



# Weekly Australian Climate, Water and Agricultural Update

No. 35/2021

9 September 2021

## Summary of key issues

- During the week ending 8 September 2021, a trough of low-pressure systems and an associated cold front resulted in substantial rainfall for south-eastern and central Australia over the weekend. The trough was replaced by a high-pressure system moving eastward across southern Australia, bringing clear, dry conditions to much of Australia. Cropping regions in Western Australia and parts of eastern and southern Australia will require further rainfall in the coming weeks to consolidated forecast production prospects ([see Section 1.1](#)).
- For the 3 months to August 2021, modelled pasture growth was above average to extremely high across large areas of New South Wales, eastern and central Queensland, and large areas of Western Australia. In contrast, modelled pasture growth was extremely low to below average across scattered areas of western New South Wales, parts of Queensland, eastern South Australia, central Western Australia, and parts of central Northern Territory ([see Section 1.2](#)).
- Strong easterly winds have caused the Indian Ocean Dipole (IOD) to rise slightly above the negative threshold. However, these conditions are not expected to persist, and the current negative IOD event is anticipated to continue well into spring. The Southern Annular Mode (SAM) is currently positive and is expected to remain positive over the coming week ([see Section 1.3](#)).
- The outlook for October 2021 indicates that there is a 75% chance of rainfall totals between 10 and 100 millimetres across parts of eastern, central, south-western and far southern Australia. Rainfall totals in excess of 100 millimetres are expected across alpine regions of New South Wales and Victoria, and western Tasmania ([see Section 1.4](#)).
- The outlook for October to December 2021 suggests there is a 75% chance of rainfall totals between 50 and 200 millimetres across much of New South Wales, Queensland, Victoria, the Northern Territory and eastern Tasmania, as well as parts of South Australia and Western Australia. Rainfall totals in excess of 200 millimetres are likely across parts of eastern New South Wales, Queensland and Victoria, the north of the Northern Territory and western Tasmania.
- Over the 8-days to 16 September 2021 high-pressure systems are expected to dominate the Australian continent resulting in clear skies and dry conditions. Low-pressure systems in the Southern Ocean are likely to bring substantial rainfall to Tasmania, as well as southern parts of Western Australia later in the week ([see Section 1.5](#)).
- Water storage in the Murray–Darling Basin (MDB) increased by 525 gigalitres (GL) between 1 September 2021 and 8 September 2021. The current volume of water held in storage is 21,154 GL, which represents 84% of total capacity. This is 48% or 6,865 GL more than at the same time last year.
- Allocation prices in the Victorian Murray below the Barmah Choke increased from \$150 per ML on 28 August 2021 to \$155 per ML on 4 September 2021. Prices are lower in the Goulburn–Broken, Murrumbidgee, and regions above the Barmah choke due to the binding of the Goulburn intervalley trade limit, Murrumbidgee export limit, and Barmah choke trade constraint.

# 1. Climate

## 1.1. Rainfall this week

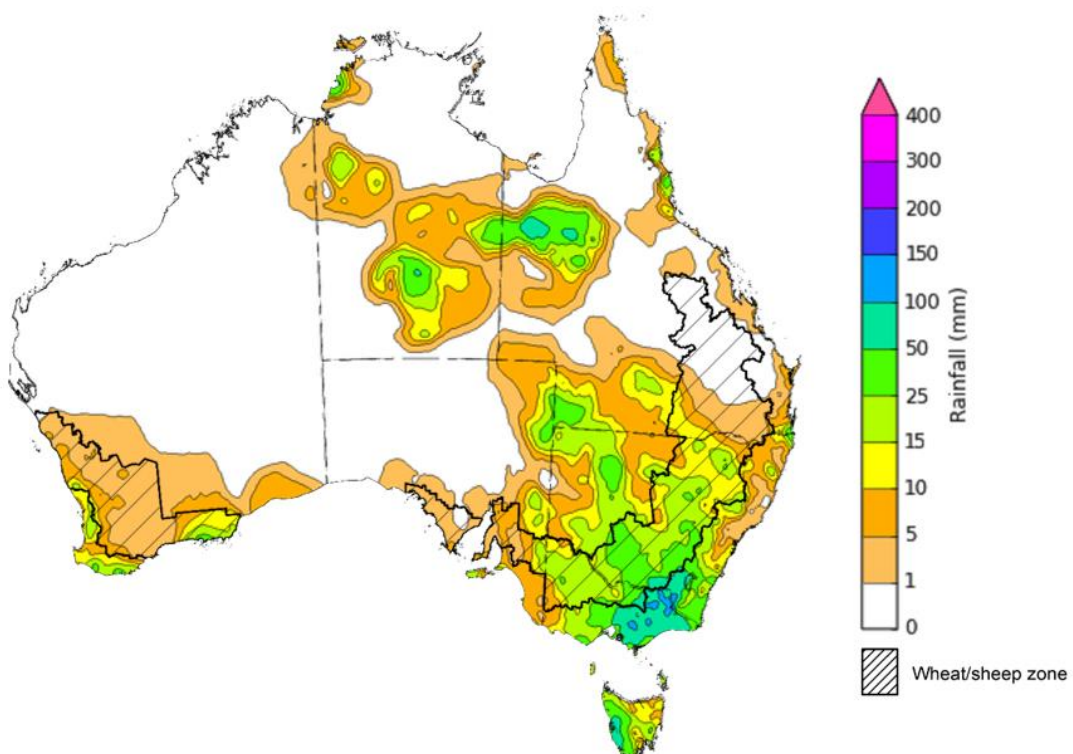
During the week ending 8 September 2021, a trough of low-pressure systems and an associated cold front resulted in substantial rainfall for south-eastern and central Australia over the weekend. The trough was replaced by a high-pressure system moving eastward across southern Australia, bringing clear, dry conditions to much of Australia.

Rainfall totals of between 10 and 50 millimetres were recorded across much of New South Wales and Victoria, parts of southern and western Queensland, the east of South Australia, southern parts of Western Australia, central Northern Territory and much of Tasmania. Rainfall totals in excess of 50 millimetres were recorded in southern New South Wales, parts of western Queensland, eastern Victoria and western Tasmania.

In cropping regions, rainfall totals of between 10 and 50 millimetres were recorded in New South Wales and Victoria, as well as the Esperance region of Western Australia, and isolated areas of southern Queensland and eastern South Australia. Little to no rainfall was recorded across the remainder of Australian cropping regions.

The rainfall across eastern cropping regions will continue to support above average yield prospects for winter crops as they enter critical grain forming growth stages in spring. Most cropping regions have average to above average soil moisture levels which supported crop development through a drier than normal finish to winter. Cropping regions in Western Australia and parts of eastern and southern Australia will require further rainfall in the coming weeks to consolidated forecast production prospects.

**Rainfall for the week ending 8 September 2021**



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Note: The rainfall analyses and associated maps utilise data contained in the Bureau of Meteorology climate database, the Australian Data Archive for Meteorology (ADAM). The analyses are initially produced automatically from real-time data with limited quality control. They are intended to provide a general overview of rainfall across Australia as quickly as possible after the observations are received. For further information go to <http://www.bom.gov.au/climate/rainfall/>

## 1.2. Pasture growth

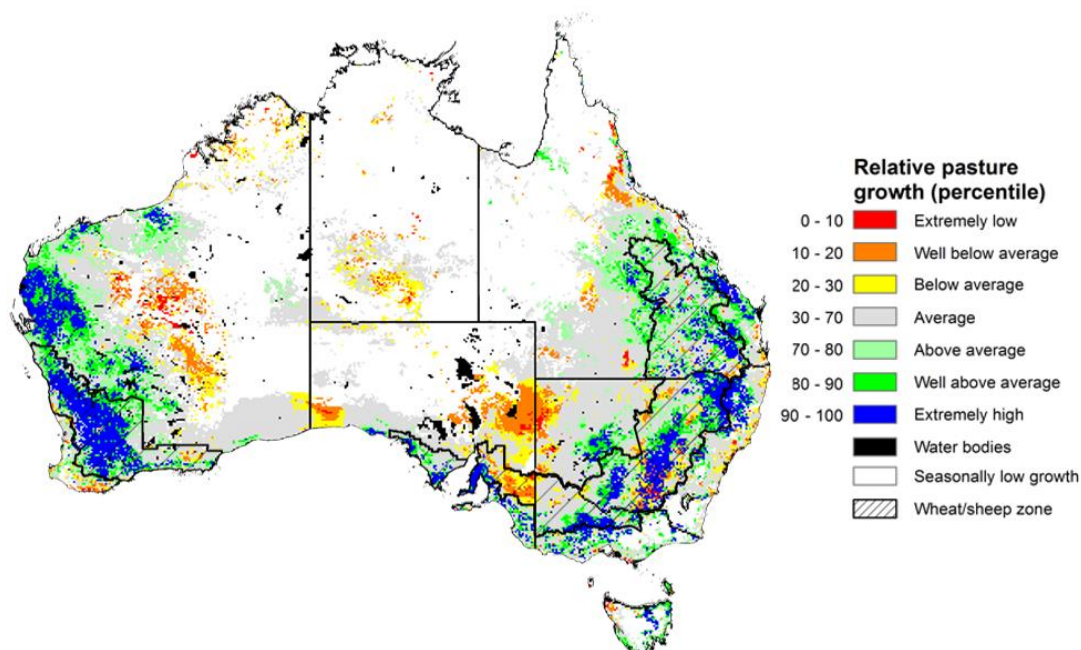
Pasture growth during the June to August period is typically low across large areas of central and northern Australia as it enters a seasonally low growth period due to cooler temperatures and little to no rainfall. Across southern Australia, June to August pasture growth influences the number of livestock than can be supported without supplementary feeding over winter and the level of reliance on hay and grain during this period.

For the 3 months to August 2021, above average rainfall totals and mild winter temperatures resulted in well above average pasture production for this time of year across most grazing regions.

Modelled pasture growth was above average to extremely high across large areas of New South Wales, eastern and central Queensland, and large areas of Western Australia. This growth is likely to enable farmers to continue to rebuild stock numbers and provide opportunities to replenish fodder supplies during spring. In contrast, modelled pasture growth was extremely low to below average across scattered areas of western New South Wales, parts of Queensland, eastern South Australia, central Western Australia, and parts of central Northern Territory.

A dry start to winter and below average soil moisture levels in parts of western Victoria and the east of South Australia resulted in below average to average pasture growth. As a result, livestock producers in western Victoria and eastern South Australia will require substantial rainfalls through spring to build soil moisture levels and supplementary feed to maintain current stock numbers.

### Relative pasture growth for 3-months ending August 2021 (1 June to 31 August 2021)



Notes: AussieGRASS pasture growth estimates are relative to the long-term record and shown in percentiles. Percentiles rank data on a scale of zero to 100. This analysis ranks pasture growth for the selected period against average pasture growth for the long-term record (1957 to 2016). Pasture growth is modelled at 5km<sup>2</sup> grid cells.

Source: Queensland Department of Science, Information Technology and Innovation

### 1.3. Climate Drivers

Throughout spring the climate drivers with the largest potential impact on Australia's climate patterns are the El Niño–Southern Oscillation (ENSO), the Indian Ocean Dipole (IOD) and the Southern Annular Mode (SAM). These climate drivers will likely influence the final yield prospects for Australia's winter cropping season, pasture growth rates during this peak growth period and planting condition for summer crops.

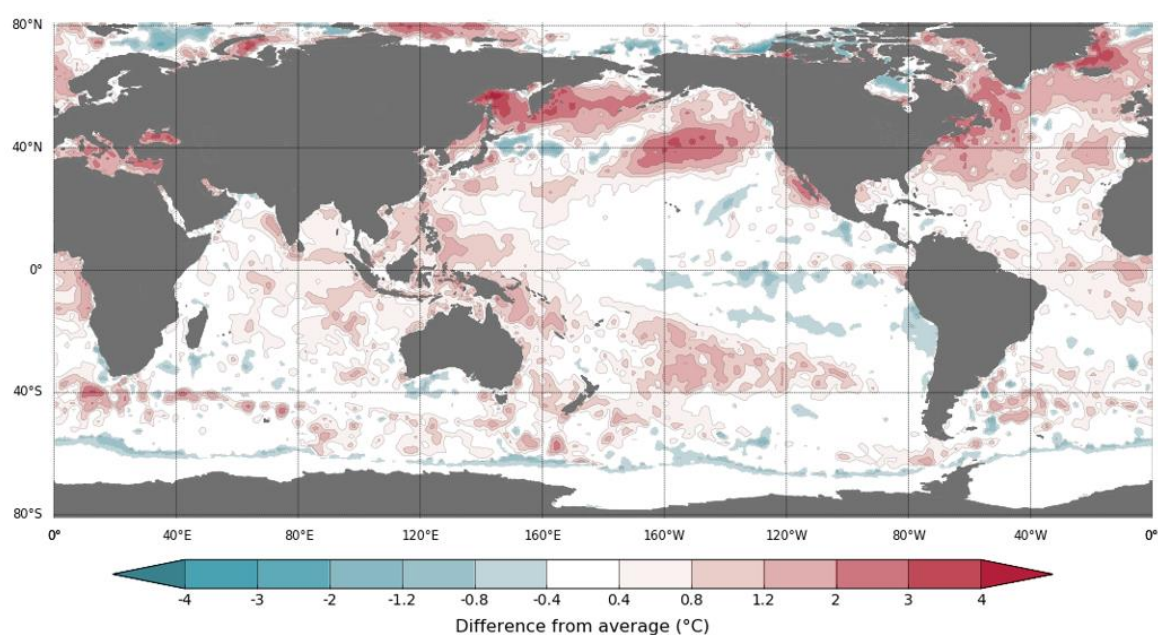
Strong easterly winds have caused the IOD to rise slightly above the negative threshold. However, these conditions are not expected to persist, and the current negative IOD event is anticipated to continue well into spring. A negative IOD event increases the chance of above average rainfall for southern and eastern Australia and the far north during winter and spring. It is also typically associated with an early onset of northern rainfall. The SAM is currently positive and is expected to remain positive over the coming week. The IOD and SAM are likely to have the largest influence currently on the Australian climate.

ENSO conditions, on the other hand, remain neutral according to most oceanic and atmospheric indicators, reducing its influence on Australia's climate. However, tropical sea surface temperatures are forecast to cool over the coming months. International climate models surveyed by the Bureau of Meteorology agree that ENSO conditions are likely to remain neutral throughout September. Three of the seven models expect the development of a La Niña event in mid-to-late spring.

Sea surface temperature anomalies were close to average across the tropical Pacific Ocean over the previous week. However, cool anomalies across central and eastern equatorial Pacific have increased. Warm than average temperatures in the western Pacific, the Maritime Continent and along the east coast of Australia have strengthened slightly over the past two weeks. Neutral Pacific equatorial sea surface temperatures are associated with neutral ENSO conditions.

Warm sea surface temperature anomalies in the eastern Indian Ocean, near Western Australia and Indonesia, have persisted and strengthened in parts. The warm anomalies in the eastern Indian Ocean and the ocean surrounding Australia underpin the continuation of the negative IOD event.

**Difference from average sea surface temperature observations 23 August to 29 August 2021**



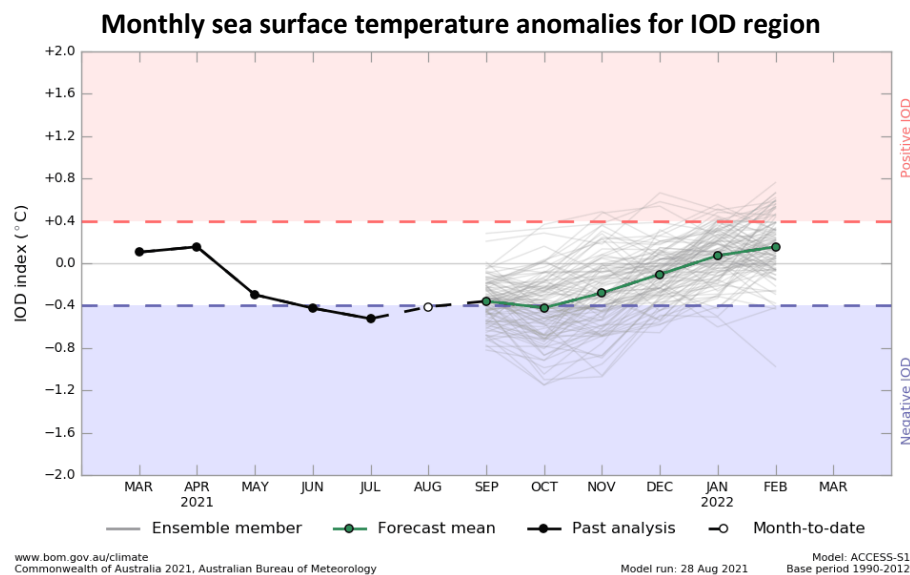
Data: BOM SST  
Climatology baseline: 1961 to 1990  
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Weekly average: 29 August 2021  
<http://www.bom.gov.au/climate>  
Created: 30/08/2021

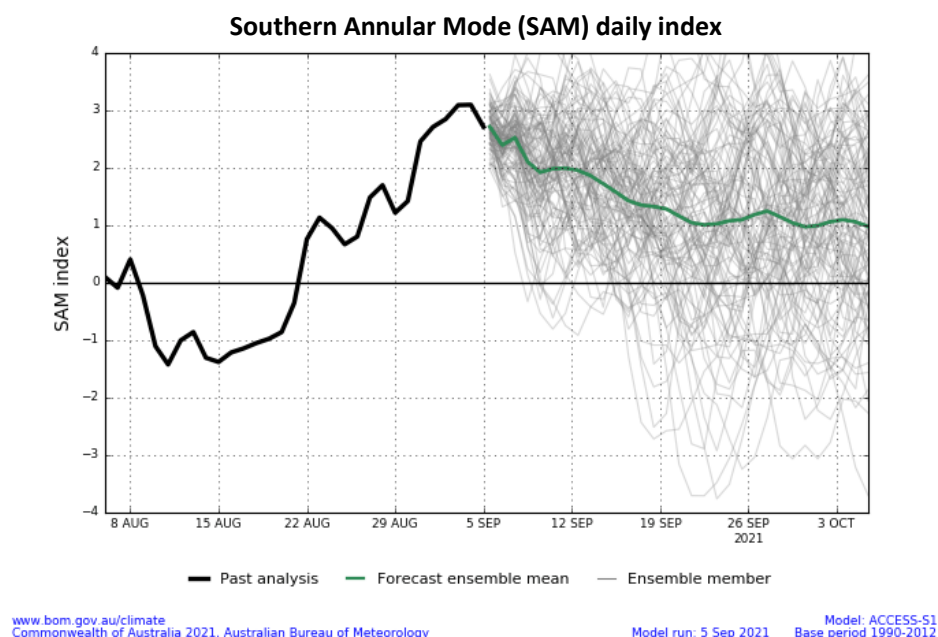


As at 29 August 2021, the Indian Ocean Dipole (IOD) weekly value was  $-0.35^{\circ}\text{C}$ . The IOD index has generally been below the negative IOD threshold ( $-0.4^{\circ}\text{C}$ ) since mid-May. A negative IOD, and warmer sea surface temperatures in the eastern Indian Ocean, is associated with above average rainfall for much of southern Australia in winter and spring. It also increases the chances of below average maximum temperatures in southern Australia, while increasing the chances of above average minimum and maximum temperatures in northern Australia.

The majority of international climate models surveyed by the Bureau of Meteorology expect the negative IOD event to persist until November, with all models expecting a return to neutral conditions in December.



The Southern Annular Mode (SAM) is currently positive but expected to return to neutral in the second half of September. The SAM refers to the north-south shift of the band of rain-bearing westerly winds and weather systems in the Southern Ocean compared to the usual position. When SAM is positive during spring, the band of westerly winds is further south than normal. A negative SAM in spring is associated with increased rainfall for northern New South Wales, southern Queensland and southern parts of South Australia and Western Australia. It is also associated with decreased rainfall for much of Victoria, the west of Western Australia and Tasmania.



## 1.4. National Climate Outlook

These climate outlooks are generated by ACCESS–S (Australian Community Climate Earth-System Simulator–Seasonal). ACCESS–S is the Bureau of Meteorology's dynamical (physics-based) weather and climate model used for monthly, seasonal and longer-lead climate outlooks.

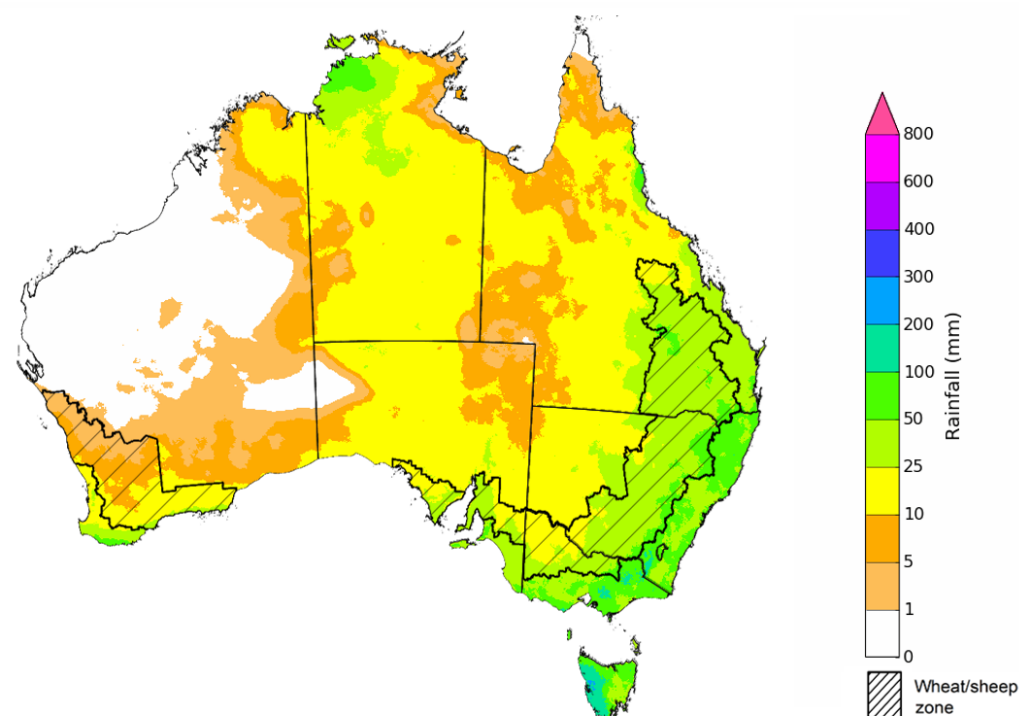
For further information, go to <http://www.bom.gov.au/climate/ahead/about/>

The Bureau of Meteorology's latest rainfall outlook indicated wetter than average conditions are expected for much of eastern, central and southern Australia during October. The wetter than average conditions expected for most cropping regions reaffirms the positive production outlook for Australia's 2021 winter cropping season and for the planting of summer crops. The ACCESS-S climate model suggests there is close to a 65% chance of exceeding median October rainfall totals across much of eastern Australia.

The outlook for October 2021 indicates that there is a 75% chance of rainfall totals between 10 and 100 millimetres across parts of eastern, central, south-western and far southern Australia. Rainfall totals in excess of 100 millimetres are expected across alpine regions of New South Wales and Victoria, and western Tasmania.

Across cropping regions there is a 75% chance of rainfall totals of between 10 and 50 millimetres across New South Wales, Victoria, South Australia and southern parts of Western Australia. There is a 75% chance of rainfall less than 10 millimetres for northern and central cropping regions of Western Australia. The expected rainfall across eastern states will bolster yield potentials as winter crops begin flowering and grain fill.

### Rainfall totals that have a 75% chance of occurring October 2021



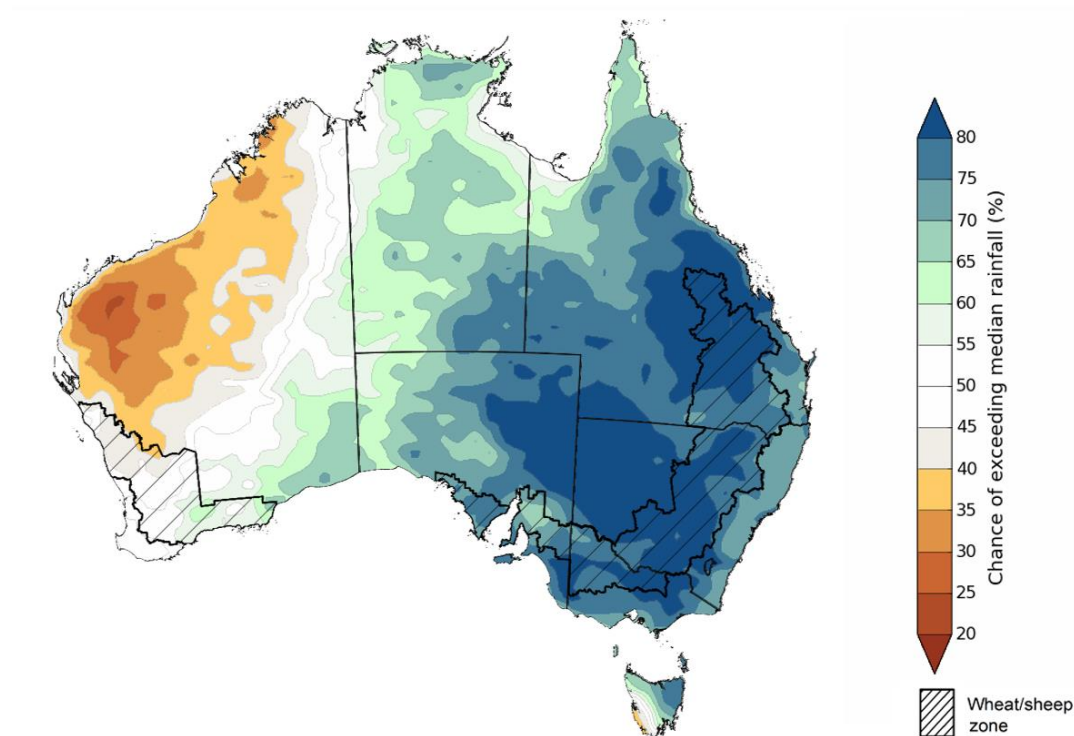
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The rainfall outlook for October to December 2021 suggests there is a greater than 70% chance of exceeding median rainfall across much of New South Wales, Queensland, Victoria, the east of South Australia and the south-east of the Northern Territory. There is an increased chance of below average rainfall across north-west parts of Western Australia between October and December 2021 (Bureau of Meteorology 'National Climate Outlook', 2 September 2021).

Bureau of Meteorology rainfall outlooks for October to December have greater than 55% past accuracy across most of Australia. Outlook accuracy is greater than 65% across much of New South Wales, Victoria, Queensland, as well as parts of South Australia and the Northern Territory. On the other hand, there is low past accuracy for large areas of south-western and central Western Australia.

#### Chance of exceeding the median rainfall October to December 2021



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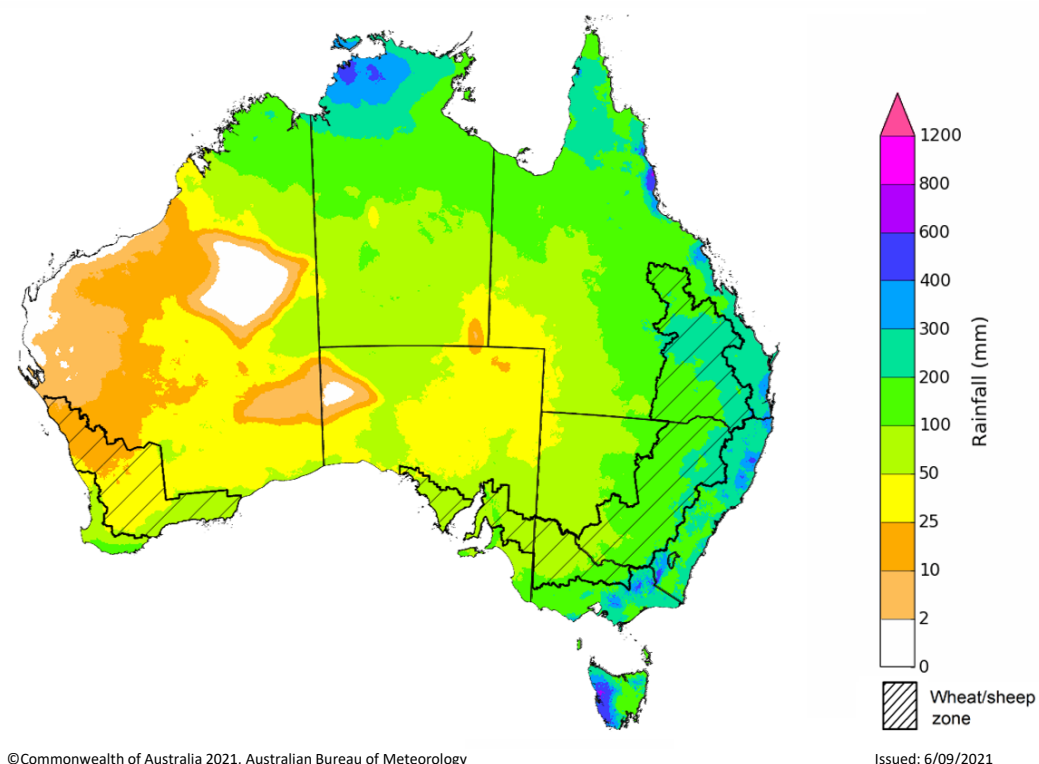
Issued: 6/09/2021

The outlook for October to December 2021 suggests there is a 75% chance of rainfall totals between 50 and 200 millimetres across much of New South Wales, Queensland, Victoria, the Northern Territory and eastern Tasmania, as well as parts of South Australia and Western Australia. Rainfall totals in excess of 200 millimetres are likely across parts of eastern New South Wales, Queensland and Victoria, the north of the Northern Territory and western Tasmania.

Across cropping regions, there is a 75% chance of receiving between 50 and 200 millimetres in New South Wales, Queensland, Victoria, South Australia and southern cropping regions of Western Australia. Rainfall totals in excess of 200 millimetres are forecast for north-eastern New South Wales, plus central and south-eastern Queensland. Totals of less than 50 millimetres are expected across remaining cropping regions in Western Australia.

These rainfall totals are average or better for this three-month period across most Australian cropping regions, with the exception of Western Australia. Winter crops in most growing regions are in excellent condition entering spring, with average to above average soil moisture levels. The average to above average rainfall expected in October to December will support current high yield potentials across most winter cropping regions and assist with emergence and establishment of summer crops in northern growing regions. In Western Australia, final yield prospects are less reliant on October to December compared to the eastern states. This means that drier than average conditions during the 3 months (October to December) will have less of an impact on final crop yield prospects and are more likely to lead to less rainfall delays during harvest.

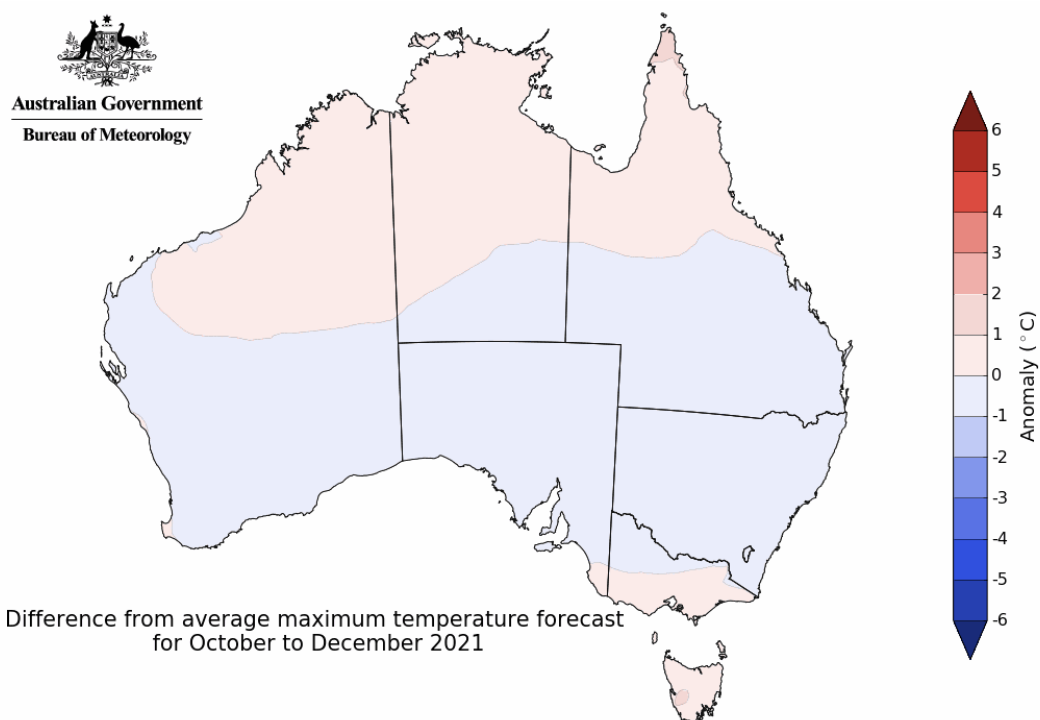
#### Rainfall totals that have a 75% chance of occurring October to December 2021



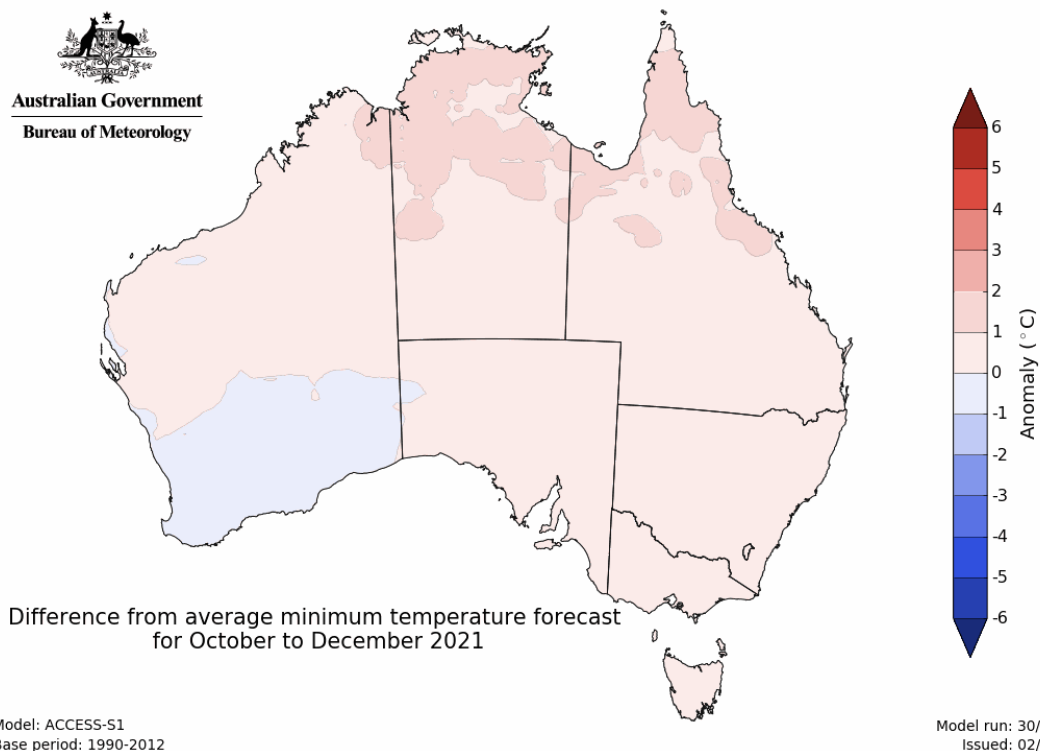


The temperature outlook for October to December 2021 indicates that maximum temperatures across most of Australia are likely to be close to the 1990-2012 average ( $-1^{\circ}\text{C}$  to  $1^{\circ}\text{C}$ ). Minimum temperatures are expected to be slightly above average for parts of Northern Australia and close to average for the rest of Australia (Bureau of Meteorology 'National Climate Outlook', 2 September 2021).

### Predicted maximum temperature anomaly for October to December 2021



### Predicted minimum temperature anomaly for October to December 2021



## 1.5. Rainfall forecast for the next eight days

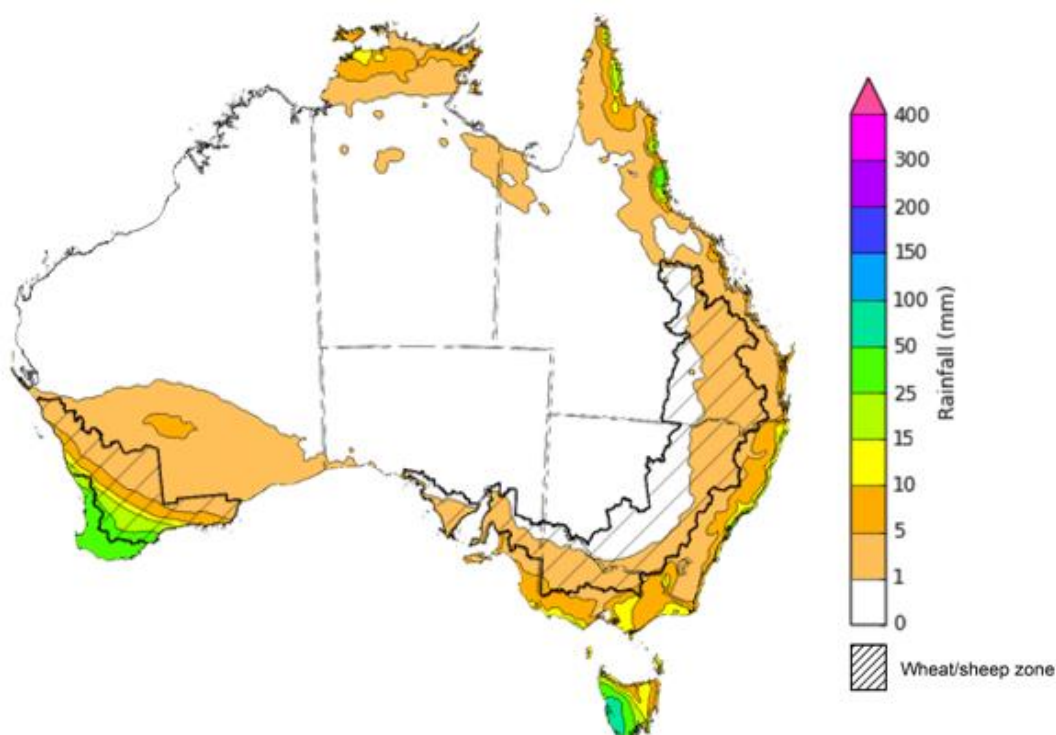
Over the 8-days to 16 September 2021 high-pressure systems are expected to dominate the Australian continent resulting in clear skies and dry conditions. Low-pressure systems in the Southern Ocean are likely to bring substantial rainfall to Tasmania, as well as southern parts of Western Australia later in the week.

Rainfall totals of between 10 and 50 millimetres are forecast for isolated parts of eastern New South Wales, northern Queensland, southern Victoria, the south-west of Western Australia, the north of the Northern Territory and much of Tasmania. Rainfall in excess of 50 millimetres is expected in western Tasmania.

In Australian cropping regions, rainfall totals of between 10 and 50 millimetres are expected in south-western parts of Western Australia. Little to no rainfall is forecast for cropping regions in New South Wales, Queensland, Victoria, South Australia and remaining parts of Western Australia during the next 8-days.

Winter crop development is expected to continue unimpeded over the next 8-days given the substantial rainfall across eastern states in the past week and above average soil moisture levels in most cropping regions. Yield prospects across most growing regions remain very favourable, but spring rainfall will be required to support crops through flowering and grain filling in the coming months. The dry conditions in Queensland will provide ideal conditions for sowing of cotton crops without delay.

**Total forecast rainfall (mm) for the period 9 September to 16 September 2021**



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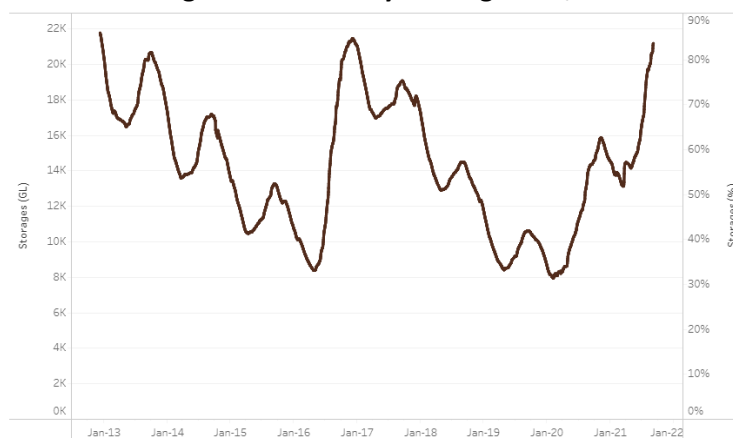
Note: This rainfall forecast is produced from computer models. As the model outputs are not altered by weather forecasters, it is important to check local forecasts and warnings issued by the Bureau of Meteorology.

## 2. Water

### 2.1. Water markets – current week

Water storage in the Murray–Darling Basin (MDB) increased by 525 gigalitres (GL) between 1 September 2021 and 8 September 2021. The current volume of water held in storage is 21,154 GL, which represents 84% of total capacity. This is 48% or 6,865 GL more than at the same time last year.

**Water storages in the Murray–Darling Basin, 2013–2021**

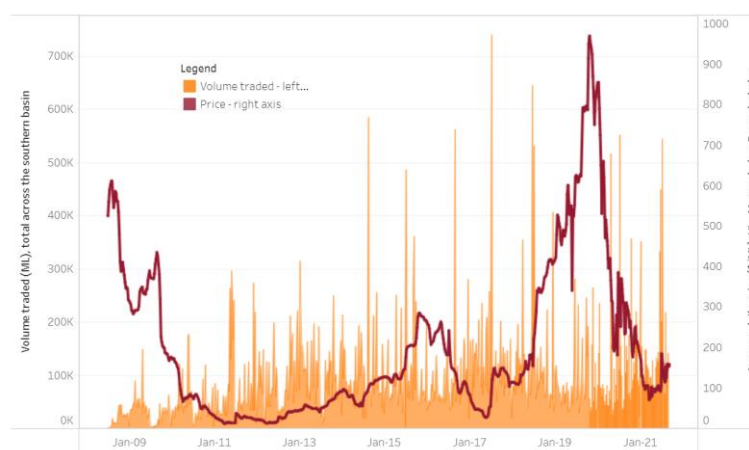


Water storage data is sourced from the Bureau of Meteorology.

Allocation prices in the Victorian Murray below the Barmah Choke increased from \$150 per ML on 28 August 2021 to \$155 per ML on 4 September 2021. Prices are lower in the Goulburn–Broken, Murrumbidgee, and regions above the Barmah choke due to the binding of the Goulburn intervalley trade limit, Murrumbidgee export limit, and Barmah choke trade constraint.

Region	\$/ML
NSW Murray Above	113
NSW Murrumbidgee	149
VIC Goulburn–Broken	137
VIC Murray Below	155

**Surface water trade activity, Southern Murray–Darling Basin**



The trades shown reflect estimated market activity and do not encompass all register trades. The price is shown for the VIC Murray below the Barmah choke. Historical prices (before 1 July 2019) are ABARES estimates after removing outliers from BOM water register data. Prices after 1 July 2019 and prior to the 30 October 2019 reflect recorded transaction prices as sourced from Ruralco. Prices after the 30 October 2019 are sourced from Waterflow. Data for volume traded is sourced from the BOM water register. Data shown is current at 9 September 2021.

To access the full, interactive, weekly water dashboard, which contains the latest and historical water storage, water market and water allocation information, please visit

[http://www.agriculture.gov.au/abares/products/weekly\\_update/weekly-update-090921](http://www.agriculture.gov.au/abares/products/weekly_update/weekly-update-090921)

### 3. Commodities

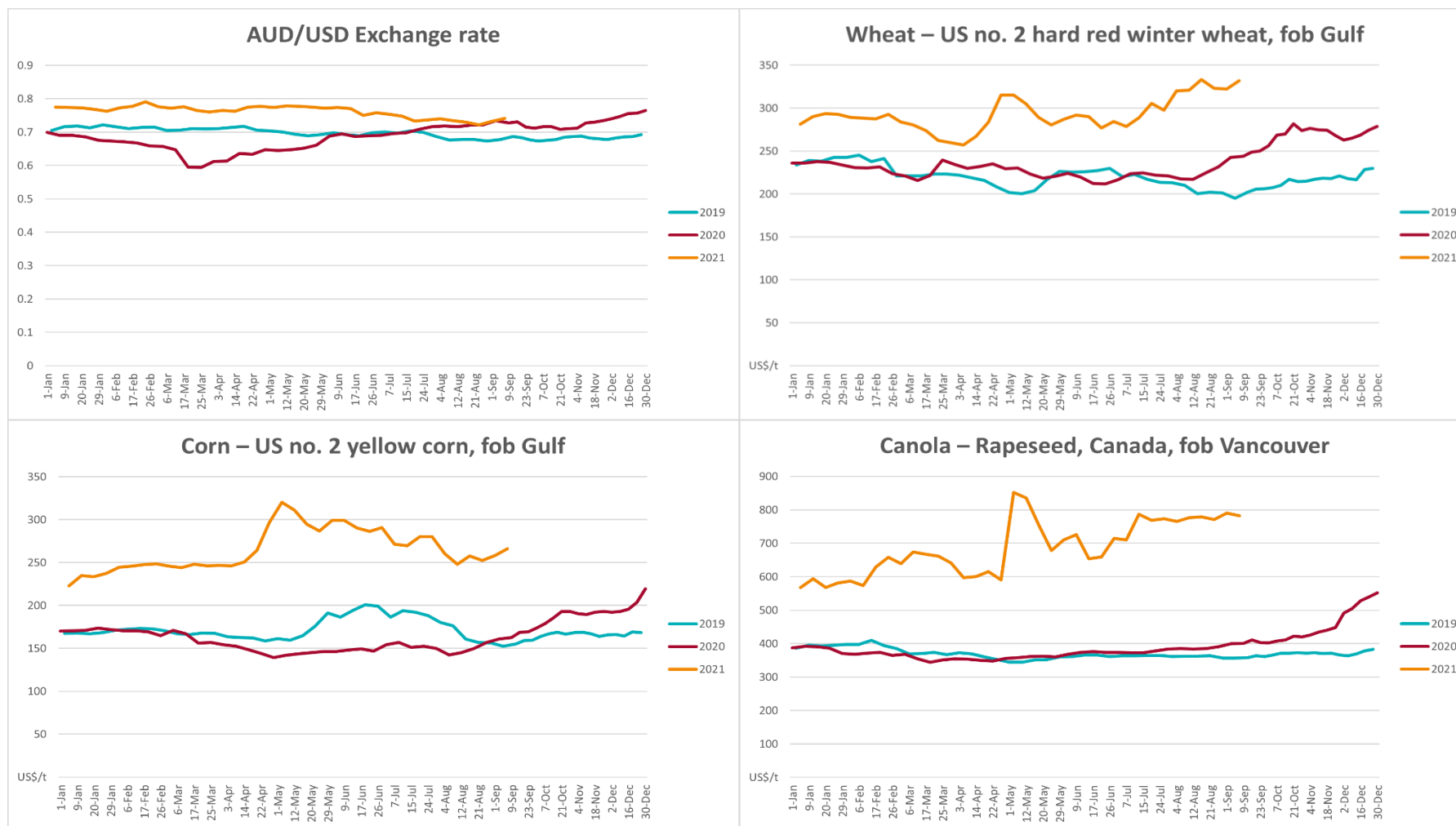
Indicator	Week ended	Unit	Latest price	Previous week	Weekly change	Price 12 months ago	Annual change
<b>Selected world indicator prices</b>							
AUD/USD Exchange rate	08-Sep	A\$/US\$	0.74	0.73	1%	0.73	1%
Wheat – US no. 2 hard red winter wheat, fob Gulf	08-Sep	US\$/t	332	322	3%	249	33%
Corn – US no. 2 yellow corn, fob Gulf	08-Sep	US\$/t	266	258	3%	169	58%
Canola – Rapeseed, Canada, fob Vancouver	08-Sep	US\$/t	782	790	-1%	411	90%
Cotton – Cotlook 'A' Index	08-Sep	USc/lb	103	104	0%	71	45%
Sugar – Intercontinental Exchange, nearby futures, no.11 contract	08-Sep	USc/lb	19.6	20.7	-5%	13	56%
Wool – Eastern Market Indicator	01-Sep	Ac/kg clean	1,332	1,350	-1%	1,110	20%
Wool – Western Market Indicator	01-Sep	Ac/kg clean	1,356	1,351	0%	1,310	4%
<b>Selected Australian grain export prices</b>							
Milling Wheat – APW, Port Adelaide, SA	08-Sep	A\$/t	415	419	-1%	331	25%
Feed Wheat – ASW, Port Adelaide, SA	08-Sep	A\$/t	407	412	-1%	316	29%
Feed Barley – Port Adelaide, SA	08-Sep	A\$/t	344	347	-1%	271	27%
Canola – Kwinana, WA	08-Sep	A\$/t	837	840	0%	651	29%
Grain Sorghum – Brisbane, QLD	08-Sep	A\$/t	364	362	0%	346	5%
<b>Selected domestic livestock indicator prices</b>							
Beef – Eastern Young Cattle Indicator	08-Sep	Ac/kg cwt	1,006	1,007	0%	784	28%
Mutton – Mutton indicator (18–24 kg fat score 2–3), Vic	08-Sep	Ac/kg cwt	690	696	-1%	554	25%
Lamb – Eastern States Trade Lamb Indicator	08-Sep	Ac/kg cwt	927	949	-2%	787	18%
Pig – Eastern Seaboard (60.1–75 kg), average of buyers & sellers	25-Aug	Ac/kg cwt	318	318	0%	289	10%
Goats – Eastern States (12.1–16 kg)	01-Sep	Ac/kg cwt	895	879	2%	753	19%
Live cattle – Light steers ex Darwin to Indonesia	17-Feb	Ac/kg lwt	355	355	0%	360	-1%
Live sheep – Live wethers (Mucnea WA saleyard) to Middle East	19-May	\$/head	145	145	0%	#N/A	#N/A

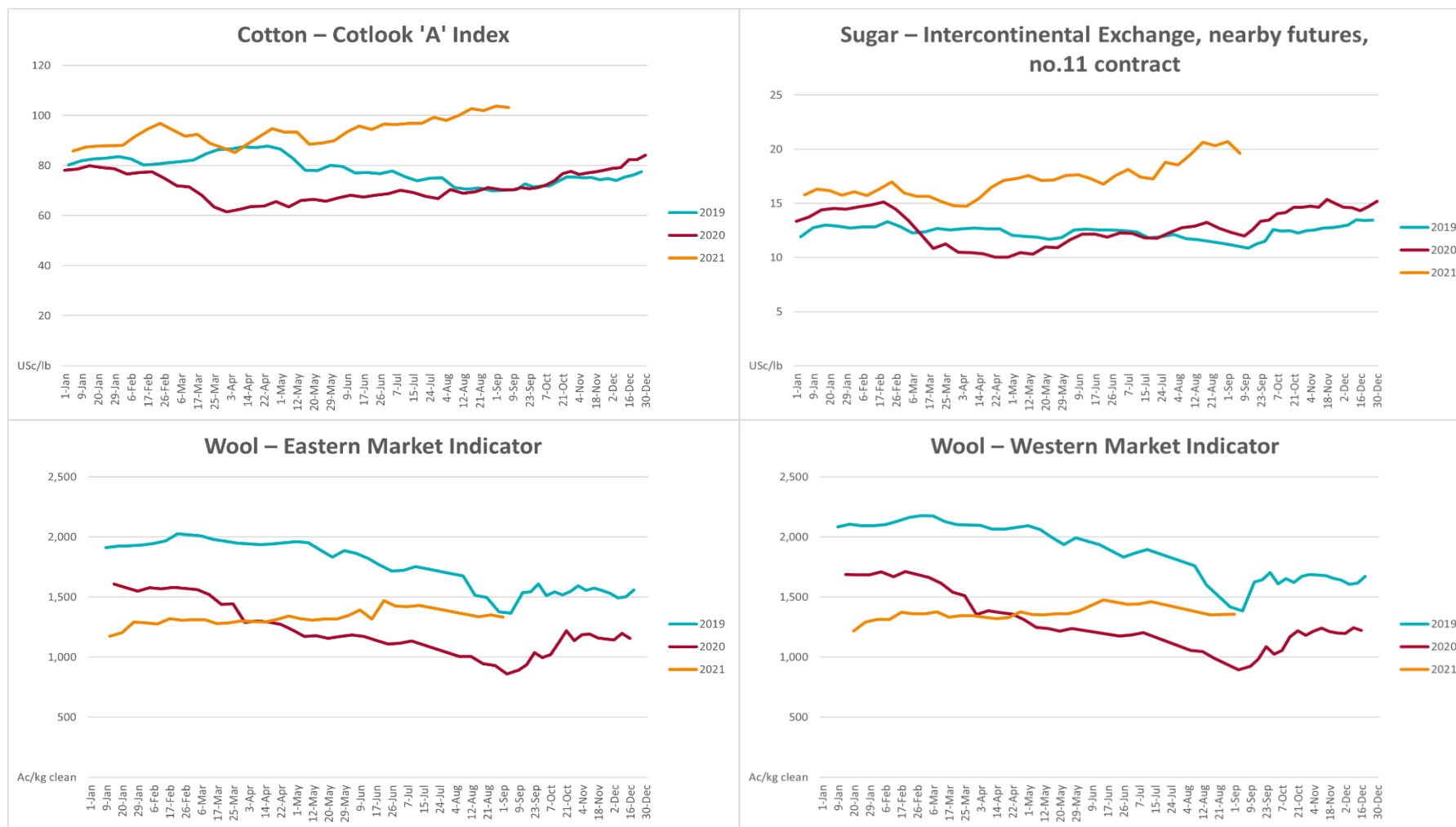
Indicator	Week ended	Unit	Latest price	Previous week	Weekly change	Price 12 months ago	Annual change
<b>Global Dairy Trade (GDT) weighted average prices <sup>a</sup></b>							
Dairy – Whole milk powder	08-Sep	US\$/t	3,691	3,552	4%	3,074	20%
Dairy – Skim milk powder	08-Sep	US\$/t	3,274	3,052	7%	2,505	31%
Dairy – Cheddar cheese	08-Sep	US\$/t	4,328	4,184	3%	3,838	13%
Dairy – Anhydrous milk fat	08-Sep	US\$/t	5,970	5,791	3%	5,246	14%

**a** Global Dairy Trade prices are updated twice monthly on the first and third Tuesday of each month.

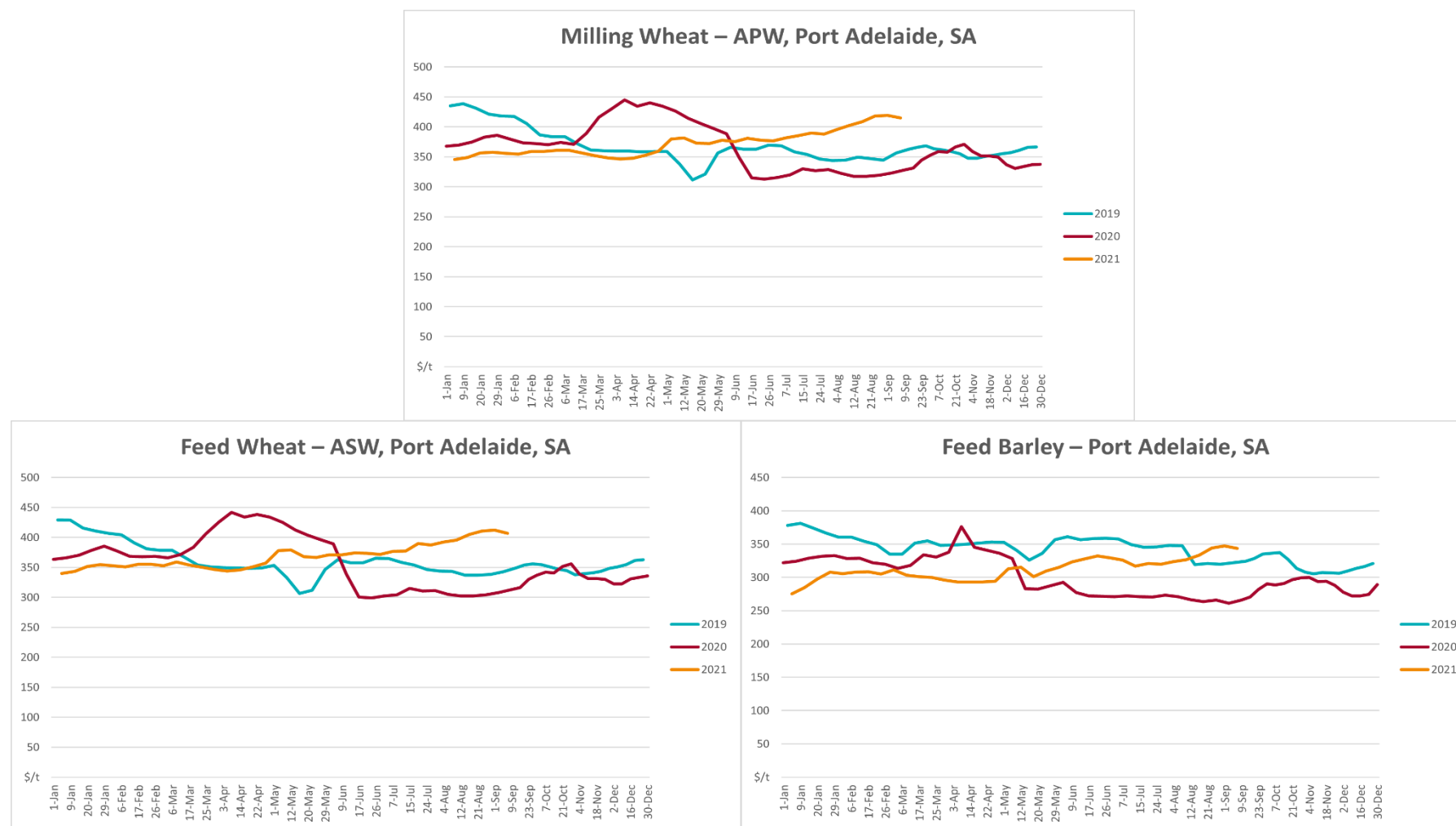


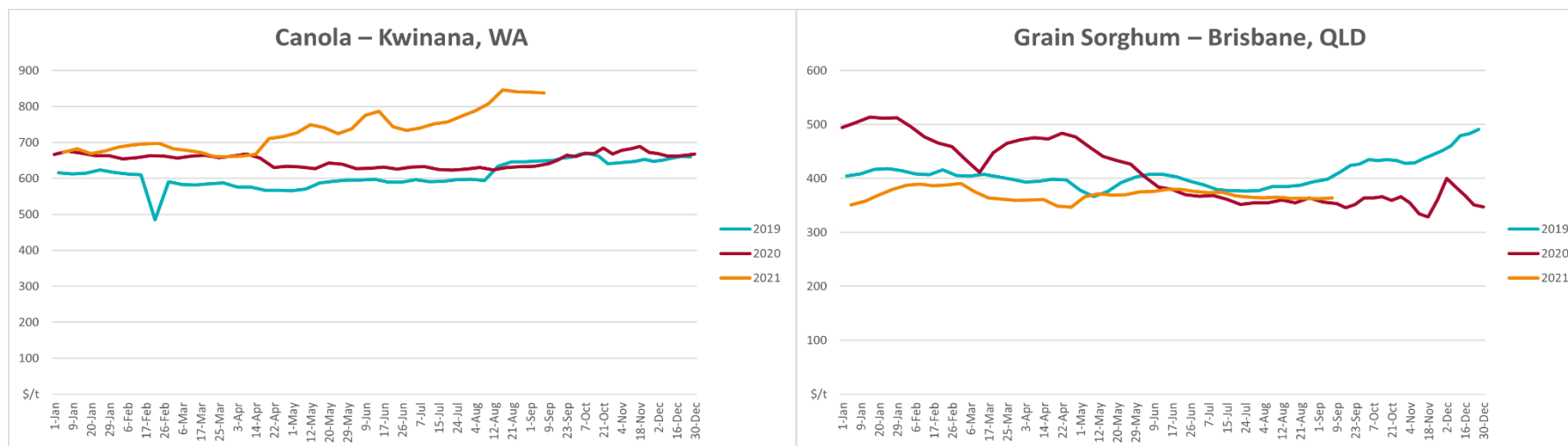
### 3.1. Selected world indicator prices



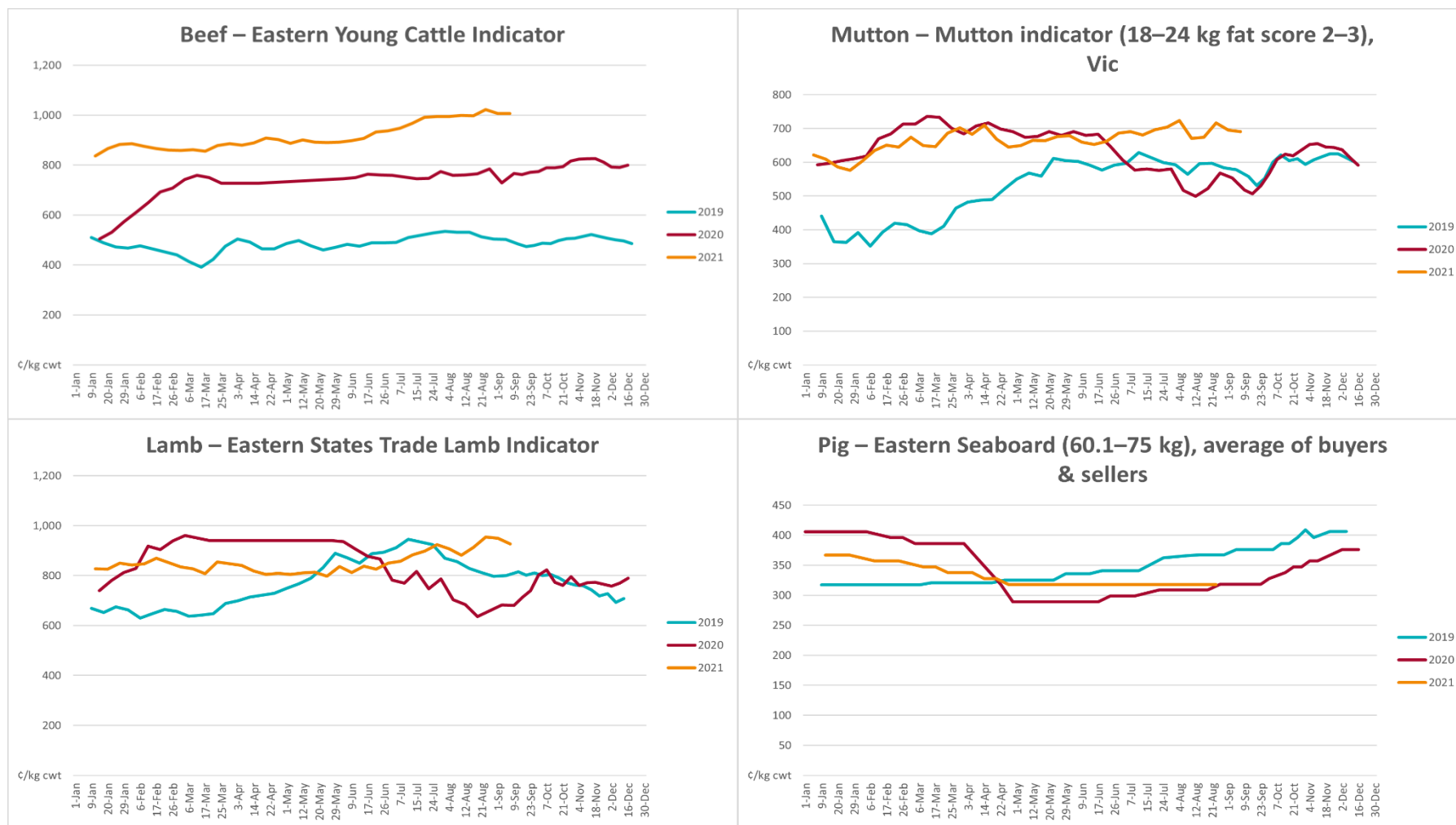


### 3.2. Selected domestic crop indicator prices

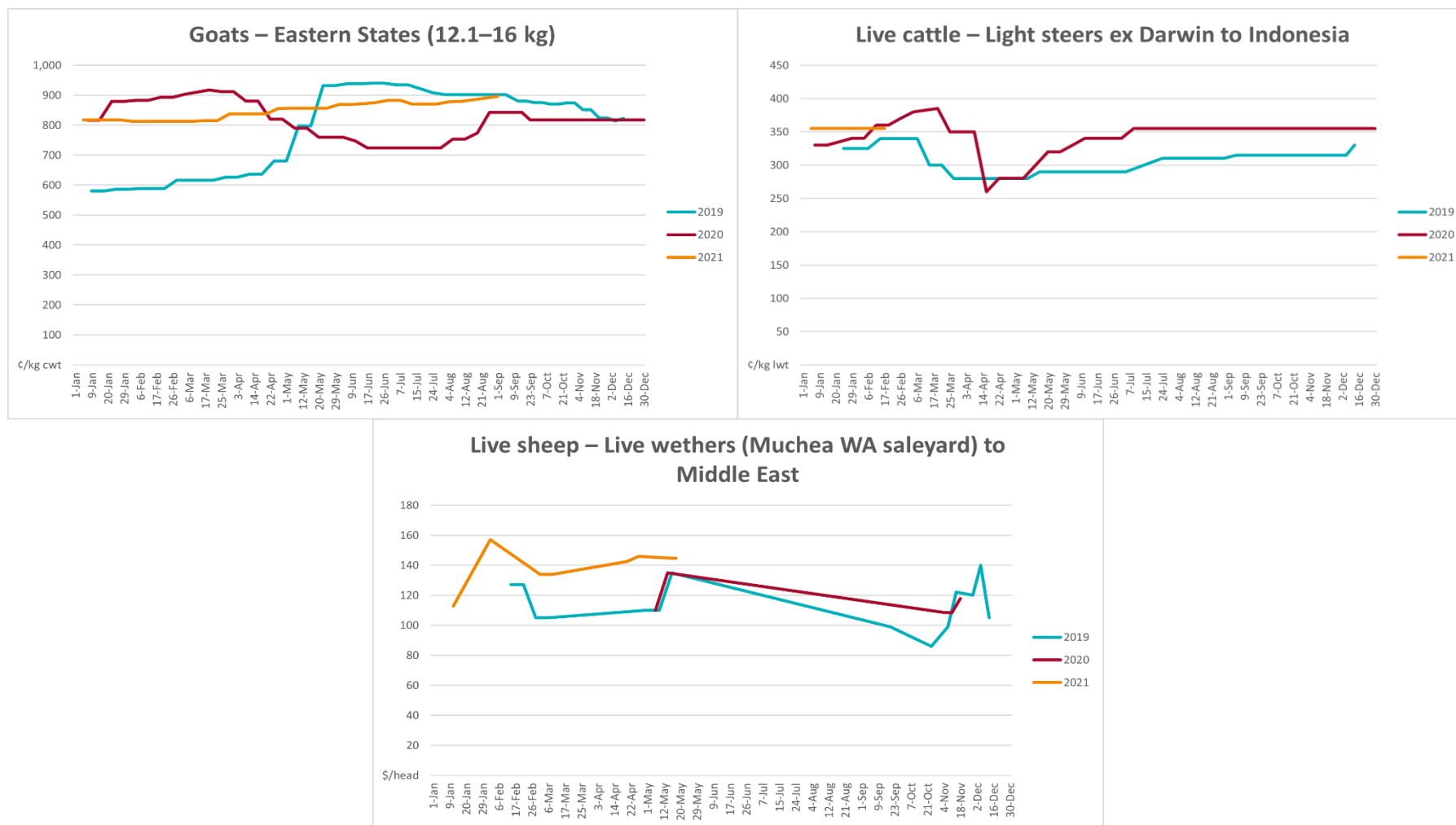




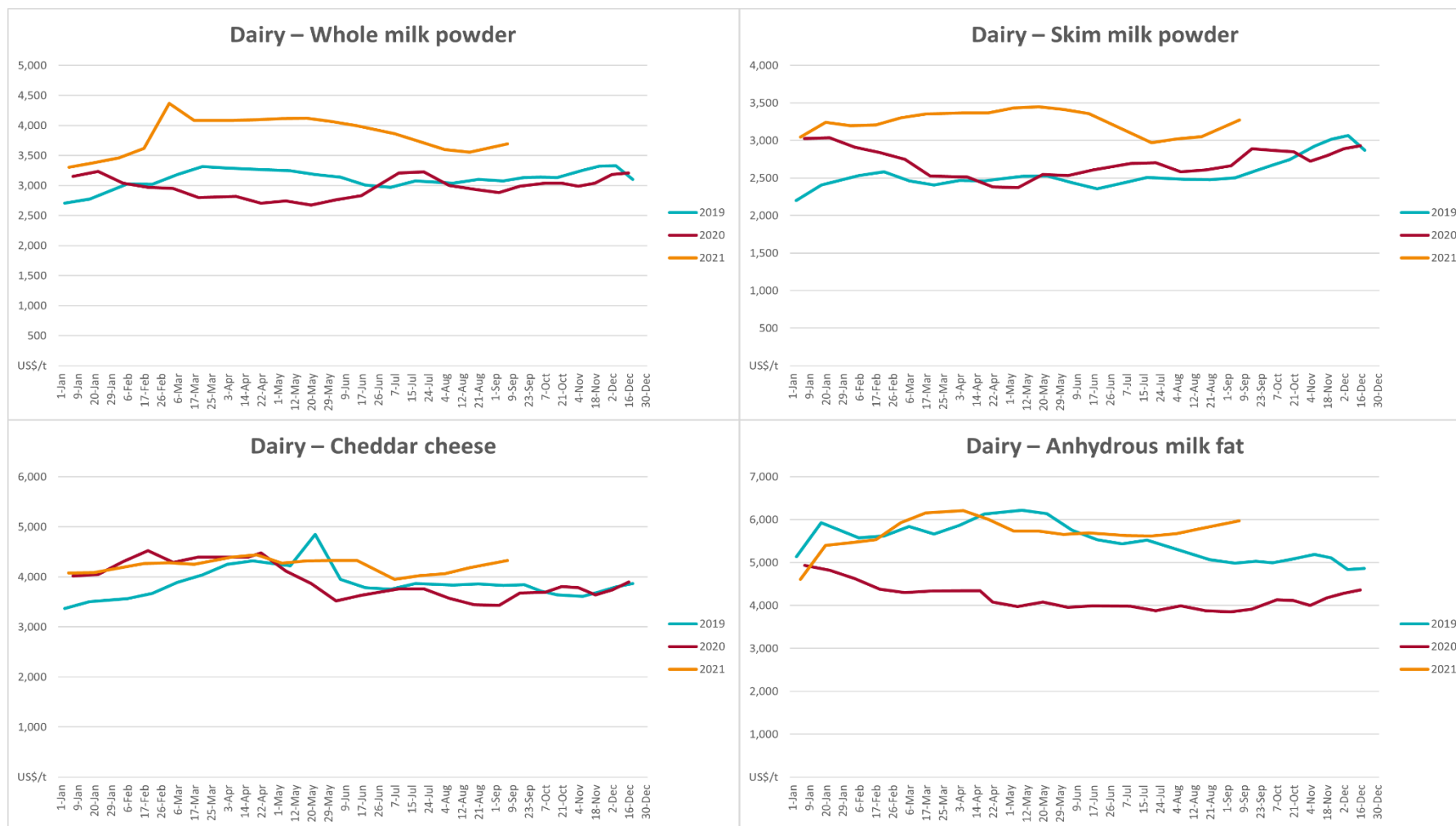
### 3.3. Selected domestic livestock indicator prices



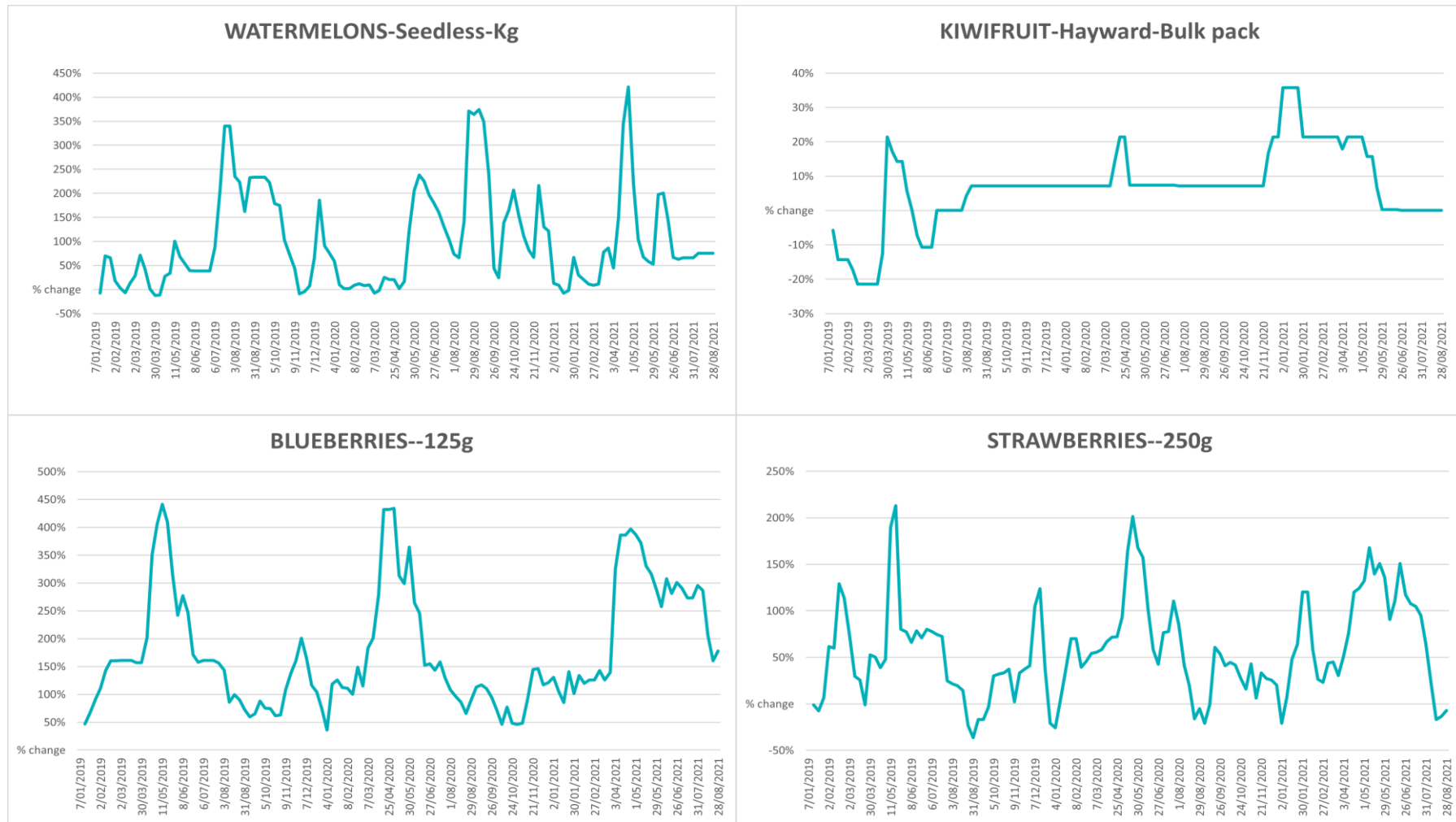


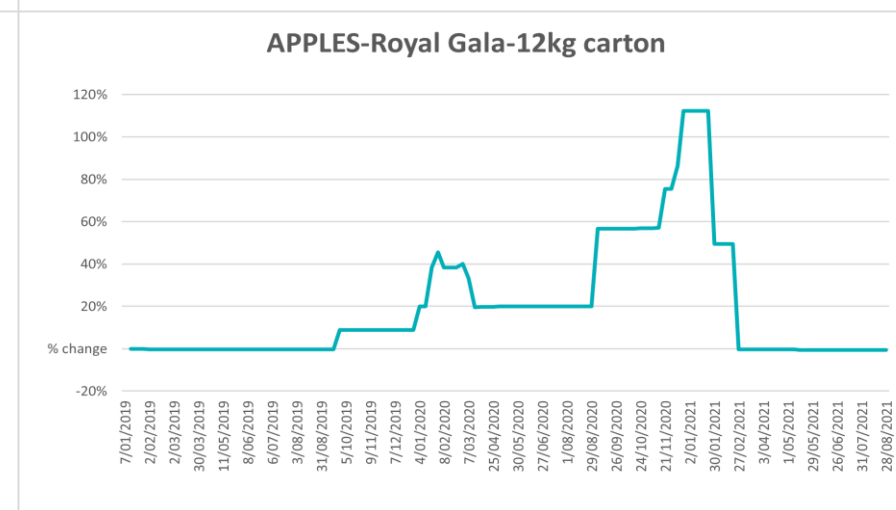
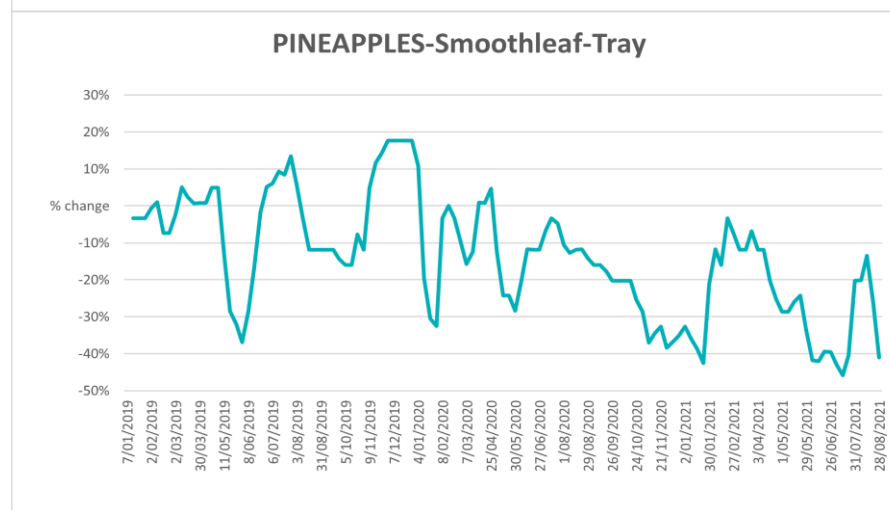
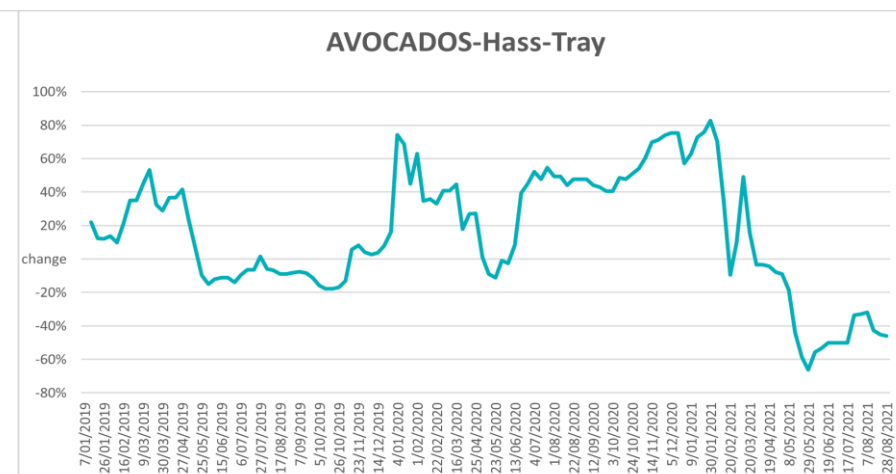
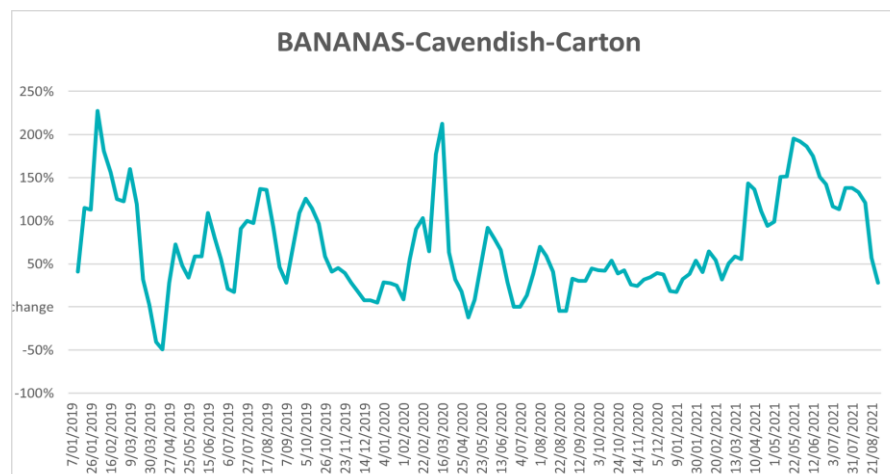


### 3.4. Global Dairy Trade (GDT) weighted average prices



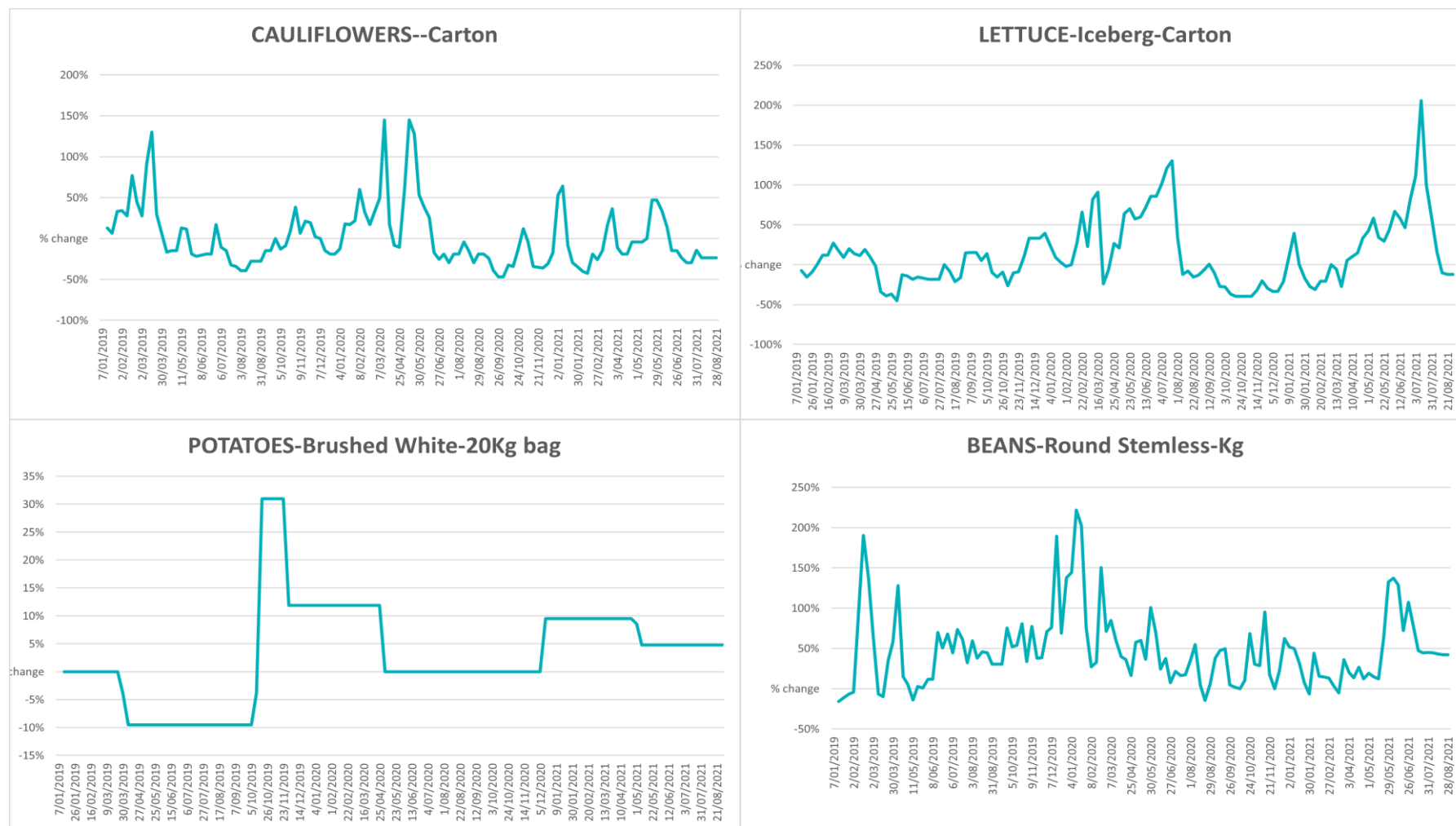
### 3.5. Selected fruit and vegetable prices



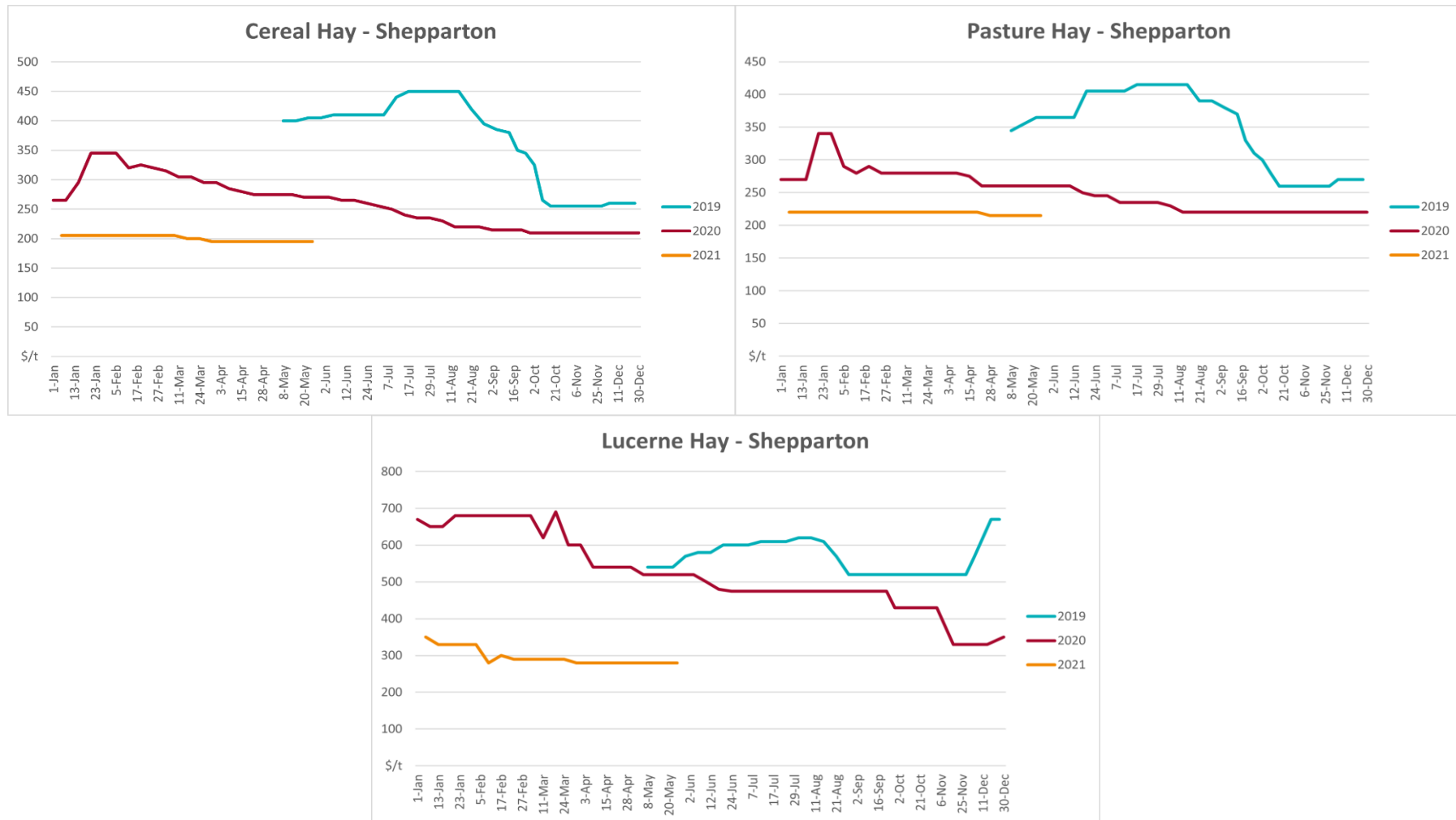








### 3.6. Selected domestic fodder indicator prices



## 4. Data attribution

### Climate

#### Bureau of Meteorology

- Weekly rainfall totals: [www.bom.gov.au/climate/maps/rainfall/](http://www.bom.gov.au/climate/maps/rainfall/)
- Monthly and last 3-month rainfall percentiles: [www.bom.gov.au/water/landscape/](http://www.bom.gov.au/water/landscape/)
- Temperature anomalies: [www.bom.gov.au/jsp/awap/temp/index.jsp](http://www.bom.gov.au/jsp/awap/temp/index.jsp)
- Rainfall forecast: [www.bom.gov.au/jsp/watl/rainfall/pme.jsp](http://www.bom.gov.au/jsp/watl/rainfall/pme.jsp)
- Seasonal outlook: [www.bom.gov.au/climate/outlooks/#/overview/summary/](http://www.bom.gov.au/climate/outlooks/#/overview/summary/)
- Climate drivers: <http://www.bom.gov.au/climate/enso/>
- Soil moisture: [www.bom.gov.au/water/landscape/](http://www.bom.gov.au/water/landscape/)

#### Other

- Pasture growth: [www.longpaddock.qld.gov.au/aussiegrass/](http://www.longpaddock.qld.gov.au/aussiegrass/)
- 3-month global outlooks: [Environment and Climate Change Canada](#), [NOAA Climate Prediction Center](#), [EUROBRISA CPTEC/INPE](#), [European Centre for Medium-Range Weather Forecasts](#), [Hydrometcenter of Russia](#), [National Climate Center Climate System Diagnosis and Prediction Room \(NCC\)](#), [International Research Institute for Climate and Society](#)
- Global production: <https://ipad.fas.usda.gov/ogamaps/cropmapsandcalendars.aspx>
- Autumn break: Pook et al., 2009, <https://rmets-onlinelibrary-wiley-com.virtual.anu.edu.au/doi/epdf/10.1002/joc.1833>

### Water

#### Prices

- Waterflow: <https://www.waterflow.io/>
- Ruralco: <https://www.ruralcowater.com.au/>

#### Bureau of Meteorology:

- Allocation trade: <http://www.bom.gov.au/water/dashboards/#/water-markets/mdb/at>
- Storage volumes: <http://www.bom.gov.au/water/dashboards/#/water-storages/summary/drainage>

#### Trade constraints:

- Water NSW: <https://www.watarnsw.com.au/customer-service/ordering-trading-and-pricing/trading/murrumbidgee>
- Victorian Water Register: <https://www.waterregister.vic.gov.au/TradingRules2019/>

### Commodities

#### Fruit and vegetables

- Datafresh: [www.freshstate.com.au](http://www.freshstate.com.au)

#### Pigs

- Australian Pork Limited: [www.australianpork.com.au](http://www.australianpork.com.au)

#### Dairy

- Global Dairy Trade: [www.globaldairytrade.info/en/product-results/](http://www.globaldairytrade.info/en/product-results/)

#### World wheat, canola

- International Grains Council

#### World coarse grains

- United States Department of Agriculture

#### World cotton

- Cotlook: [www.cotlook.com/](http://www.cotlook.com/)

#### World sugar

- New York Stock Exchange - Intercontinental Exchange

#### Wool

- Australian Wool Exchange: [www.awex.com.au/](http://www.awex.com.au/)
- Domestic wheat, barley, sorghum, canola and fodder
  - Jumbuk Consulting Pty Ltd: <http://www.jumbukag.com.au/>

#### Cattle, beef, mutton, lamb, goat and live export

- Meat and Livestock Australia: [www.mla.com.au/Prices-and-market](http://www.mla.com.au/Prices-and-market)

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