

NRM on farms



A monthly news summary about climate and natural resources in agriculture.

March 2017

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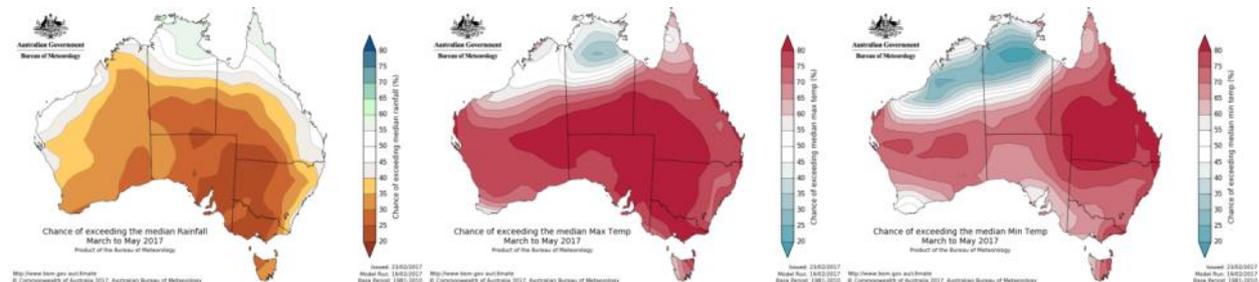
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CLIMATE

Seasonal outlook: Drier and warmer than average



NSW is likely to be drier and warmer than average during autumn, due to higher than average pressure over southern and western Australia bringing fewer rain-bearing systems. Southeast Australia has had below average autumn rainfall in 22 of the past 26 years.

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

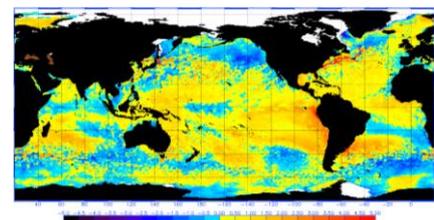
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

The Eastern Pacific and large areas of the southern half of the Pacific Ocean are warmer than average, along with waters surrounding southeast and eastern Australia.

<http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/index.html>

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



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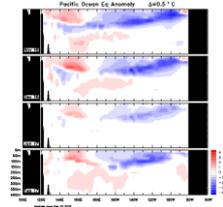


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Weak anomalies in Pacific subsurface

Cool anomalies across the sub-surface of the central to eastern Pacific, and weak warm anomalies in the west are generally weakening and decreasing in volume.

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



SOI

The 30-day Southern Oscillation Index (SOI) has been in the neutral range since mid-October.

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



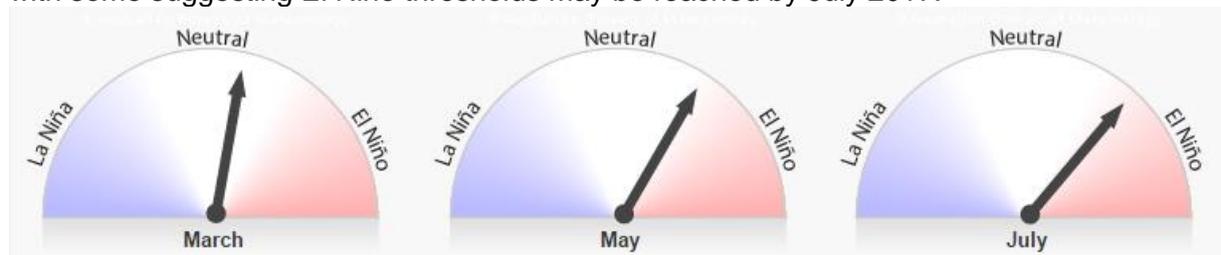
ENSO outlook: Watch

Recent changes in the tropical Pacific and atmosphere suggest that El Niño may return in 2017. Sea surface temperatures in the eastern Pacific are warmer than average for the first time since June 2016, while the SOI Index has been trending downwards. However, model accuracy is lower through the autumn months compared to other times of the year.

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

Model outlook points to El Niño trend

Most models indicate steady warming in the central tropical Pacific over the next six months, with some suggesting El Niño thresholds may be reached by July 2017.



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

IOD remains neutral

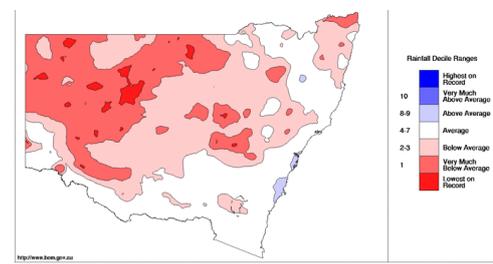
The influence of the IOD on Australian climate is weak during December to April, due to the monsoon trough shifting south and changing the overall wind circulation, which prevents an IOD ocean temperature pattern forming. Current outlooks suggest a neutral IOD for the end of autumn.

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

February in NSW: Hot and dry

February was hot and dry, with very warm temperatures in the first half of the month culminating in record-breaking heat over the 10th and 11th. Mean temperatures were the fifth-warmest on record for the state, daytime temperatures were the highest since February 1926, and rainfall was less than half the historical average.

<http://www.bom.gov.au/climate/current/month/nsw/sydney.shtml>



Exceptional heat in southeast Australia in early 2017

In January and February, there were three distinct heatwaves in southeast Australia, with the highest temperatures recorded over 9-12 February 2017. The periods between the waves of extreme heat also saw above average temperatures over large areas of east and southeast Australia. It was the consistency of high temperatures more than the extreme temperatures themselves that made early 2017 an exceptional event. The 2017 heatwaves broke the January 1939 record in central NSW, but the 1939 heatwave remains the hottest on record in many parts of southern and western NSW, and border areas of northeast Victoria.

<http://www.bom.gov.au/climate/current/statements/scs61.pdf>

Warmest NSW summer on record

NSW's summer mean temperature was the warmest since records began in 1910, 2.57°C above the historical average and 0.13°C above the previous record set in summer 2005-06. The state's average maximum temperature was also the warmest on record, and the average minimum temperature was the second-warmest behind summer 1980-81. There were several significant heatwaves, the most severe heat on 11 February, when the state's average maximum temperature reached 44°C, the warmest February day on record. Persistent heat also led to several stations breaking records for either total numbers of hot days or warm nights. Rainfall was 34% below average.

<http://www.bom.gov.au/climate/current/month/nsw/summary.shtml>

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.

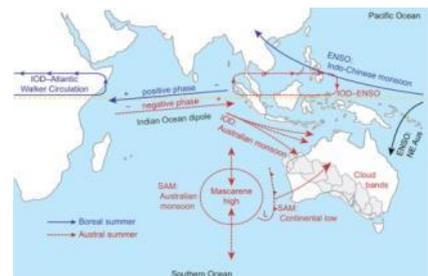
<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

GLOBAL CLIMATE

Volatile climate when ocean phases combine

New research has found that conditions in the three oceans that surround Australia – the Pacific, Indian and Southern Oceans – combine to amplify each other's influences on Australian weather. Extraordinarily wet and dry years occur when the ENSO phase is in sync with the Indian Ocean Dipole (IOD) and the Southern Annular Mode (SAM). The three have been synchronised since 1999, which explains why things have been so volatile this century.

<https://theconversation.com/droughts-and-flooding-rains-it-takes-three-oceans-to-explain-australias-wild-21st-century-weather-56264>



CLIMATE IMPACTS

Higher CO2 reduces grain protein and nutrients

Nine years of Victorian research has found that elevated CO2 reduces the concentration of grain protein and micronutrients like zinc and iron in cereals (pulses are less affected). In wet years there will be a smaller impact than in drier years.

<https://theconversation.com/how-climate-change-threatens-to-make-our-bread-less-tasty-73762>

Climate change doubled likelihood of February's heatwave

Extreme heatwaves such as that experienced in February are now twice as likely to occur according to analysis by UNSW and University of Melbourne scientists. They compared climate model simulations with and without human greenhouse gas emissions, and found that a heatwave of this severity and extent now occurs, on average, once every 120 years. Without human-induced climate change, this heatwave would only occur every 240 years.

<https://theconversation.com/climate-change-doubled-the-likelihood-of-the-new-south-wales-heatwave-72871>

Burning bark can travel far and fast

Firebrands, strips of bark from burning trees, can be lifted to immense heights in the convection column above the fire and transported long distances to start new spot-fires downwind. CSIRO researchers have found that long strips of bark from ribbon bark eucalypts such as *E. viminalis* (manna gum) and *E. rubida* (candlebark) are capable of remaining alight for more than 30 minutes. Under conditions typical of a high intensity forest fire, the firebrand would be capable of travelling and causing a spotfire 37 km away. The research concluded that it is both the length and, importantly, the way the strips curl in on themselves which make them so successful as long distance firebrands.

<https://blogs.csiro.au/ecos/firespotting/>

New plant characteristics needed

Feeding more people will require crops highly adapted to dry and hot environments. The Green Revolution of the 1960s and 1970s created plants with short stature and enhanced responsiveness to nitrogen fertiliser. Now, a new set of plant characteristics is needed to further increase crop yield, by making plants resilient to the challenges of water-scarcity.

<https://theconversation.com/as-global-food-demand-rises-climate-change-is-hitting-our-staple-crops-73360>

Victorians want action on climate change

A new survey from Sustainability Victoria has found that more than 90% of respondents were concerned about climate change and want to see government action. Some 50-60 percent believe that environmental events, including severe bushfires, storms and floods, coastal erosion, crop failures/declining agriculture, air pollution, heatwaves and drought, have increased in the past 10 years.

<http://www.sustainability.vic.gov.au/socialresearch>

APRA: Climate risk is no longer a future problem

In a recent speech at the Insurance Council of Australia conference, Geoff Summerhayes of the Australian Prudential Regulation Authority, said that climate risks are no longer a future problem or a non-financial problem. "Some climate risks are distinctly 'financial' in nature.

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Many of these risks are foreseeable, material and actionable now. Climate risks also have potential system-wide implications that APRA and other regulators here and abroad are paying much closer attention to.”

<http://www.apra.gov.au/Speeches/Documents/ICA%20Speech%20Geoff%20Summerhayes%2017%20February%202017.pd>

CLIMATE TOOLS

Victoria passes Climate Change Act

Last month Victoria passed the Climate Change Act 2017 which has a long-term emissions reduction target of net zero emissions by 2050. The Act requires adaptation action plans for key systems such as agriculture that are vulnerable to the impacts of climate change, to ensure Victoria is prepared for these impacts. The Act sits alongside Victoria's Climate Change Framework, Victoria's Climate Change Adaptation Plan 2017-2020 and the Renewable Energy Action Plan.

<http://www.legislation.vic.gov.au>

<http://www.climatechange.vic.gov.au/news>

Super glasshouses to safeguard against climate change

Australian horticulturists are increasingly planting in super glasshouses to control climate impacts. The glasshouses have climate-controlled retractable roof panels and walls which shield crops, or open them up to sun and rain.

<http://www.abc.net.au/news/2017-03-04/farmers-grow-crops-in-greenhouses-prevent-climate-change-effects/8321720>

World Environment Day climate action awards

Entries for the 2017 United Nations Association Australia (UNAA) World Environment Day climate action awards are now open in the following categories: Climate change leadership; Excellence in climate research; Clean energy; Infrastructure innovation for a strong climate future ; Protecting biodiversity from rapid climate change; Business climate action; Community climate action; Climate education and engagement; Local government climate action; and Media climate reporting. Entries close Friday 31 March.

<http://unaavictoria.org.au/world-environment-day-awards/>

Australian climate change science program

The Australian climate change science programme was the Australian Government's flagship climate change science programme from 1989 to 2016. Resources available from 27 years of research include information papers on rainfall, extreme weather, and research reviews.

<http://www.cawcr.gov.au/projects/Climatechange/resources/>

Earth Systems and Climate Change Hub

The Earth Systems and Climate Change Hub is a partnership of Australia's leading Earth systems and climate change research institutions, hosted by CSIRO. Its research addresses major challenges that the changing climate poses for Australia, encompassing water, food, natural resources, natural disasters and greenhouse gases.

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

EMISSIONS

Environmental impact of a loaf of bread

UK analysis of breadmaking from wheat growing to loaf, found that ammonium nitrate fertiliser used in wheat cultivation contributes almost half (43 per cent) of greenhouse gas emissions involved. This arises from the large amount of energy needed to make the fertiliser and from nitrous oxide gas released when it is degraded in the soil. Researchers believe the emissions can be reduced through improved agronomic practices that harness the best of organic farming, combined with new technologies to monitor the nutritional status of soils and plants, recycle waste, and utilise soil nitrogen more efficiently.

<http://www.sheffield.ac.uk/news/nr/loaf-bread-energy-1.684676>

SOILS

Enhancing beneficial microbial communities in cotton soils

This CRDC project found that some of the key microbial groups and functions in cotton soils are regionally specific and can be influenced by management involving specific crop types and fertiliser management strategies.

<http://www.insidecotton.com/xmlui/handle/1/4416>

Fungi increase carbon uptake in abandoned field soils

Netherlands research has found that in abandoned field soils, carbon uptake by fungi increases without an increase in fungal biomass or shift in bacterial-to-fungal ratio. The implication is that the efficiency of nutrient cycling and carbon uptake can increase by a shift in fungal composition and/or fungal activity.

<http://www.nature.com/articles/ncomms14349>

Biochar: A guide to analytical methods

This book describes a range of analytical procedures and techniques for biochar analysis. Biochar initially attracted attention for its potential to improve soil fertility and store carbon in a form that can remain stable for hundreds to thousands of years. It has since been found to have applications in environmental and water science, mining, and microbial ecology.

<http://www.publish.csiro.au/book/7478/#sthash.9z6VVtoG.dpuf>

WATER

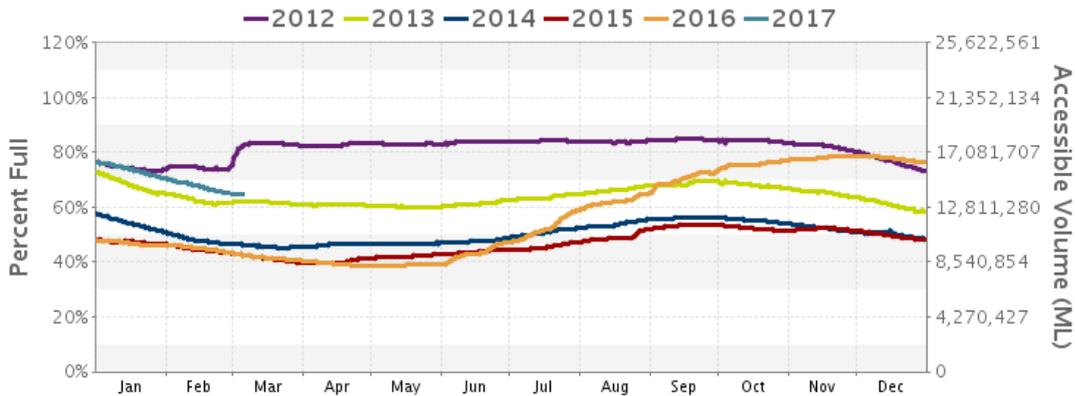
Precipitable water

Expect to hear more of this term. It refers to how much liquid water you would end up with if you condensed all of the water vapour above your head — from Earth's surface to the top of the atmosphere. There is increasing interest because a warmer atmosphere can hold more water vapour than a cooler one — about 7% more for every 1°C rise in temperature. As the planet warms, however, regions like southern Australia and northern California can expect more tropical rainfall events, even as average rainfall declines.

<https://theconversation.com/explainer-what-is-precipitable-water-and-why-does-it-matter-73358>

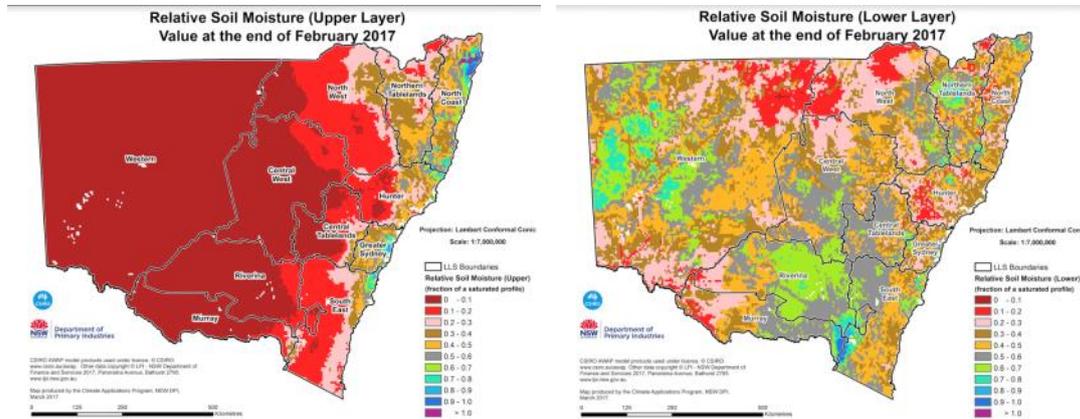
Water storages

New South Wales



<http://water.bom.gov.au/waterstorage/awris/#urn:bom.gov.au:awris:common:codelist:region.state:newsouthwales>

Soil moisture maps



<http://www.dpi.nsw.gov.au/climate-and-emergencies/droughthub/information-and-resources/regional-seasonal-conditions-reports>

Comments called for Water Resource Plans

Comments are invited on Water Resource Plan status and issues papers for the following eight plans by Friday 31 March: Gwydir alluvium, Lachlan alluvium, Macquarie-Castlereagh alluvium, Border Rivers alluvium, Barwon-Darling surface water, Namoi surface water, Murrumbidgee surface water, and Murray Lower Darling surface water.

<http://www.water.nsw.gov.au/water-management/water-resource-plans>

DipStik flood warning trial

NRMA and NSW SES are trialling a digital device, DipStik, to alert drivers to flooded areas. The 12 month trial is underway in areas prone to flash flooding in Campbelltown, Coffs Harbour, Dungog, Liverpool, Shellharbour and Wollondilly.

<https://www.youtube.com/watch?v=4xYQT0vqNq4&feature=youtu.be>

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BIODIVERSITY

Rabbit virus released

A Korean strain of calicivirus, RHDV1 K5, was released at more than 600 sites across Australia last month to reduce the impact of feral rabbits on agriculture and the environment. Unlike previous biocontrol releases, the K5 strain will not result in a 90 per cent reduction of pest rabbit populations but will help slow down the increase in rabbit numbers.

<http://www.pestsmart.org.au/boosting-rabbit-biocontrol-rhdv-k5-national-release/>

Threatened species prospectus

The Federal government is seeking financial support for protection of threatened species, particularly from the private sector. Many of the project proposals featured in the prospectus involve volunteers from community groups, including Landcare and 'Friends of' groups.

<http://www.environment.gov.au/biodiversity/threatened/species/threatened-species-prospectus>

ENERGY

State of solar 2016

The Climate Council reports that in 2017 over 20 new large-scale solar projects will come on line nationally. A further 3,700 MW of large-scale solar is in the development pipeline. Australia is expected to reach over 20GW of solar PV in the next 20 years, about a third of Australia's current generation capacity.

<https://www.climatecouncil.org.au/>



FOOD

Food now key theme in Australian curriculum

Food production and consumption are now key themes in Australia's Curriculum Connections project to support interdisciplinary learning. The food and fibre theme can be incorporated in to science, geography, mathematics, economics and business, history, design and social sciences. The food and wellbeing theme can be incorporated into science, mathematics, social sciences, design, and health.

<http://www.resources.australiancurriculum.edu.au/curriculum-connections/>

What role should UK producers have in feeding the UK?

This report was commissioned by Morrisons supermarket chain to promote the importance of the local food production economy. The report revealed that only 52 per cent of UK food comes from local sources and only 23 per cent of UK-consumed fruit and vegetables are grown in the UK.

<http://www.morrisons-corporate.com/Global/local-foodmakers/BritishFoodReportFeb2017.pdf>

New book: Food production and nature conservation

This book describes efforts to protect nature through globally connected protected area systems and illustrate how farming methods are being shaped to protect nature within agricultural systems.

www.routledge.com/p/book/9781138859395

New book: Sustainability challenges in the agrifood sector

This new book covers urban and rural agriculture and livelihoods, water-energy management, food and environmental policies, diet and human health

<http://au.wiley.com/WileyCDA/WileyTitle/productCd-111907276X,subjectCd-FO60.html>

LAND USE

NSW agricultural land use conflict

This UTS report commissioned by NSW DPI investigated the type and extent of agricultural land use conflict in NSW, how councils are managing conflict, and how councils can best be supported in conflict management. The findings benchmark the level and types of complaints about agricultural land use reported to NSW rural councils.

http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0007/699010/Right-to-farm-agricultural-land-use-survey.pdf

Digital land use tools

VegMachine and Forage are two digital land use tools. VegMachine uses satellite imagery to summarise decades of change in Australia's grazing lands. Forage is Queensland focussed, and provides information about rainfall, pasture, seasonal rainfall outlooks, ground cover, soil erodibility, land types, tree density and climate change projections in easy to read formats.

<https://www.longpaddock.qld.gov.au/forage/>

<http://vegmachine.net/>

Cities are eating farmland

An international study has concluded that by the year 2030 the world could lose 30 million hectares of farmland to cities, mainly in Asia and Africa, with forest lands likely be converted to farmland. In India, evidence indicates that forest-clearing has weakened summer monsoon rainfall. The croplands that will disappear by 2030 have productivity that is almost twice the global average and accounted for about 3-4 percent of global crop production in 2000.

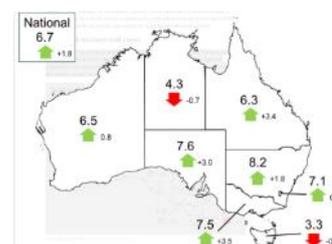
<http://www.pnas.org/content/early/2016/12/20/1606036114.full>

SUSTAINABILITY

Australia's environmental scorecard

After several dry years, vegetation across much of Australia received much-needed rains in 2016, but there was major environmental damage due to bushfires, drought and coral bleaching. You can assess your area's environmental scorecard.

<https://theconversation.com/australias-2016-environment-scorecard-rains-return-but-in-some-cases-too-late-72882>



Australia's state of the environment 2016

The main pressures facing the Australian environment today are the same as in 2011: climate change, landuse change, habitat fragmentation and degradation, and invasive species. In addition, the interactions between these and other pressures are resulting in cumulative impacts, amplifying the threats faced by the Australian environment.

<https://soe.environment.gov.au/download/reports>

<https://theconversation.com/five-yearly-environmental-stocktake-highlights-the-conflict-between-economy-and-nature-73964>

EVENTS

March 22	World Water Day http://www.worldwaterday.org/
April 28-29	Land for Wildlife Forum, Canberra http://www.cen.org.au
May 1-4	Australasian Vertebrate Pest Conference, Canberra http://avpc.net.au/
June 5	World Environment Day http://www.un.org/en/events/environmentday/
June 7	UNAA climate collaboration forum, Melbourne http://unaavictoria.org.au/world-environment-day-awards/#

SUBSCRIBE

NRM on Farms is a monthly NSW DPI 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, email Rebecca Lines-Kelly at rebecca.lines-kelly@dpi.nsw.gov.au.

Recent issues of NRM on Farms are available at <http://www.dpi.nsw.gov.au/content/agriculture/resources/climate-and-weather>