Queensland Climate Change Centre of Excellence Monthly Climate Statement – June 2011

Key messages

- Strong La Niña conditions prevailing over last summer have now broken down.
- The El Niño-Southern Oscillation is likely to remain in a neutral state over winter.
- Rainfall probabilities for winter (June to August) are currently near-normal.
- Sea-surface temperatures in the extra-tropical Pacific are currently favourable for summer rainfall although this pattern may change. Rainfall probabilities will be updated monthly.

Findings for June 2011

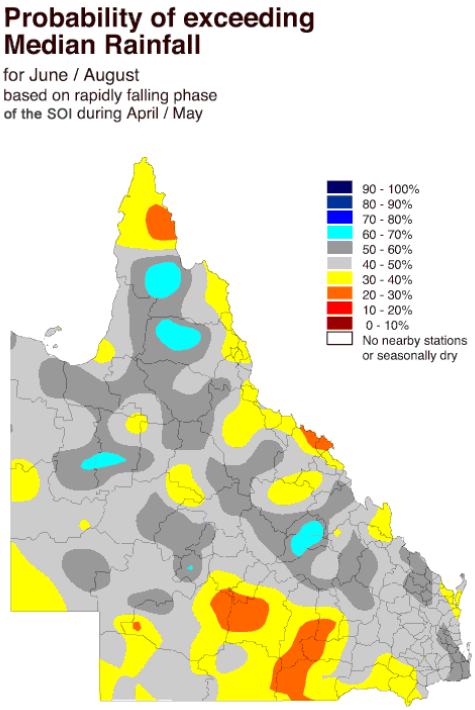
The Queensland Climate Change Centre of Excellence (the Centre) considers that **the probability of above- or below- median rainfall for the next three-month period (June to August) is normal (40-60 per cent) for most of Queensland. This outlook is based on the currently neutral state of the El Niño-Southern Oscillation (ENSO) phenomenon. However, the sea-surface temperature pattern in the extra-tropical Pacific continues to indicate a higher than normal probability of above-median rainfall for the coming summer (November to March).**

The Centre's understanding is based on the current and projected state of the ENSO phenomenon and on factors which alter the impact of ENSO on Queensland rainfall (e.g. the Pacific Decadal Oscillation (PDO)).

As at 1 June 2011, the Centre notes that the strong La Niña climate pattern which prevailed since last spring has now broken down and the El Niño-Southern Oscillation (ENSO) phenomenon is currently in a neutral state. ENSO-neutral conditions are likely to continue to prevail through winter (see the latest Bureau of Meteorology 'ENSO Wrap-Up').

Currently, in relation to the ENSO phenomenon:

- The Southern Oscillation Index (SOI), a key atmospheric measure of ENSO, fell substantially from very high values in March (+17.5) and April (+23.9), to near-average (+2.1) in May.
- Observed sea surface temperatures in the key Niño 3.4 and Niño 4 regions warmed over autumn and are currently near-normal.
- The recent breakdown of the strong La Niña pattern which has prevailed since last spring is consistent with an historical tendency for extreme ENSO events (i.e. La Niña or El Niño events) to break down over autumn.
- The likely continuation of ENSO-neutral conditions over the coming months is supported by most global climate models



The Centre also closely monitors sea-surface temperature patterns in both the South-West Pacific and the North Pacific and, on this basis, makes a long-lead assessment of rainfall probabilities for the coming summer.

The sea-surface temperature pattern in the North Pacific remains consistent with a 'Cool Phase' of the PDO. The PDO modulates the impact of ENSO on summer rainfall in Queensland, particularly under La Niña conditions. The ENSO and PDO signals have historically had the strongest impact on rainfall in north-eastern Queensland and the weakest impact in south-eastern Queensland.

Whilst both sea-surface temperatures in the equatorial Pacific and the SOI have returned to near-average values, there remains a strong sea-surface temperature gradient across the South West Pacific which is part of the broader La Niña signal. The Centre considers that this strong sea-surface temperature gradient in the South West Pacific, combined with a

'Cool Phase' of the PDO, increases the probability of above-median rainfall for the coming summer (November to March). The Centre will continue to monitor this sea-surface temperature pattern up until November and revise rainfall probabilities for summer on this basis.

Rainfall outlook

Rainfall over the last three-month period (March to May) has been above-average for much of Queensland. This is consistent with the continuation of the La Niña pattern through this period as discussed in previous climate statements.

There are various approaches used to provide probabilistic rainfall outlooks based on the above information. These approaches tend to differ in terms of which components of the climate system are considered and, for this reason, each approach may convey a different outlook, particularly for specific locations.

The Centre produces two statistical climate risk assessment schemes:

- The experimental SPOTA-1 scheme integrates sea-surface temperature information, including indices of ENSO and the PDO.
- The SOI Phase Scheme relies solely on the SOI, an atmospheric measure of ENSO.

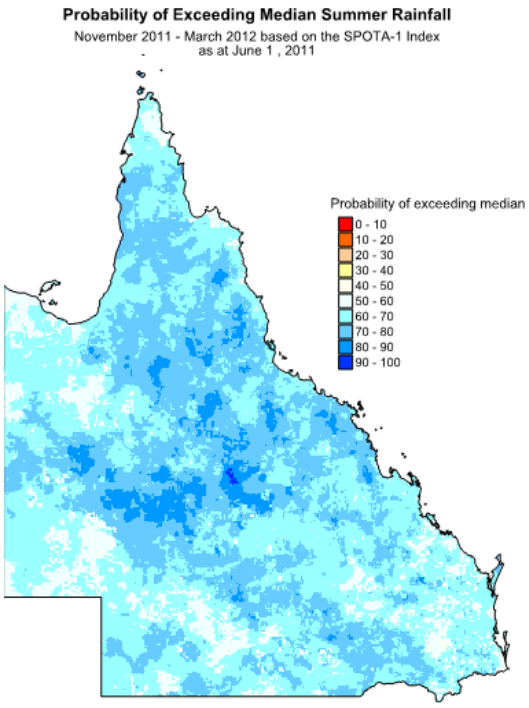
The Centre's experimental SPOTA-1 scheme provides long-lead probabilities of summer (November to March) rainfall for Queensland from mid-April through to mid-November each year. The sea surface temperature gradient (west to east) across the South Pacific Convergence Zone (i.e. between eastern Australia and the Central Pacific) remains quite positive (+1.36 ºC), a remnant of the recent La Niña pattern. According to the Centre's experimental SPOTA-1 scheme, a positive sea surface temperature gradient across this region is favourable for summer rainfall in Queensland. The SPOTA-1 scheme, which takes this sea-surface temperature gradient into account, as well as the state of the PDO, currently indicates a higher than normal probability of above-median rainfall in parts of Queensland for the coming summer.

The Centre's SOI Phase scheme commentary, which relies on the SOI, indicates that the probability of exceeding median rainfall (or below median rainfall) across most of Queensland is normal (40-60 per cent) for the next three-month period (June to August).

As the above schemes indicate rainfall probabilities based on historical relationships, it is important that the nature of seasonal outlooks are understood and long-term risk management is undertaken. For example, if an outlook indicates a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall. Additionally, an increased risk of above or below-median rainfall in Queensland due to ENSO will not necessarily result in above or below-median rainfall occurring throughout all of the state (see Australia's Variable Rainfall poster or the Centre's archive of historical rainfall maps).

The Centre understands that each of the schemes may have its own particular following. Although such schemes cannot provide outlooks with absolute certainty each year, users of the information who follow a skilful scheme should benefit from doing so in the long-term. Users should consider the historical track record of any scheme and such information is becoming increasingly available. The Centre's Long Paddock website provides an historical archive of SPOTA-1 reports and past commentaries on the SOI Phase scheme. Users should also consider the wide range of information available each month describing the current state of the ocean/climate system, for example the 'ENSO Wrap-Up'.

ENSO influences other climate variables apart from rainfall (e.g. temperature, pan evaporation and vapour pressure). This means that the impact of ENSO on crop or pasture growth can be stronger than on rainfall alone. The impact of ENSO on pasture growth is also dependent on current pasture condition and soil water status. The Centre's AussieGRASS model takes these factors into account in producing pasture growth seasonal probabilities.



For further information, please visit www.LongPaddock.qld.gov.au/climatestatement or contact QCCCE@climatechange.qld.gov.au