



# NRM on farms

News about climate and natural resource management in agriculture

September 2017

This month's masthead photo is from Jayfields Nursery, Holbrook in southern NSW. If you would like to submit a photo for the masthead illustrating good NRM management in agriculture please send it to [nrmonfarms@primus.com.au](mailto:nrmonfarms@primus.com.au)

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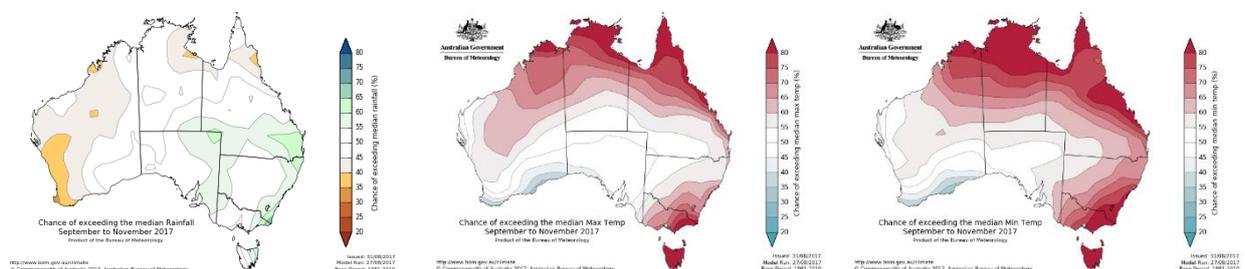
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## CLIMATE



### Seasonal outlook

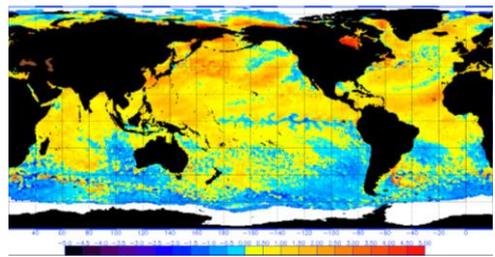
Rainfall is likely to be below average in southwest Australia, above average in southeast Queensland, and average elsewhere. Temperatures are likely to be warmer than average in northern and south-eastern Australia, but frost risk remains in areas with clear skies and dry soils. Outlook drivers include sea surface temperatures and higher pressures south of the continent encouraging more easterly flow across Australia.

<http://www.bom.gov.au/climate/outlooks/#/overview/summary/>  
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

### Ocean temperatures

Weak cool anomalies have emerged near the equator in the eastern Pacific, and weak warm anomalies are present across much of the South Pacific.

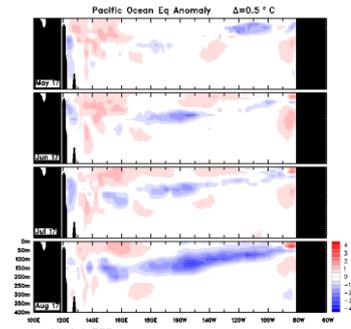
<http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/index.html>  
<http://www.bom.gov.au/climate/enso/#abs=Sea-surface>



## Subsurface temperatures are cooling

Over the past month cool anomalies have strengthened across the equatorial Pacific, stretching from the west at about 200 to 150 m depth, rising to near the surface in the east. In some areas these anomalies are more than 2.5°C cooler than average.

<http://www.bom.gov.au/climate/enso/>



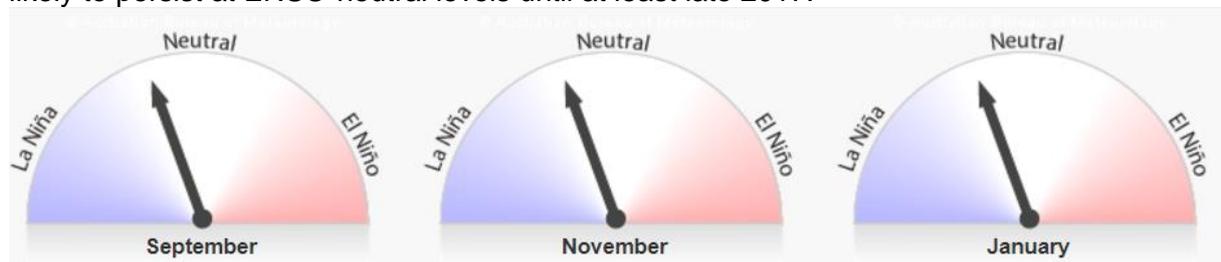
## ENSO is inactive

The El Niño–Southern Oscillation remains neutral, and the ENSO Outlook inactive, with little sign of El Niño or La Niña developing in coming months.

<http://www.bom.gov.au/climate/enso/outlook/>

## El Niño models opt for ENSO neutral

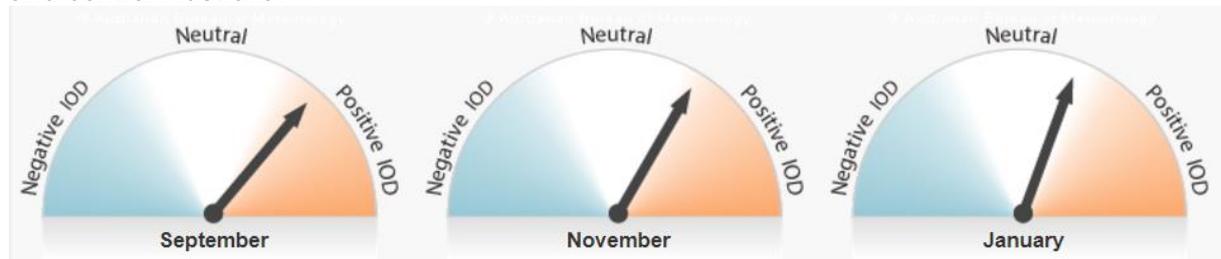
International climate models surveyed by the Bureau suggest the tropical Pacific Ocean is likely to persist at ENSO-neutral levels until at least late 2017.



<http://www.bom.gov.au/climate/model-summary/>

## IOD models indicate neutral in spring

Most of the climate models surveyed by the Bureau indicate that the IOD will remain neutral during spring. Two models suggest a positive IOD remains a possibility during spring. A positive IOD is typically associated with below average winter–spring rainfall over southern and central Australia.

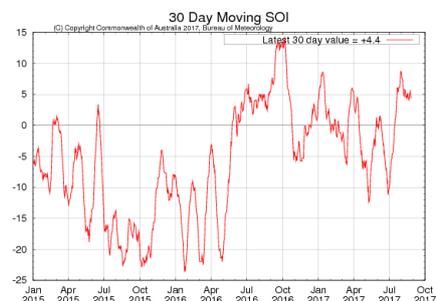


<http://www.bom.gov.au/climate/enso/#tabs=Indian-Ocean>

## SOI

The 30-day Southern Oscillation Index is within the neutral range at +4.4 (90-day value +1.0). The SOI has remained relatively steady during the past month.

<http://www.bom.gov.au/climate/enso/#tabs=SOI>

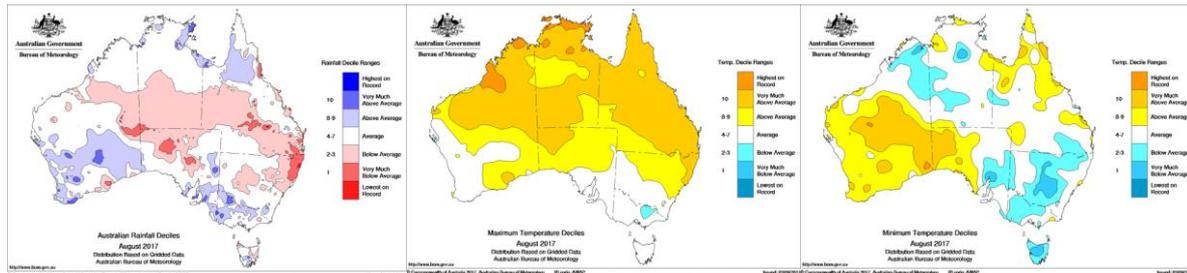


## NSW DPI seasonal conditions report

Subscribe to NSW DPI's seasonal conditions report, and the climate summary which provides a snapshot of the monthly report in an easy to read four-page format with additional graphs and charts.

<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

## Australia in August

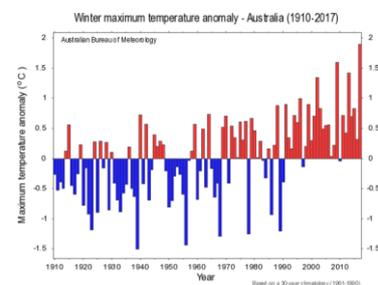


August rainfall was below average for eastern WA, Central Australia, western and southern Queensland, and much of northern NSW, and above-average around the Gulf of Carpentaria, and parts of southern Australia. August temperatures were the eighth highest on record nationally, and among the top ten for Queensland, NT and WA. Minimum temperatures were cooler than average for much of southeast Australia and the Kimberley. <http://www.bom.gov.au/climate/current/month/aus/summary.shtml>

## Winter temperatures highest on record

Australia's average daytime maximum temperatures were the highest on record for this winter, beating the previous record set in 2009 by 0.3°C. This means Australia has set new seasonal highs for maximum temperatures a remarkable ten times so far this century (across summer, autumn, winter and spring). The increased frequency of heat records in Australia has already been linked to climate change.

<https://theconversation.com/australias-record-breaking-winter-warmth-linked-to-climate-change-83304>



## GLOBAL CLIMATE

### Role of climate change in Texas and Asia flooding

As seas warm, they evaporate more easily and provide energy to storm fronts. As the air above them warms, it holds more water vapour. For every half a degree Celsius in warming, there is about a 3% increase in atmospheric moisture content. This means the skies fill more quickly and have more to dump. A key focus now is whether climate change is connected to 'stalling' of storms such as occurred with Hurricane Harvey. Researchers have recently identified a slowdown of atmospheric summer circulation in the mid-latitudes as a result of strong warming in the Arctic.

<https://www.theguardian.com/us-news/2017/aug/30/in-an-era-of-unwelcome-climate-records-hurricane-harvey-wont-be-the-last>

### Tropical forest emissions soar during 2014-16 El Niño

The 2014-16 El Niño caused tropical forests to emit 3 billion tonnes of carbon, equivalent to nearly 20% of the emissions produced during the same period by burning fossil fuels and making cement. A combination of high temperatures and drought increased the number and severity of wildfires in southeast Asia, while drought stunted plant growth in the Amazon rainforest, reducing the amount of carbon it absorbed. In Africa, a combination of warming temperatures and near-normal rainfall increased the rate at which forests exhaled CO<sub>2</sub>.

<http://www.nature.com/news/massive-el-ni%C3%B1o-sent-greenhouse-gas-emissions-soaring-1.22440>

### Why the sun is not responsible for climate change

Since 1970 global temperatures have shot up by almost 0.7 C, while the amount of solar energy reaching the Earth has actually declined. Similarly, the upper atmosphere is cooling while the lower atmosphere warms, a clear fingerprint of warming from greenhouse gases rather than the sun.

<https://www.carbonbrief.org/why-the-sun-is-not-responsible-for-recent-climate-change>

## CLIMATE IMPACTS

### More frequent droughts affect recovery times

A new Nature study has found that drought recovery times are strongly associated with climate and carbon cycle dynamics, with biodiversity and CO<sub>2</sub> fertilisation secondary factors. Recovery is longest in the tropics and high northern latitudes, and drought impacts have increased over the twentieth century. If droughts become more frequent, as expected, the time between droughts may become shorter than drought recovery time, leading to permanently damaged ecosystems and widespread degradation of the land carbon sink.

<https://phys.org/news/2017-08-recover-drought.html>

### Hot and dry conditions set scene for bushfires

Modelling that combines Bureau of Meteorology data with NASA satellite imaging has found that record-setting July warmth and low rainfall have created conditions in the Sydney Basin very similar to 2013, when highly destructive bushfires burned across NSW and Victoria. NSW research has identified critical dryness thresholds associated with significant increases in fire area. Rather than a gradual increase in flammability as forests dry out, bushfires are larger when dead fuel moisture drops below 15%. Another jump occurs when dead fuel moisture levels fall below 10%.

<https://theconversation.com/dry-winter-raises-sydney-basin-for-early-start-of-bushfire-season-82641>

### More flooding in urban areas but drier soils in rural areas

Global analysis of the world's river systems by UNSW researchers has found a growing pattern of intense flooding in urban areas coupled with drier soils in rural and farming areas. A warming atmosphere means warmer air, and warmer air can store more moisture. So when the rains do come, there is a lot more water in the air to fall, and rainfall is more intense. However, flooding is not increasing at the same rate as rainfall because there is more evaporation from moist soils in rural areas, causing them to become drier before any new rain occurs. Meanwhile, in small catchments and urban areas where there are limited expanses of soil to capture and retain moisture, intense downpours become equally intense floods, overwhelming stormwater infrastructure and disrupting life.

<https://newsroom.unsw.edu.au/news/science-tech/urban-floods-intensifying-countryside-drying>

### Explaining Harvey's huge downpour

This article from Colorado climate scientist Ross Schumacher outlines the reasons for the huge rainfalls that Cyclone Harvey dumped on Texas and Louisiana.

<https://theconversation.com/what-made-the-rain-in-hurricane-harvey-so-extreme-83137>

### Should you trust climate science

This New York Times article looks at why climate scientists have a difficult time being believed even when many of their predictions in the past century have been proved.

<https://www.nytimes.com/2017/08/18/climate/should-you-trust-climate-science-maybe-the-eclipse-is-a-clue.html>

## CLIMATE TOOLS

### Managed retreat is a potential adaptation strategy

The movement of people and infrastructure out of vulnerable areas, a process called managed retreat, is gaining recognition as a potential adaptation strategy to climate change and natural hazards. Scientists should evaluate past initiatives to identify best practices for the future, when managed retreat may need to be executed on even larger scales.

<http://www.nature.com/nature/journal/v548/n7667/full/548281c.html>

## Qld agricultural adaptation plan

Queensland's Agriculture Sector Adaptation Plan has six recommendations.

1. Optimise access to climate hazard information and projections at scales that can inform industry and farm-level risk assessments.
2. Continue to develop and refine tools and resources that support farm, regional, supply chain and industry-level management decision-making.
3. Support the delivery of facilitation and engagement programs.
4. Improve access to necessary finance and agriculture insurance.
5. Explore mechanisms to enable climate risk management and climate adaption to be addressed across agricultural supply chains.
6. Enhance investment in programs and initiatives that support and catalyse innovation and resilience, with a particular focus on the "next generation" in the agriculture sector.

<https://www.qff.org.au/wp-content/uploads/2017/08/Agricultural-sector-adaption-plan-2.pdf>

## EMISSIONS

### ERF plantation forestry method released

The Emissions Reduction Fund's new plantation forestry method allows Australian carbon credit units for activities that increase carbon sequestration through the establishment of new plantation forests, increase sequestration in existing plantation estates, or transition from short-rotation to long-rotation plantation forests. The method is restricted to plantations that are managed with the intention of harvesting forest products, and does not allow managed investment schemes to operate forestry projects under the Emissions Reduction Fund.

<http://www.cleanenergyregulator.gov.au/ERF/Pages/News%20and%20updates/News-Item.aspx?ListId=19b4efbb-6f5d-4637-94c4-121c1f96fcfe&ItemId=404>

### The importance of negative carbon emissions

This article discusses the importance of negative carbon emissions, ie removing more carbon from the atmosphere than we are emitting, by capturing it and burying it beneath the earth's surface. It will require international agreement, a reliable emissions accounting, and policies to encourage carbon removal technologies.

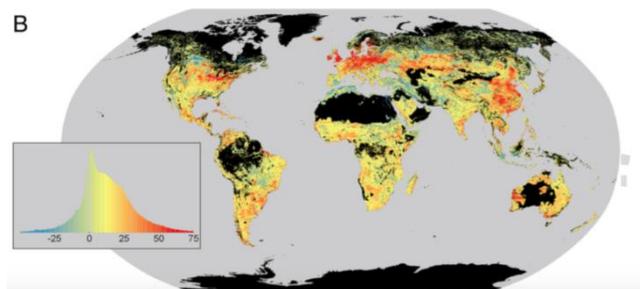
<https://www.vox.com/energy-and-environment/2017/8/18/16166014/negative-emissions>

## SOILS

### World's soils have lost 133bn tonnes of carbon

A new study suggests that the world's soils have lost 133bn tonnes of carbon since humans first started farming the land around 12,000 years ago. Crop production and cattle grazing have contributed almost equally to global losses. Regions that have experienced the most soil carbon loss include the US corn belt and western Europe

<https://www.carbonbrief.org/worlds-soils-have-lost-133bn-tonnes-of-carbon-since-the-dawn-of-agriculture>



### US soil health indicators

Over the past three years, US scientists, farmers, field conservationists, soil test laboratories and others have developed a list of 19 soil health measures. These specific measurements are regionally defined, have known thresholds, and help define management strategies to improve soil function – like providing nutrients and water.

<http://soilhealthinstitute.org/national-soil-health-measurements-accelerate-agricultural-transformation/>

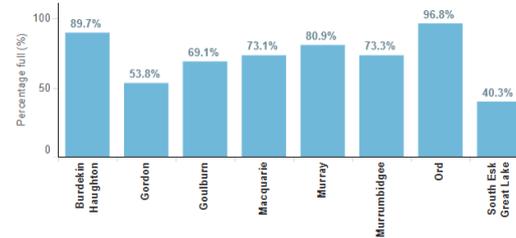
# WATER

## Water storage levels

Percentage full - States and Territories



Percentage full - Rural systems



<http://www.bom.gov.au/water/dashboards/#/water-storages/summary/state>

## Can plants hear water?

WA research has found that plant roots were able to locate a water source by sensing the vibrations generated by water moving inside pipes, even in the absence of substrate moisture.

<https://link.springer.com/article/10.1007%2Fs00442-017-3862-z>

## The key to drought-tolerant crops may be in the leaves

US research into drought tolerant plants has found that cultivars in a high and dry area of Texas generated more protective wax on their leaves as a measure to protect themselves against more extreme conditions.

<https://www.sciencedaily.com/releases/2017/08/170815145836.htm>

## Farmers for Climate Action against Adani water licence

More than 70,000 people have signed a petition initiated by Farmers for Climate Action to the Queensland Premier to rescind the unlimited, free 60-year water licence the Qld Government is proposing to grant to the Adani coal mine.

<http://www.farmersforclimateaction.org.au/>

# BIODIVERSITY

## NSW Biodiversity Conservation Trust

As part of the NSW Biodiversity Conservation Act 2016 which commenced on 25 August 2017, a Biodiversity Conservation Trust will be established. The Trust will initially continue the private land conservation functions of the Office of Environment and Heritage and the Nature Conservation Trust. Over the next six months the Trust will become established and its Board will set out its approach and strategy.

<https://www.landmanagement.nsw.gov.au/nsw-biodiversity-conservation-trust/>

## NSW Government response to NRC pest animal review

The NSW Government has responded to the Natural Resources Commission's review of pest animal management in NSW. Key changes that will be introduced include regional pest management plans, a state pest animal committee, and a deer management strategy.

<http://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/review-of-the-management-of-pest-animals-in-nsw>

## Leaf size depends on temperate, rain and solar radiation

New research has found that the key limiting factors for leaf size are day and night temperatures, rainfall and solar radiation. The interaction of these factors means that in hot and sunny regions that are also very dry, most species have small leaves, but in hot or sunny regions that receive high rainfall, many species have large leaves. In very cold regions (e.g. at high elevation, or at high northern latitudes), most species have small leaves.

<https://theconversation.com/new-research-unlocks-the-mystery-of-leaf-size-83294>

## Agri-environment schemes in Europe

This EU report comprises several two page papers looking at the impacts on European farm ecosystems, biodiversity and farmers of environmentally friendly practices such as grassy swards, wildflower plantings, tree planting, bird-friendly plantings etc.

[http://ec.europa.eu/environment/integration/research/newsalert/pdf/AES\\_impacts\\_on\\_agricultural\\_environment\\_57si\\_en.pdf](http://ec.europa.eu/environment/integration/research/newsalert/pdf/AES_impacts_on_agricultural_environment_57si_en.pdf)

## Save our magnificent UK meadows

Save Our Magnificent Meadows is a UK project to raise awareness of the plight of wildflower meadows and grasslands and equip communities with knowledge and skills to reverse the decline.

<http://www.magnificentmeadows.org.uk/>



## The garden of dye plants

The Jardin Conservatoire des Plantes Tinctorial in Lauris, France, houses a collection of some 250 species of dye plant. The garden aims to promote natural, environmentally friendly, non-polluting techniques, introducing visitors to plants, dyeing techniques, history, ethno-botanical links and new lines of research aimed at reviving interest in natural dyes.

<https://thebiologist.rsb.org.uk/biologist/158-biologist/features/1792-to-dye-for>

## ENERGY

### Energy resilience in Australia

This report from the Australian Strategic Policy Institute discusses options for addressing the surety of energy supply, reforming energy supply through the electricity grid, addressing evolving transport energy demand, and future-proofing our communities.

<http://apo.org.au/node/104041>

## FOOD

### Slow food alliance between farmers and chefs

East Maitland chef Amorelle Dempster has initiated a slow food alliance between farmers and chefs in the NSW Hunter Valley to connect chefs with the choice and biodiversity in the local food system.

<http://www.abc.net.au/news/2017-08-25/slow-food-alliance-aiming-to-boost-agriculture-and-tourism/8841664>

### NSW food waste study

NSW EPA-funded research into food waste generated by retail and wholesale businesses indicates that most food waste is currently sent to landfill, with 5-25% donated to food rescue charities and 20% recycled through, for example, composting or use as animal feed. Much of waste that occurs at the wholesale and retail stages of the supply chain is caused (or influenced) by practices at earlier stages.

<http://apo.org.au/node/104536>

### Reshaping the UK food and farming system

A report from UK food alliance Eating Better urges the Government to see Brexit as an historic opportunity to reshape the food and farming system so that it delivers better outcomes for health, the environment and climate change, for farm animal welfare, and for providing livelihoods from sustainable farming. A related report from Sussex University summarises 15 major issues on which Food Brexit has the potential to threaten UK food resilience and security.

<http://www.eating-better.org/good-livestock-policy-post-CAP-Brexit-meat-dairy-production.html>

<http://sro.sussex.ac.uk/69300/>

## LAND USE

### National agricultural land use

The latest ABS statistics on agriculture land use reveal that agricultural businesses operated across 48% of Australia's total land area during 2015-16, including a 1.4% increase in agricultural land, and 1.1% more agricultural businesses. Most land (84%) was used for grazing, while croplands decreased slightly, mainly due to a 2.4% decrease in WA cropping land.

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4627.0>

### England is losing its small farms

A new report by the Campaign to Protect Rural England illustrates that England is rapidly losing its network of smaller farms, and the diversity in food and landscape they provide. Almost a third of farms under 50 hectares disappeared between 2005 and 2015. CPRE believes that a mix of farm sizes and enterprises is crucial to maintaining England's world-renowned landscapes and diversity of food. Smaller farms are vital to the countryside as they sustain rural communities through jobs and protect distinctive local character. In their diversity of approaches, they create greater diversity in food production and conservation, both of which shape rural heritage and rural economies.

<http://www.cpre.org.uk/media-centre/latest-news-releases/item/4648-smaller-farms-heading-towards-a-cliff-edge>

## SUSTAINABILITY

### Dryland sustainable agriculture strategy

Mallee Catchment Management Authority, Agriculture Victoria, Mallee Sustainable Farming and Birchip Cropping Group are developing the 2017-2023 Dryland Sustainable Agriculture Strategy to boost productivity by improving on-farm resilience and collaboration between stakeholders.

<http://www.malleecma.vic.gov.au/resources/corporate-documents/Draft%20Mallee%20Dryland%20Sustainable%20Agriculture%20Strategy>

### Online farm trials

The GRDC-funded Online Farm Trials project aims to improve productivity and sustainability of farming enterprises by improving access to trial research information. Trial Explorer allows users to search and filter farm trial projects from across the country to provide targeted results before giving users the opportunity to view, share and export the information. Trial Browser, a subsidiary tool of the Trial Explorer, provides users with the opportunity to browse trial projects in areas where slow speeds restrict internet access.

<https://www.farmtrials.com.au/>

## EVENTS

- |                 |  |
|-----------------|--|
| September 5-7   | Queensland coastal conference, Airlie Beach<br><a href="http://event.icebergevents.com.au/qldcoastalconference2017">http://event.icebergevents.com.au/qldcoastalconference2017</a> |
| September 18-20 | International river symposium/environmental flows conference, Brisbane<br><a href="http://riversymposium.com/">http://riversymposium.com/</a>                                      |
| September 24-28 | Australian agronomy conference, Ballarat<br><a href="http://www.agronomyconference.com/">http://www.agronomyconference.com/</a>  |
| September 25-28 | Australian Rangeland Society conference<br><a href="http://www.austrangesoc.com.au/">http://www.austrangesoc.com.au/</a>   |
| October 16-19   | NSW weeds conference, Armidale<br><a href="http://conferencecompany.com.au/weedsconference/">http://conferencecompany.com.au/weedsconference/</a>                                  |
| October 18-20   | National private land conservation conference, Hobart<br><a href="http://plc-conference.org.au/">http://plc-conference.org.au/</a>   |
| October 25-27   | NSW Landcare and Local Land Services conference, Albury  |

June 2018

<http://nswlandcareconference.com.au/>

Adaptation futures 2018, Cape Town, South Africa

<http://adaptationfutures2018.capetown/>

## **SUBSCRIBE**

NRM on Farms is a monthly newsletter that summarises recent information about climate and natural resource management relevant to agriculture to keep farmers and agricultural and NRM advisors and researchers up to date. It is freely available to anyone interested or involved in agriculture or NRM. To subscribe to future editions, email Rebecca Lines-Kelly at [nrmonfarms@primus.com.au](mailto:nrmonfarms@primus.com.au)