Climate information for EP farmers and advisers

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Key messages

- **A positive phase of the Indian Ocean Dipole (IOD +ve) developed during the 2019 growing season. This phase of the IOD is associated with increased chances of warmer and drier springs.**
- **To make better sense of forecasts it is important to understand the difference between weather and climate and how multi-week forecasts are starting to blur this distinction.**

The positive IOD in 2019

The Indian Ocean Dipole is clearly explained on the Bureau of Meteorology website http://www.bom.gov.au/climate/iod/. Events usually start around May or June, peak between August and October and then decay when the monsoon arrives in the southern hemisphere. A positive phase of the IOD developed in 2019. This phase is associated with increased chances of warmer and drier springs. Figure 1 shows August to October was drier than average at Minnipa (23 mm below average of 100 mm), Kimba (70 mm below average of 110 mm) and Cummins (40 mm below average of 131 mm). Since 1960 there have been 11 IOD positive events; 8 have been below average at Minnipa and Cummins and 9 of the 11 at Kimba. As can be seen on the graph, positive IOD years change the odds, but the reduction in rainfall can be small or large. Growers and agronomists can check the historical impact of IOD and ENSO on their location using the local climate tool at a website developed by AgVic, SARDI and Federation University as part of a GRDC project https://forecasts4profit.com.au/.

The different time scales of weather, seasonal climate and climate change

Although the terms weather and climate are often used interchangeably, the distinction is important because there are differences in what is being forecast, how the forecast is made and the accuracy of the forecast. Weather is a 'snap shot' of the atmosphere at a particular time. Weather is determined by the timing of individual synoptic events such as a cold front or high-pressure systems and can last between a few hours to a week. Climate is some composite or average of the weather over time.

Weather forecasts are mostly based on numerical models; these are initiated from the current state of the atmosphere and used to predict future states of the atmosphere, including the timing and amount of rainfall for the coming week. Seasonal climate forecasts typically give the chance of the next 3–6 months being wetter or drier than the long-term average. Rather than being influenced from the inherently chaotic dynamics of the atmosphere, they are based on patterns of the sea surface temperature (SST) and associated atmospheric characteristics.

Up until 2013, Australian seasonal outlooks were based on statistical relationships between sea surface temperatures or the southern oscillation index. Since 2013 the Bureau of Meteorology has used dynamic models which are similar to numeric weather models but run at a coarser spatial scale and daily rather than hourly. These dynamic models can deliver multi week (2-6 weeks) forecasts that bridge the gap between weather (next week) and climate (3 months ahead). The multi-week forecasts are more usefully seen as bringing the forecast period of climate forecasts earlier rather than extending weather forecasts.

Bureau of Meteorology forecasts – more forecasts more often

Because of the access to computing power and dynamic forecasts the Bureau of Meteorology has recently started producing more climate outlooks, more often. In addition to more frequent updates on the seasonal timescale, there is information on the coming weeks, fortnights and months. The GRDC is contributing to a larger applied research project funded by the Commonwealth Department of Agriculture called Forewarned is Forearmed. This project is working with the Bureau of Meteorology to develop forecast products on weather and climate extremes at the multi-week and seasonal time scale. Products from this project will be available in coming months.

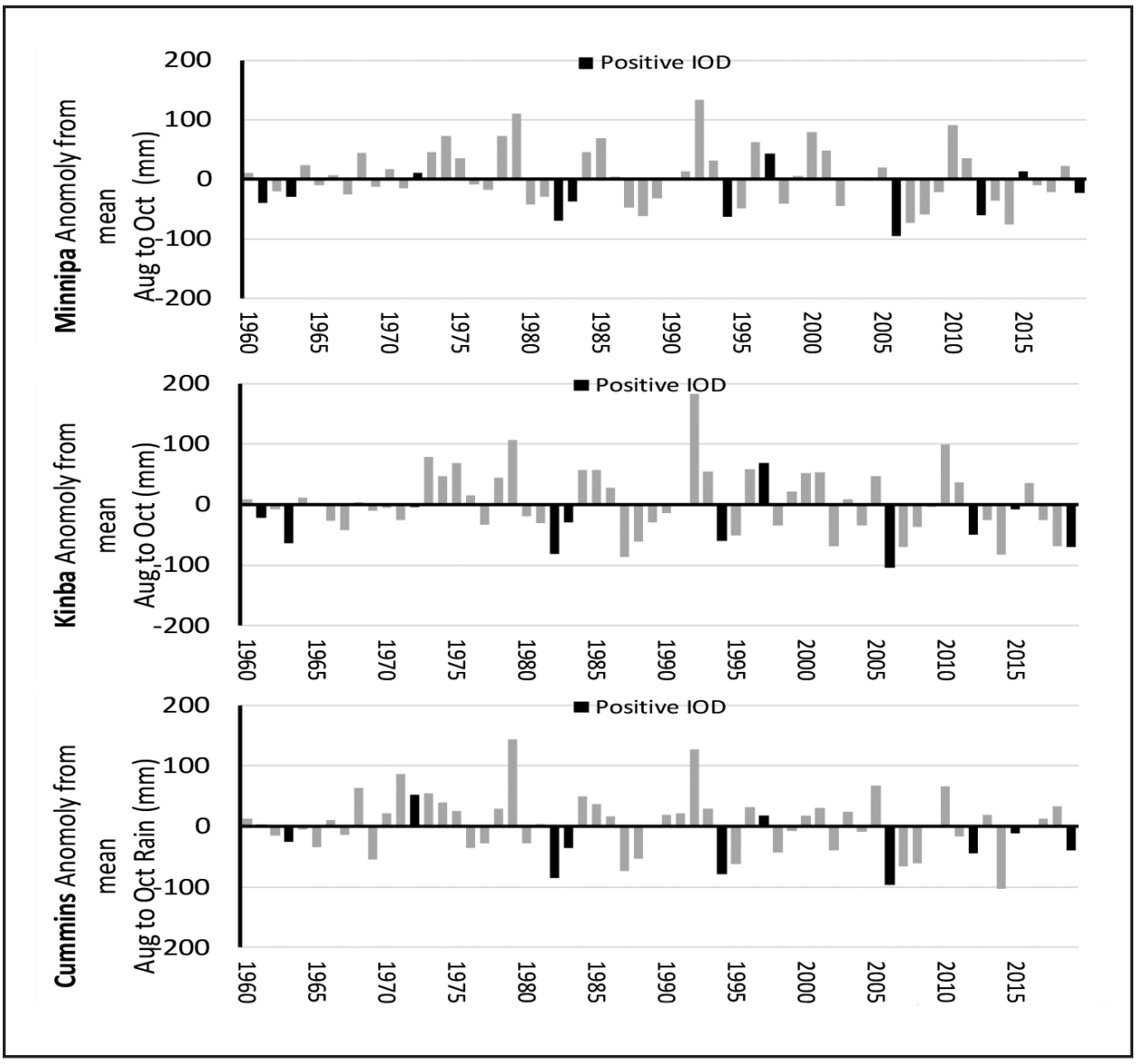

Figure 1. August to October rainfall anomalies in mm for 1960 to 2019 for Minnipa, Kimba and Cummins showing the positive IOD years in black bars.

Linking future climate information to current soil water status

Dryland farming on EP is about managing water. Successful farmers capture as much water as possible and then maximise the efficiency of water use in the crop and pasture systems. A recent development has been the network of soil moisture probes providing real time information on soil water. As part of a larger project managed by EPARF and funded through the Australian Government's Smart Farming Partnerships, SARDI Climate Applications will be working with advisers and farmers to link what is measured (water stored in the soil) with historical and forecast information about rainfall in the coming season.

While short term weather forecasts are very accurate and getting better and better, improvements in seasonal climate information are slower and harder to gauge. Seasonal forecasts still fall into the category of "too good to ignore but not good enough to be sure". Nevertheless, there is information that changes the odds on the coming season and some farmers and agronomists are incorporating the information into risk management.

Acknowledgements

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