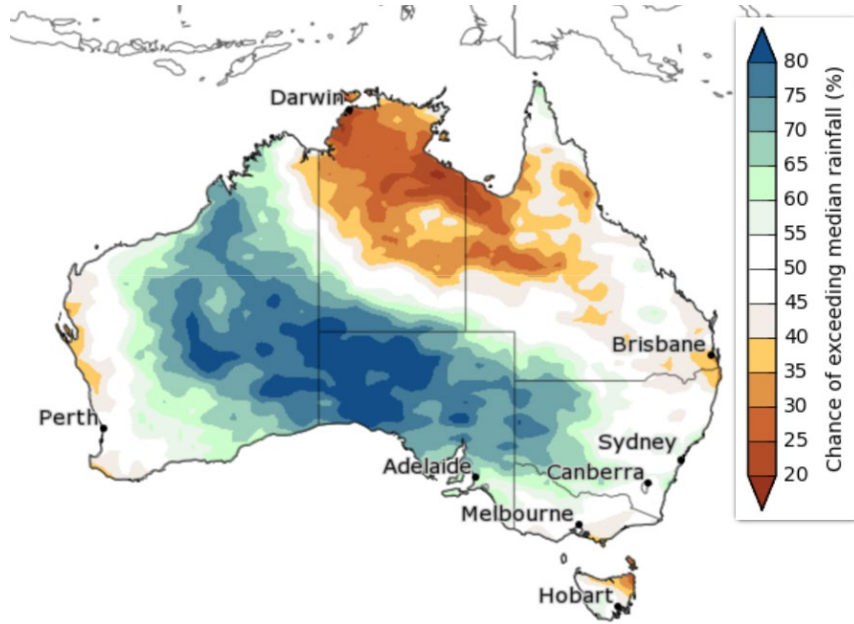
Getting information. Seasonal Outlooks



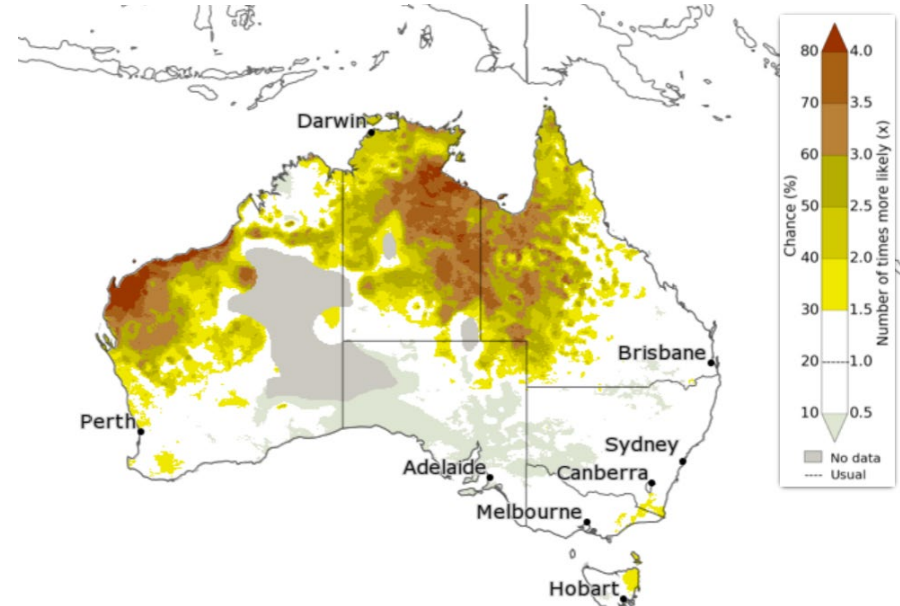
Chance of exceeding median rainfall

<https://www.bom.gov.au/climate/outlooks/#/overview/summary>

Getting information. Seasonal Outlooks



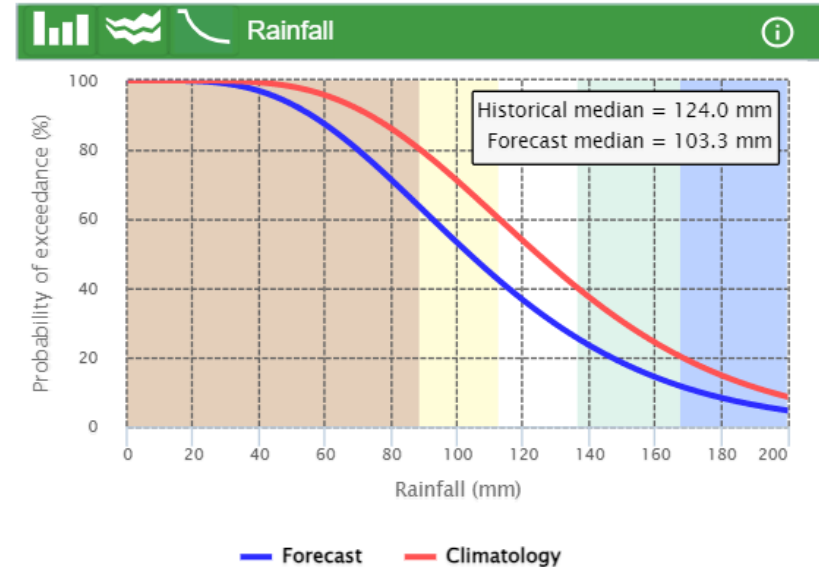
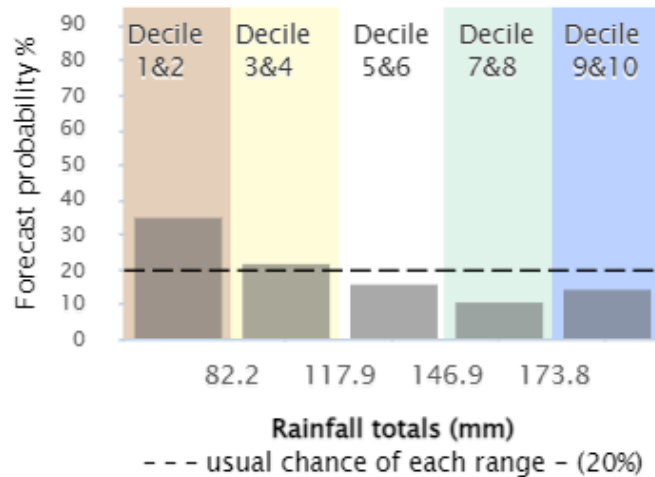
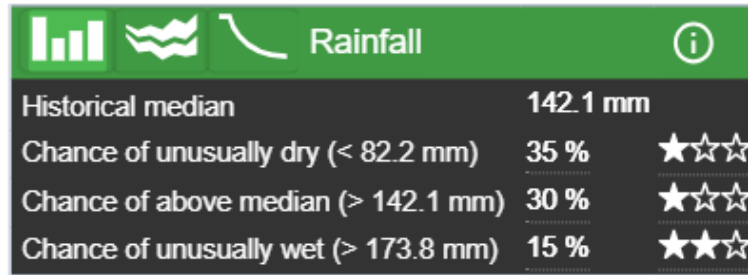
Chance of exceeding median rainfall



Chance of extremes: Unusually dry
Chance of rainfall being less than historic
decile 2 rainfall

<https://www.bom.gov.au/climate/outlooks/#/overview/summary>

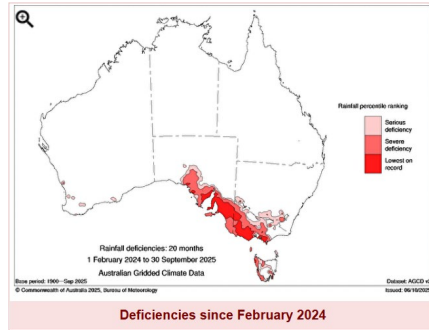
Getting information. Seasonal Outlooks



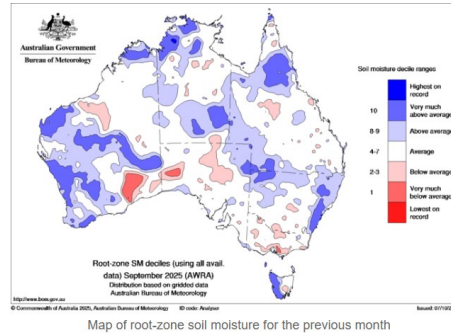
<https://www.bom.gov.au/climate/outlooks/#/overview/summary>

Getting information. Rainfall and soil moisture

Rainfall deficiencies



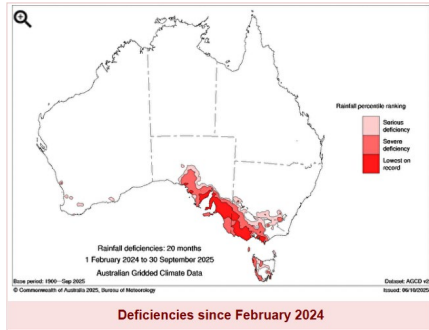
Soil moisture



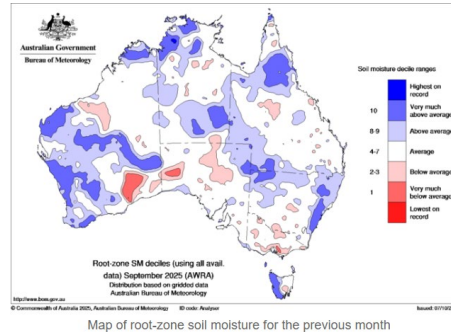
<https://www.bom.gov.au/climate/drought/>

Getting information. Drought

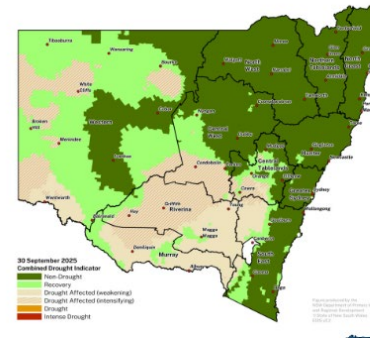
Rainfall deficiencies



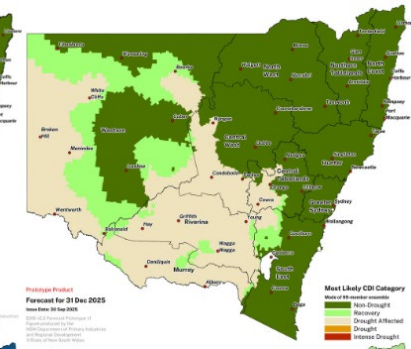
Soil moisture



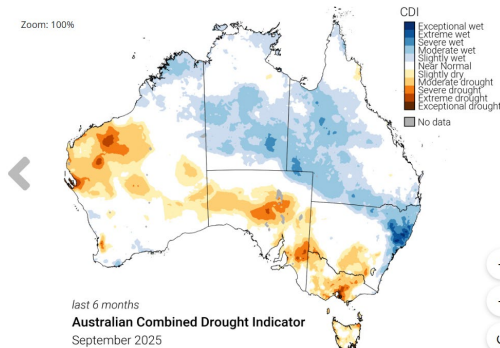
Current (sept 2025)



3 month Forecast



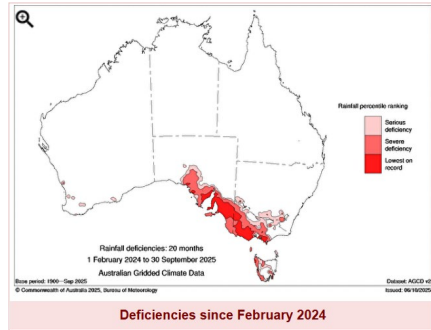
Drought Monitor



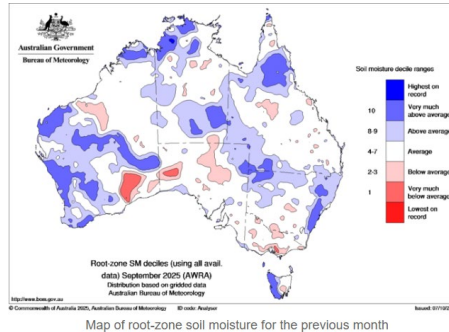
<https://www.bom.gov.au/climate/drought/> https://www.nacp.org.au/drought_monitor
https://www.dpi.nsw.gov.au/climate_applications/state-seasonal-update/drought-forecast

Getting information. Stream flow and storage

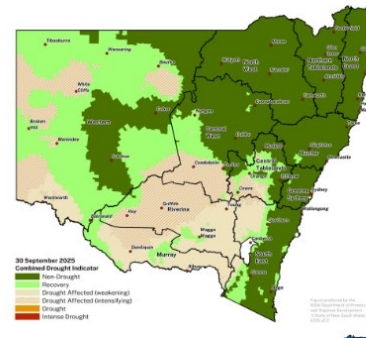
Rainfall deficiencies



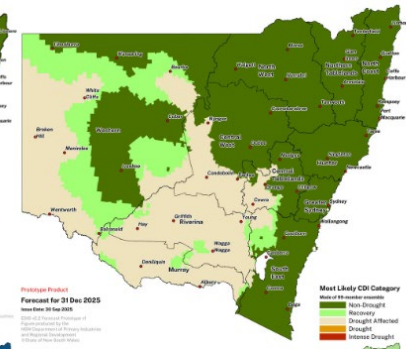
Soil moisture



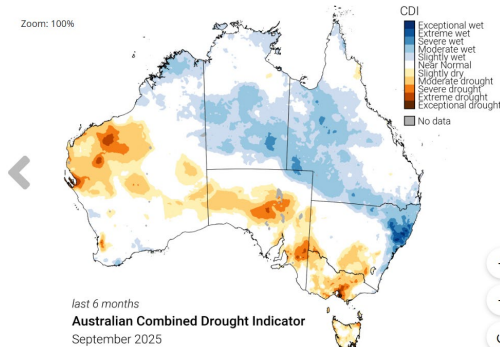
Current (sept 2025)



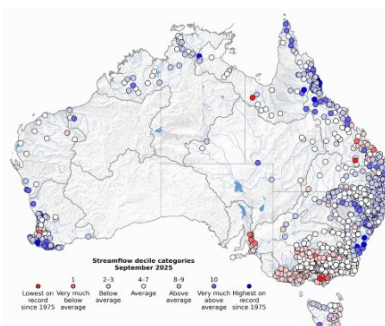
3 month Forecast



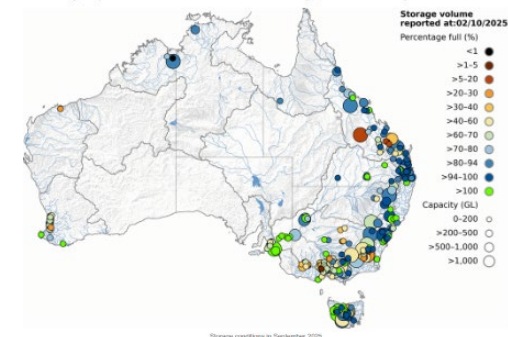
Drought Monitor



Stream flow



Storage

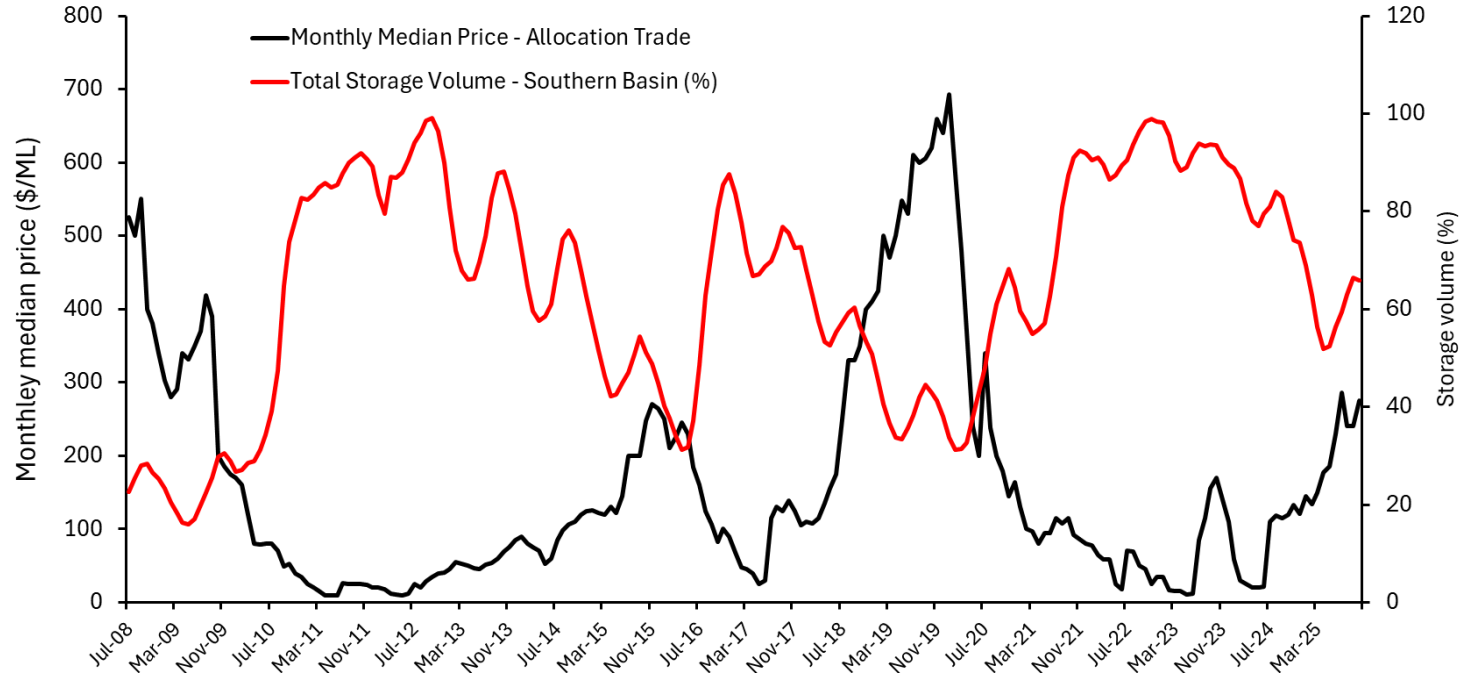


<https://www.bom.gov.au/climate/drought/> https://www.nacp.org.au/drought_monitor
https://www.dpi.nsw.gov.au/climate_applications/state-seasonal-update/drought-forecast

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Water market



Median allocation price and storage volume southern MDB

<https://mdbwip.bom.gov.au/southern-basin/>

<https://www.bom.gov.au/water/dashboards/#/water-markets/mdb/at>

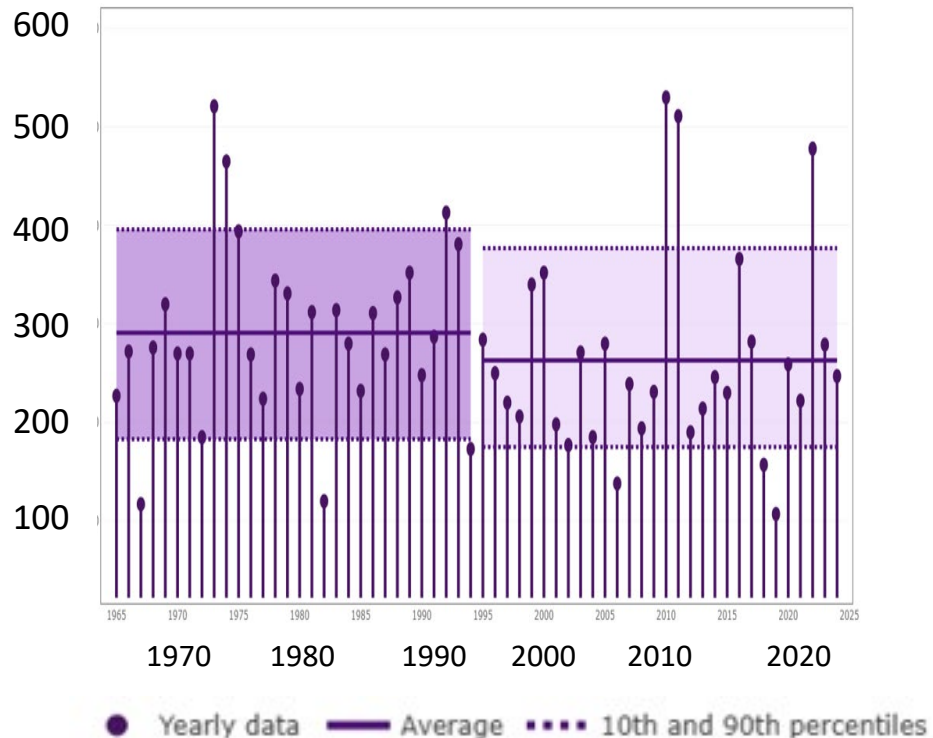
Historic Trends

Rainfall

From MyClimateView

<https://myclimateview.com.au/>

Historical observations



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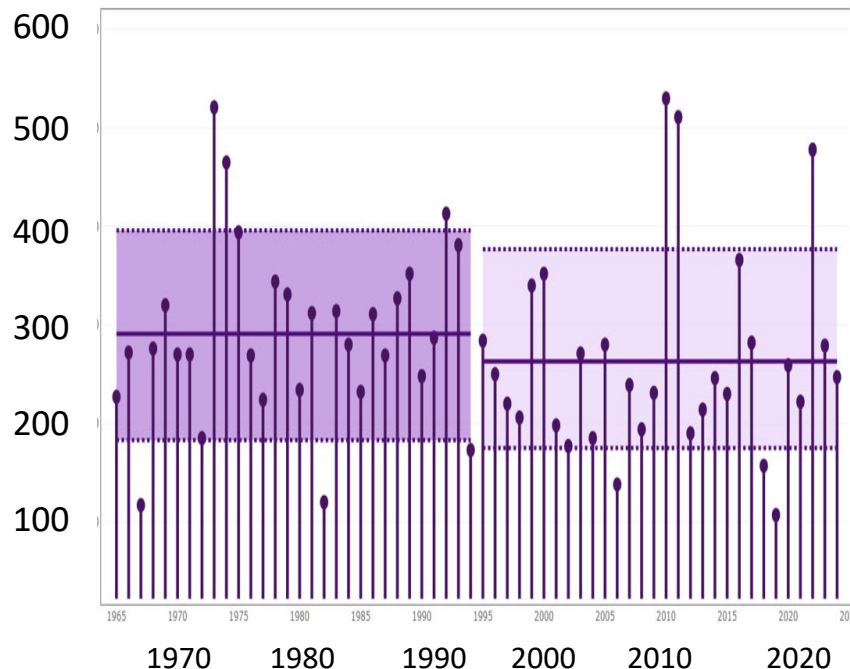
Historic Trends and Future Projections

From MyClimateView

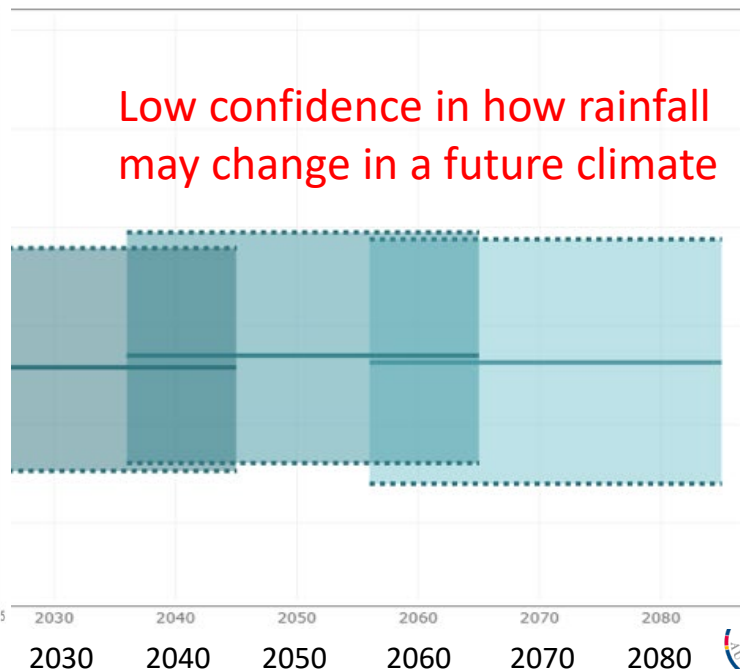
<https://myclimateview.com.au/>

Rainfall

Historical observations



Projections. RCP4.5



● Yearly data — Average - - - - 10th and 90th percentiles ■ Past ■ Future



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Annual Rainfall

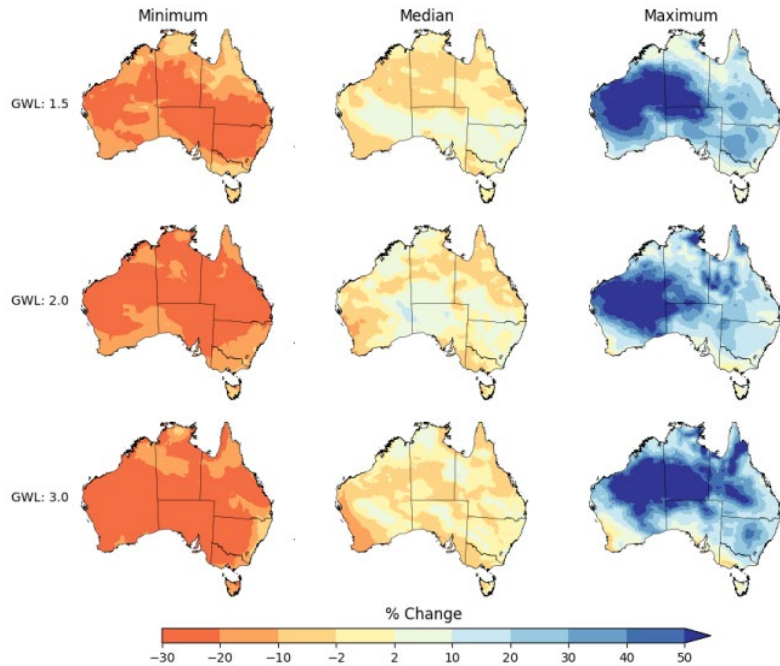
Warming

columns show GCM model uncertainty

Drier

Annual rainfall

Wetter

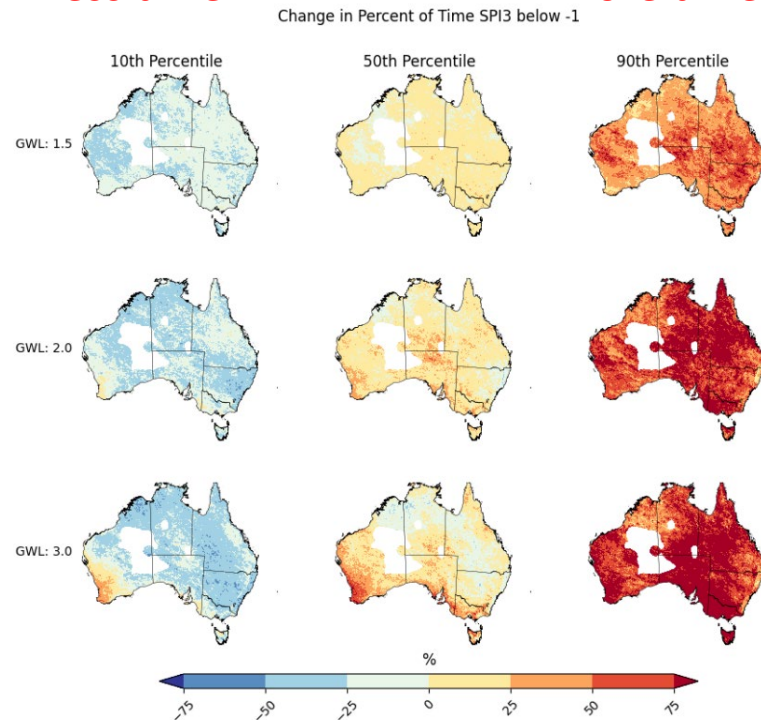


Standardized Precipitation Index (SPI)

SPI < 1 (measure of drought)

Less time

More time



From Australia's future climate and hazards report

<https://www.acs.gov.au/documents/fadb05a9fa254835b840db73383910d7/about>

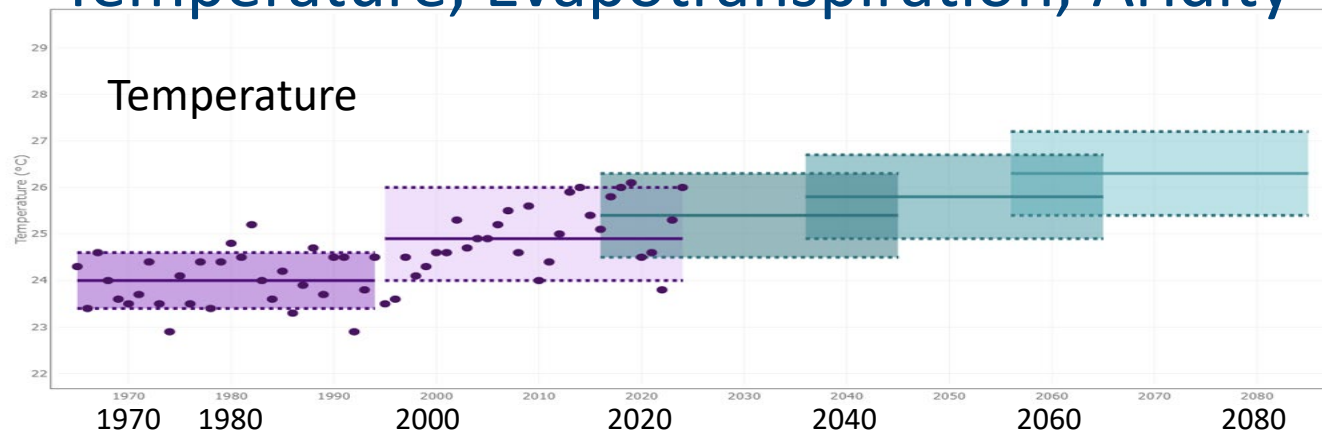
<https://www.acs.gov.au/pages/data-explorer>

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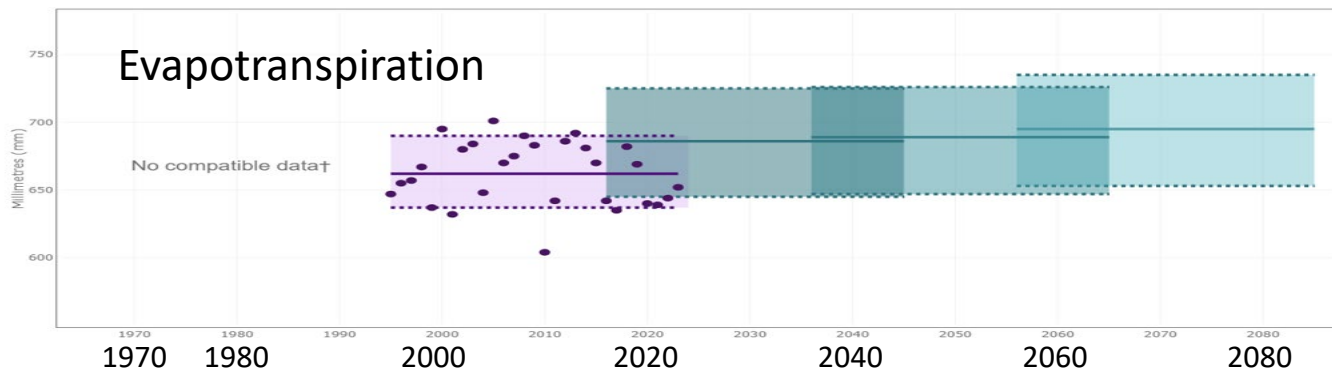
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Temperature, Evapotranspiration, Aridity



Increasing and very high confidence that will continue to increase

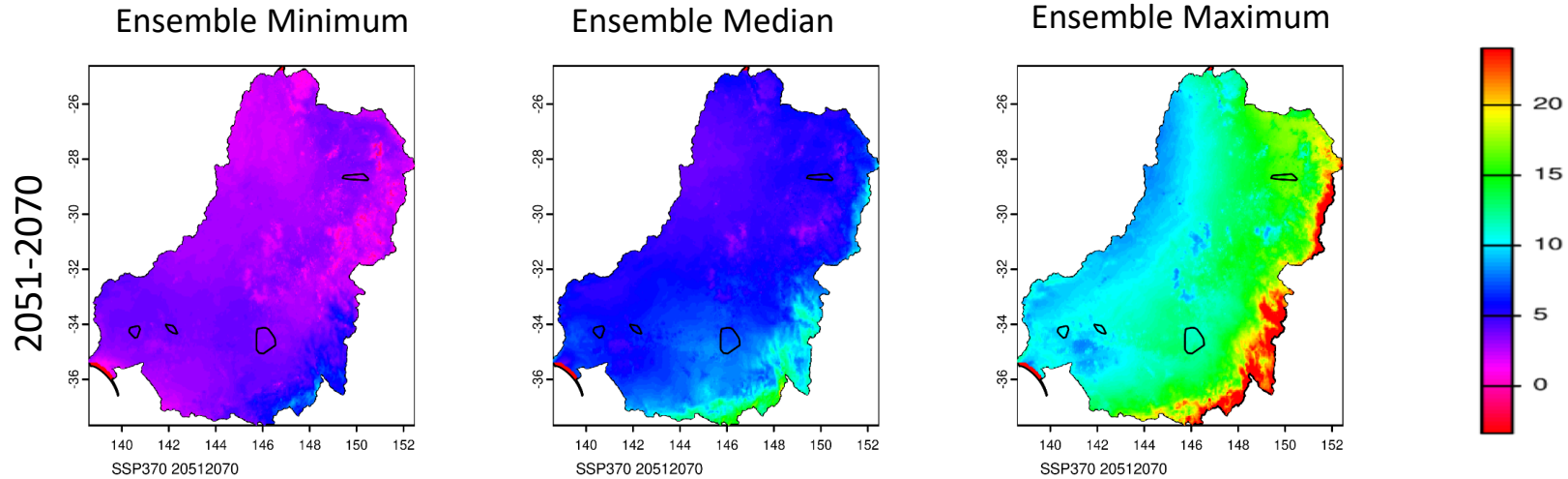


High confidence that evapotranspiration will increase in a future climate

Change in Evapotranspiration (ET_o) in MDB

% change in Summer ET_o

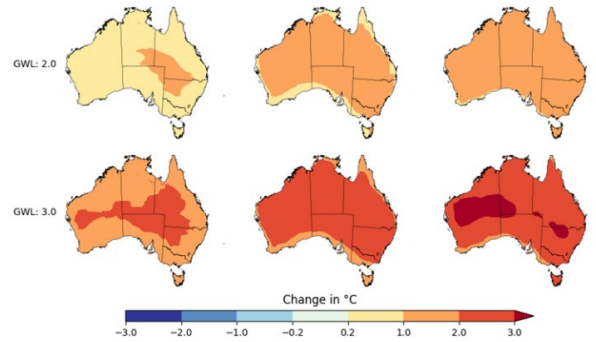
SSP3 - High emissions 2051-2070



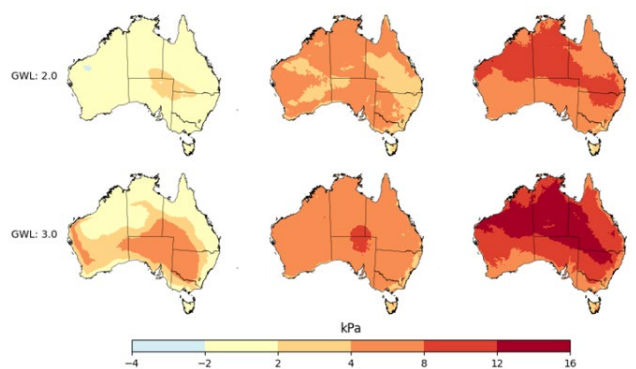
Andrew Hall – Charles Sturt University



Temperature Confident will increase

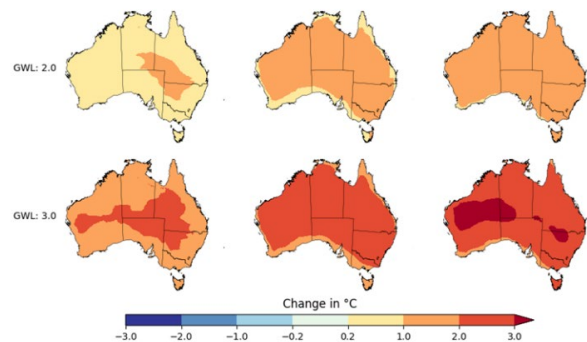


Vapour pressure deficit Confident will increase; drier atmosphere

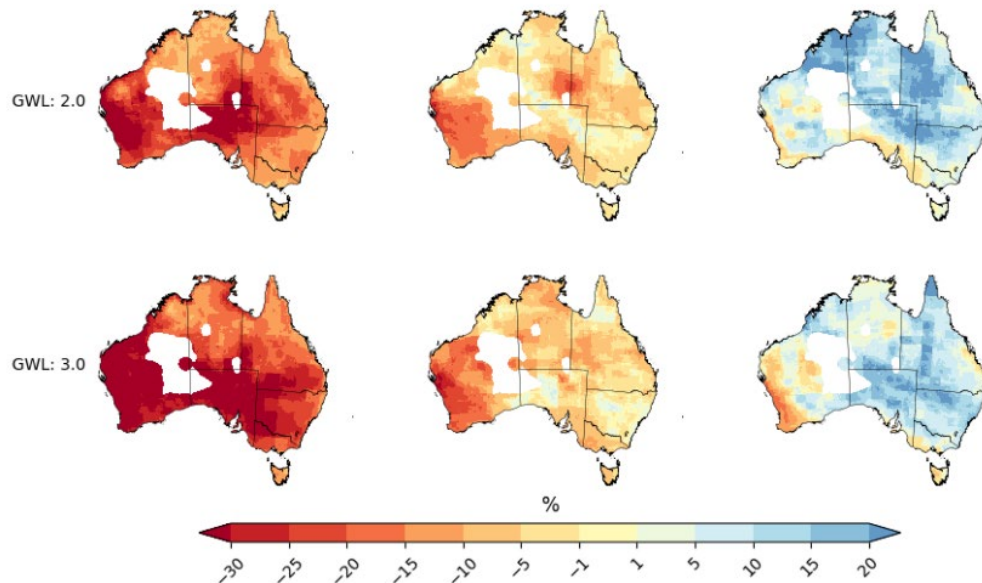


From Australia's future climate and hazards report
<https://www.acs.gov.au/documents/fadb05a9fa254835b840db73383910d7/about>
<https://www.acs.gov.au/pages/data-explorer>

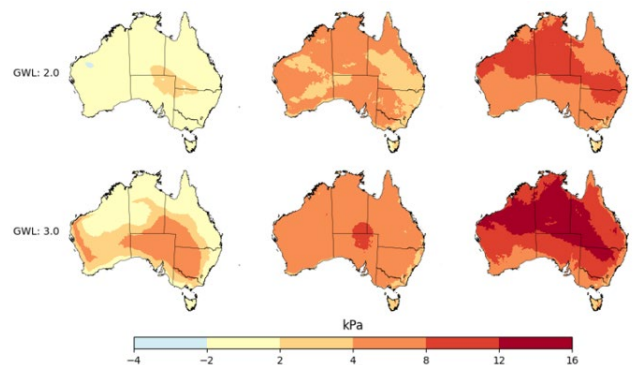
Temperature Confident will increase



Aridity Rain / Evaporation Less sure but more likely to increase; greater shortfall of moisture

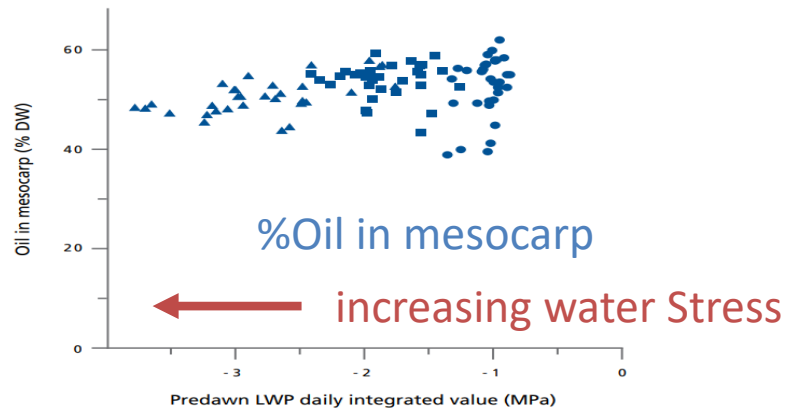
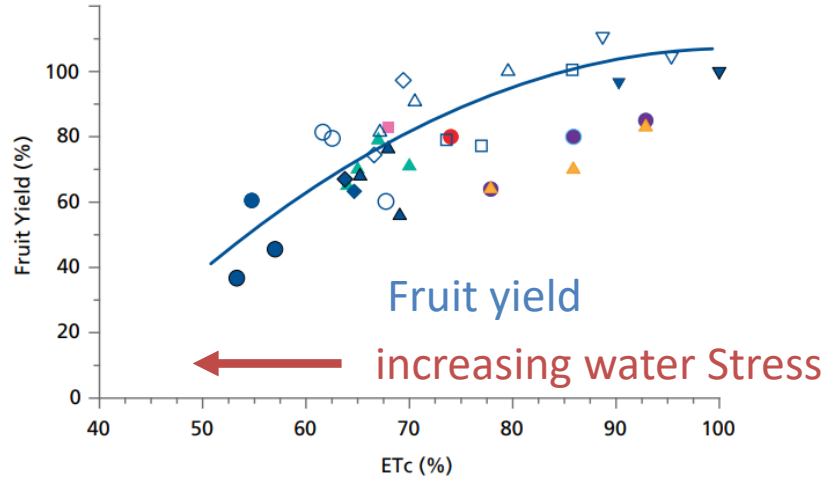


Vapour pressure deficit Confident will increase; drier atmosphere

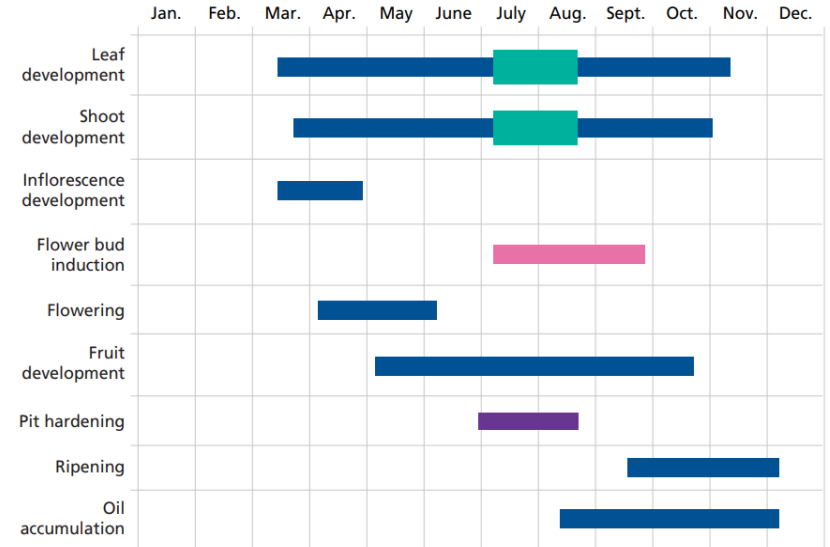


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<https://www.acs.gov.au/pages/data-explorer>

What do we know about water requirements and stress points for Olives?



Phenology



FAO66 Crop yield response to water

Decisions

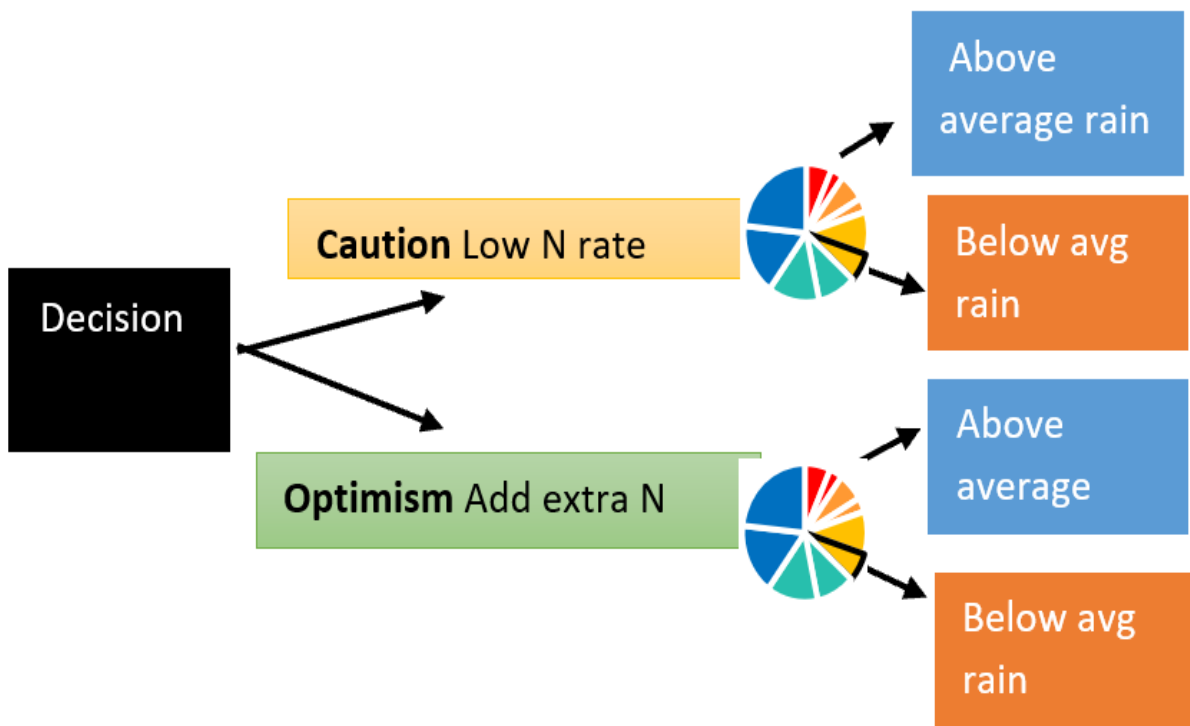
A 'Good' decision is an **informed** decision using best available information at the time to maximise the chance of a favourable outcome

The 'Right' decision can only be made in **hindsight** once the outcome is known

A seemingly 'Good' decision can turn out 'Wrong' because of incomplete use of existing information, risk and/or uncertainty

RiskWi\$e





Regret of caution. Missed opportunity for higher yield with extra N 👎

Reward of caution. Money not wasted on extra N 👍👍

Reward of optimism. Higher profit from extra N 👍👍👍

Regret of optimism. Fertiliser unused 👎👎

Challenges

Right, Wrong and Good decisions

Decision making using an educated interpretation of available information

Farm business

Competing demands for water – price and availability

Detailed knowledge of plant responses

Decisions can be difficult