

2007 seasonal outlook

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Take Home Messages

By the end of 2006 mature El Niño conditions were recorded in the eastern equatorial Pacific. Most ocean-atmosphere models suggest that the Pacific should remain warm in the short-term with a gradually return to neutral conditions by mid-year. The DAFWA analogue year selection system has a more optimistic outlook, suggesting that there is a high chance of La Niña conditions developing by the middle of the year. In terms of wheatbelt rainfall, the analogues suggest that average rainfall is likely over summer and average to above average rainfall is likely between May and October. To the northwest of WA there has been a recent trend towards warmer Sea Surface Temperatures (SST). If this trend contributes to an enhanced SST gradient to the northwest of Australia the confidence in enhanced northwest cloud-band activity and above average growing season rainfall would increase. The lesson from 2006 is that trends in SST in this region need to be closely followed.

Farmers should also pay attention to soil moisture reserves, disease risk and sowing opportunities in major management decisions. If a La Niña develops this could contribute to an upward pressure on grain and fuel prices as these years are generally related to drier and colder conditions in North America, southern South America and parts of southern Europe. However, world crop area (planted area) and the latest seasonal updates from these regions need to be considered closer to seeding.

Aims

This paper aims to review the broadscale weather pattern and summarise implications for the 2007 cropping season, i.e. May-October.

Method

Possible seasonal scenarios for 2007 are developed using several approaches. These are ocean/atmosphere indicators in the Australian/Pacific region; a review of the main forecast model predictions; and, the outlook from a forecasting system being developed at DAFWA. Pressure indices are combined with SST in the eastern Pacific (Nino-3 region), to form the basis of a “big picture” monitoring of the ocean/atmosphere pattern. An experimental computer program called ESS (ENSO Sequence System) applies weights to the importance of these indices through the year and uses pattern matching to select the most similar combination of indices from past years, called analogue years. ESS is the first step in providing better long-lead rainfall outlooks. Future developments will add local and regional influences to this experimental system to create a new rainfall outlook system. Research undertaken at DAFWA and the University of New South Wales has found that an enhanced SST gradient (cool in south Indian Ocean, warm near Indonesia) is positively related to growing season rainfall in the wheatbelt. Details of the indices used in ESS, and monthly updates of the analogues are available on DAFWA’s climate website www.agric.wa.gov.au/climate in the ENSO Technical Summary.

Results

A reduced SST gradient to the northwest of Australia and strong high pressures over Australia were the major contributing factors to drought conditions in 2006. At the end of 2006 mature El Niño conditions were in place. However, this pattern began to breakdown in early 2007 with

a strengthening of the North and South Pacific highs and associated trade winds. For the first time in eight months below normal pressures were consistently recorded in the Australian region and heavy rains from tropical low pressure systems have brought flooding to the Esperance region in Western Australia, and to parts of South Australia and Victoria.

Seven of the commonly used ENSO forecasting models are indicating that a gradual cooling back to neutral conditions in the eastern equatorial Pacific by May is likely, with four indicating that warm conditions are likely to persist (www.bom.gov.au/climate/ahead/ENSO-summary.shtml). It must be noted though that March to June is known as the 'predictability barrier' and predictive skill of the models across these months is at its lowest.

DAFWA climate indices also indicate a similar, but more dramatic cooling in the next six months. In late 2006, the El Niño Prediction Index (EPI) was +0.96, which is normally associated with a cooling of 1-2°C in the eastern Pacific over the year following El Niño. Based on preliminary data for January, ESS currently selects the three La Niña years: 1964, 1970 and 1995, and the two neutral years 1952 and 1978. These years generally had average to above average rainfall in south-eastern Australia. The skill associated with this outlook is high between May-October for north-eastern and south-western Australia, but lower in other areas. However, the accuracy of forecasts for the subset of years after an El Niño is higher. With strengthening trade winds and a rising Mean SOI, a transition to weak La Niña conditions looks most likely in the eastern Pacific by the end of the year.

In late 2006 and early 2007, the SSTs were warming to the northwest of Australia and cooling to the west of Perth. If the trend to an enhanced SST gradient in the Indian Ocean persists into late autumn this should assist cloud-band activity and moisture inflow from the northwest. The confidence in an average to above average forecast for the growing season will increase if a La Niña develops in the Pacific and an enhanced SST gradient develops in the Indian Ocean SST pattern. If a La Niña develops world grain prices could remain high as a La Niña is more often than not related to drier conditions in major production areas in North America, southern South America and parts of southern Europe, though the planted crop area is another important factor. A La Niña could also contribute to upward pressure on fuel prices as the weather in these years is generally related to colder conditions in North America. Drought is affecting the US Great Plains and developments in this area need to be followed closely as the growing season draws near.

Conclusion

Recent trends in broad-scale indicators suggest that El Niño conditions have peaked and have started to break down. DAFWA analogues suggest that there is a high chance of La Niña conditions becoming established by mid-year. Overall, the DAFWA indices suggest that a more optimistic approach to decision-making is recommended in 2007 and confidence in this assessment would be enhanced if a La Niña develops. Summer rains have already begun accumulating soil moisture reserves in much of the Victorian wheat-belt. Disease risk becomes a more critical factor in seasons with better rainfall. Farmers should respond to stored soil moisture and the timing of opening rains, but also pay close attention to updates of seasonal forecasts and SSTs to the north of Australia.

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