



IRRIGATION RESEARCH & EXTENSION COMMITTEE

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FOR IRRIGATION CROPPERS

Climate change & variability – the seasonal outlook

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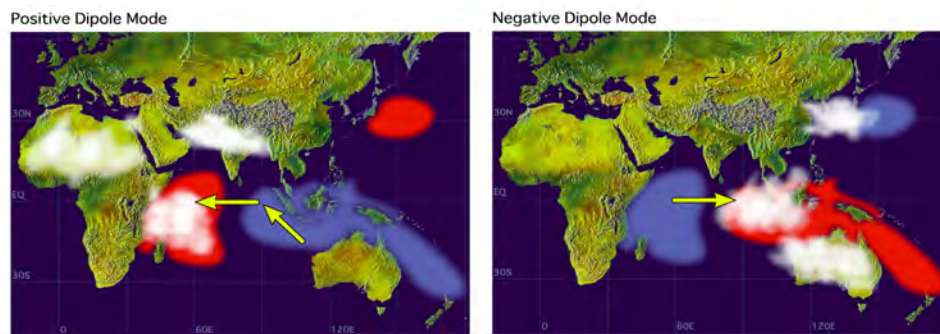
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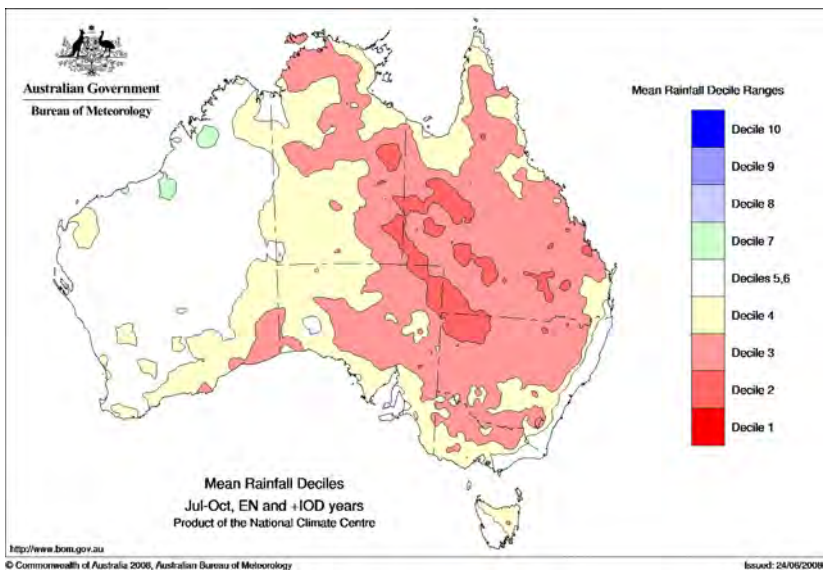
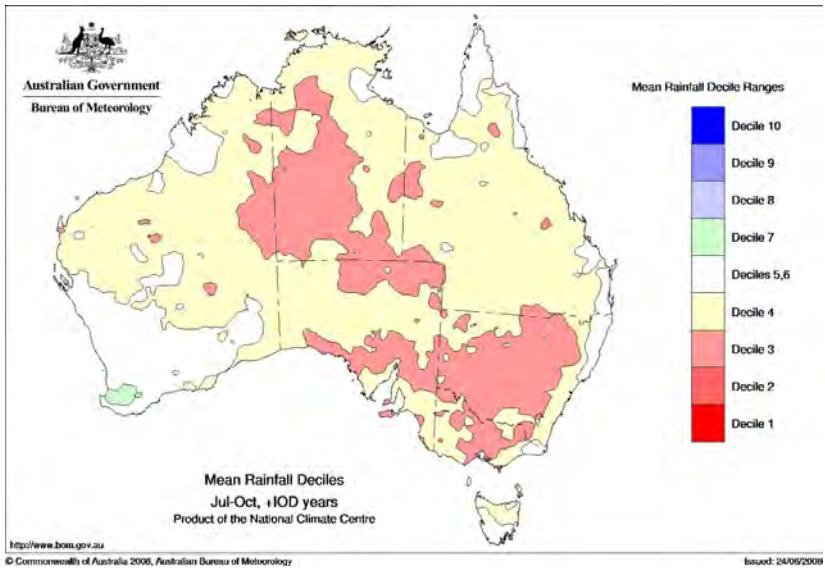
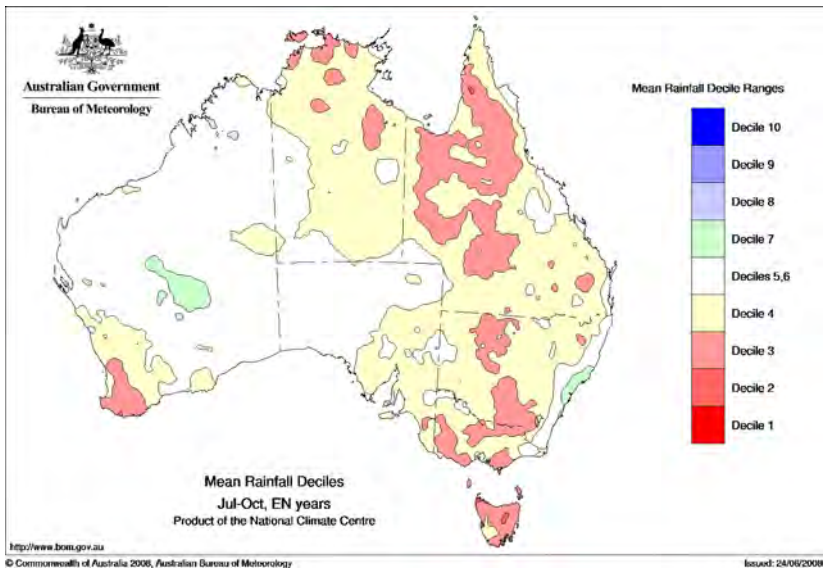
El Nino Southern Oscillation and Indian Ocean Dipole- drivers of winter/ spring rainfall variability in the Riverina

Australian farmers face enormous variability in rainfall, both between seasons and within them. Since the drought of 1982 many in Eastern Australia are aware of the significant effect on rainfall of the cycles of the Pacific Ocean phenomena known as the El Nino Southern Oscillation (ENSO). Recently climate scientists have made a new discovery in their ongoing attempt to understand the drivers of Australian rainfall variability, this time in the Indian Ocean. This relatively new discovery (1994) termed Indian Ocean Dipole (IOD) has a number of modes which like ENSO appear to have a significant effect on winter/spring rainfall in South Eastern Australia and could provide a valuable insight to assist in managing climate risk in the Riverina region in the future.

Like ENSO, the IOD phenomena could best be described as a coupled ocean, atmosphere relationship, with anomalous sea surface temperature gradients between Sumatra and the East Coast of Africa driving the atmospheric circulation in the central Indian Ocean which in turn affects moisture supply to Australian synoptic patterns. The IOD has two modes. The Positive (+ve) mode occurs when a cold pool of water forms in the Indian Ocean off Sumatra (Indonesia) and a warmer pool of water off the east coast of Africa. The Negative mode is when the reverse occurs.



Determining the relative impact on Riverina rainfall of the distinct phases of ENSO and IOD can be difficult as both phenomena can and do occur together at times. CSIRO researchers Garry Meyers, Peter McIntosh and colleagues have retrospectively reviewed the last 130 years into ENSO and IOD events and have compared this output with historic Australian rainfall patterns.



Dynamic forecast tools such as the Australian Bureau of Meteorology's POAMA model offer significant insight to Riverina farmers to predict future rainfall probabilities over the winter and spring period as a result of changes to the phases of ENSO in the Pacific Ocean and modes of IOD in the Indian Ocean.