

NRM on farms



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

June 2016

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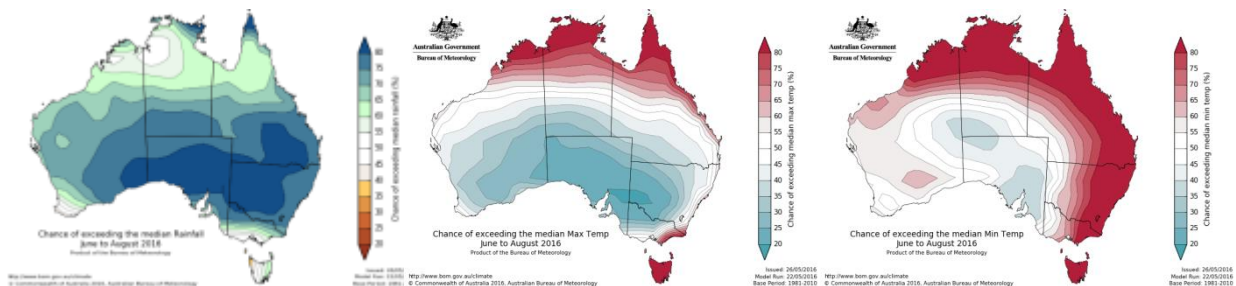
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CLIMATE

NSW seasonal outlook



The three month outlook for NSW features above-average rainfall across most of the state, average to cooler days and warmer nights, due to increasing odds for La Niña, negative IOD and very warm sea surface temperatures surrounding northern and eastern Australia. However, historical outlook accuracy for NSW winter rainfall is moderate to low.

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

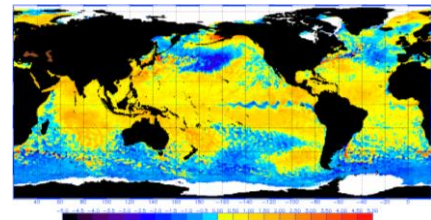
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

Equatorial temperatures have cooled in the eastern Pacific but remain warmer than normal in the west. Temperatures are more than 1°C warmer than average to the north and east of Australia, around Tasmania and in the Indian Ocean.

<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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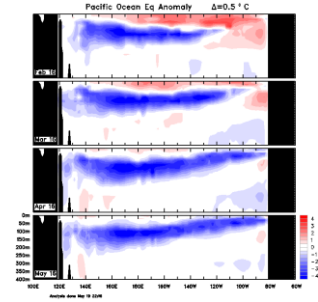


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Subsurface temperatures

Cool anomalies have spanned the entire equatorial Pacific since April. Most of the top 50 m of water west of about 150° W is now close to average.

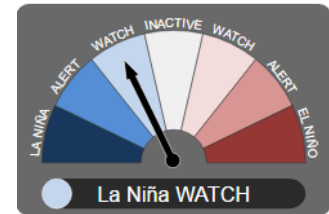
<http://www.bom.gov.au/climate/enso/>



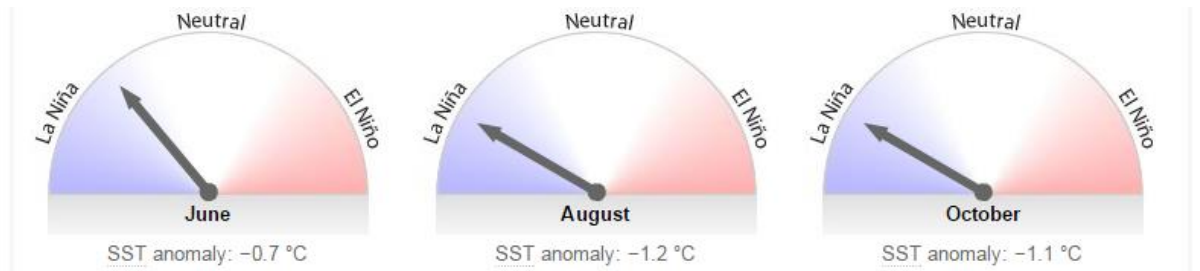
El Niño

The tropical Pacific Ocean has returned to a neutral ENSO state and outlooks suggest little chance of returning to El Niño levels. Six of eight models suggest La Niña is likely to form during winter, but individual model outlooks show a large spread between neutral and La Niña scenarios.

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



Model outlook

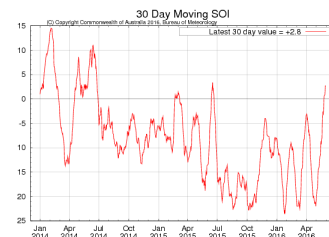


<http://www.bom.gov.au/climate/model-summary/>

SOI now neutral

The 30-day Southern Oscillation Index is in the neutral range and likely to rise further in coming weeks. Sustained positive values above +7 typically indicate La Niña.

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



IOD remains neutral

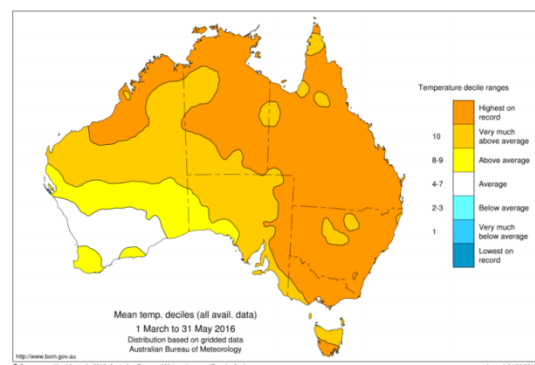
The Indian Ocean Dipole remains neutral but international models indicate negative IOD conditions are possible by June. However, model skill is generally lower at this time of year, and outlooks should be used with caution. Negative IOD events are more likely to occur during La Niña.

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

Warmest autumn on record

Autumn 2016 was warmest on record for Australia, NSW, Queensland, Victoria and NT. The national mean temperature for the season was 1.86°C above average. More than 53% of the country experienced highest on record mean temperatures.

<http://www.bom.gov.au/climate/current/statements/scs56.pdf>



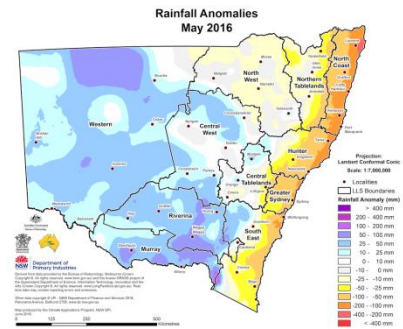
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NSW in May: wet, dry, hot and cold

NSW's May rainfall was 16.5% above average and the wettest since 2000, but very dry along the coast. Some inland stations recorded their wettest May day while some coastal stations recorded their driest May day since at least 1982. The mean temperature was 1.51°C above average and the sixth-warmest on record for May. South West Rocks recorded a minimum temperature of 22.2°C on the 10th, the state's warmest May night ever recorded. Some stations then recorded their coldest May night on record on the 30th!



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

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>

CLIMATE RESOURCES

Southern hemisphere levels of CO₂ pass 400ppm

Background atmospheric carbon dioxide levels officially passed the 400 parts per million mark on May 10 at Cape Grim on Tasmania's northwest coast, and on May 14 at Casey Station in the Antarctic. The increase is probably driven by increased emissions from fossil fuels, and the impact of the recent strong El Niño, which reduced the capacity of natural systems such as oceans and plants to absorb CO₂.

<https://blog.csiro.au/southern-hemisphere-joins-north-breaching-carbon-dioxide-milestone/>

Impacts of third strongest El Niño since 1950

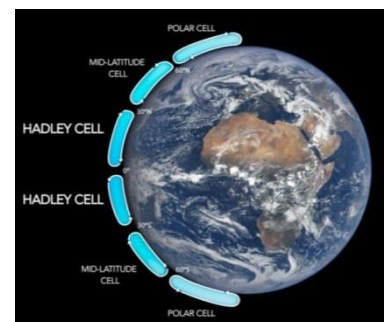
The 2015–16 El Niño is one of the three strongest El Niño events since 1950, with wide-ranging effects around the world. Impacts in Australia included the third driest spring on record, record October heatwave, three tropical cyclones, severe coral bleaching and severe fires in Victoria and Tasmania. El Niño also added to the globe's warming trend, making 2015 the world's hottest calendar year on record.

<https://theconversation.com/el-nino-is-over-but-has-left-its-mark-across-the-world-59823>

Tropics pushing clouds towards poles

NASA analysis of 30-years of satellite data suggests that high altitude clouds in the mid-latitudes are shifting toward the poles due to expansion of the tropics. Air in the tropics is heated at the surface by intense sunlight and rises. At high altitudes the tropical air currents blow into the high altitude clouds and push them toward the mid-latitudes. The warm air then sinks back to Earth. This circulation pattern is known as the Hadley Cell.

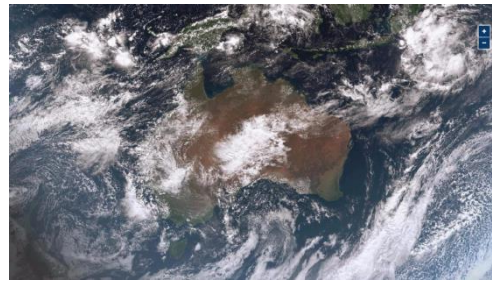
<https://www.sciencedaily.com/releases/2016/05/160505221206.htm>



Real time cloud cover

BoM has access to the stationary Japanese satellite Himawari 8 which updates every 10 minutes and shows cloud cover across Australia. The clouds do not necessarily indicate rain, but the site is useful for remote landholders with limited radar coverage.

<http://satview.bom.gov.au/>



Using rainfall data to improve grains production

Sydney University analysis concludes that while no single rainfall index is universally applicable, acceptance of early growing-season rains as an indicator seems common, along with acceptance of the variability of rainfall, the value of a soil moisture relationship, and the importance of preceding or continuous conditions. There is little doubt about the relationship between the climatic southern oscillation phenomenon and seasonal rainfall patterns in Australia, but its definition remains elusive. Data density might offer new opportunities to revisit simple indicators for seasonal forecasts. Combining research, climate models, crop models and simple indicators might deliver new insights and future value for grain producers.

<http://www.publish.csiro.au/nid/40/paper/CP15053.htm>

History of wetter wets and drier dries

Reconstruction of Australian rainfall patterns based on summer deposition of sea salt in Antarctic ice reveals wetter wet periods and drier dry periods over the past 1000 years than have occurred since European settlement. These results challenge the underlying assumptions that govern water resource management and infrastructure planning such as droughts rarely last longer than five years, and drought and flood risk do not change.

<https://theconversation.com/antarctic-ice-shows-australias-drought-and-flood-risk-is-worse-than-thought-59165>

What makes wheat sensitive to drought?

European research into spring wheat response to drought and heat stress found that stomatal conductance was the most sensitive variable to drought, followed by photosynthetic rate, leaf water potential and relative water content. Stomatal conductance measures the rate of passage of carbon dioxide entering, or water vapour exiting through the stomata of a leaf. Plants' sensitivity of stomatal conductance to soil drying reveals their adaptability to different drought and/or heat stress scenarios, which could be used for selecting cultivars.

<http://www.publish.csiro.au/nid/40/paper/CP15211.htm>

Maize and wheat response to drought

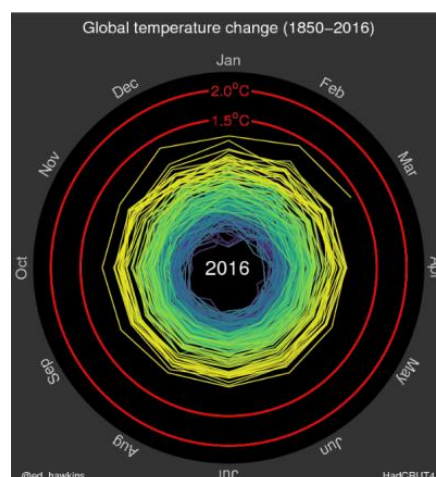
A US review of maize and wheat yield responses to drought has concluded maize experiences greater yield loss, possibly because it originates from a wetter region, is highly sensitive during its reproductive phase, and is equally sensitive to drought in dryland and non-dryland regions. Wheat's sensitivity to drought during vegetative and reproductive phases is considerably lower than that of maize. Wheat cultivation in dryland regions is more prone to yield loss than in the non-dryland regions.

<https://www.sciencedaily.com/releases/2016/05/160526115653.htm>

Temperature spiral

This new interactive graphic drawn up by Ed Hawkins, a climate scientist at UK's University of Reading uses a rainbow-colored spiral to record global temperatures from the late 19th century. The line showing temperatures in the first few months of 2016 is warmer than 2015 which was the hottest year on record.

<http://www.climate-lab-book.ac.uk/>



Climate indicator dashboard

Carbon Brief's new dashboard on key climate change indicators allows users to sort and view the data in a variety of ways. For example, you can see how Arctic sea ice has changed since 1979.

<http://www.carbonbrief.org/data-dashboard-climate-change>

Review of Australian climate science capability

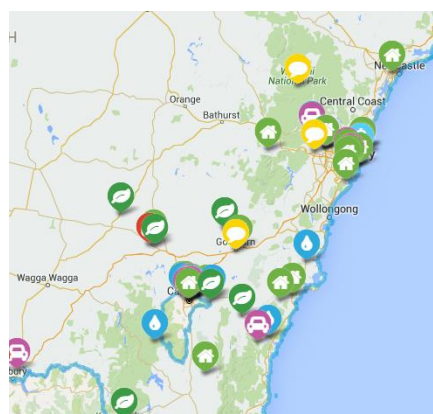
The Australian Academy of Science is conducting a review of Australian climate science capability and future requirements, in order to better understand the capabilities (including expertise and infrastructure) that are needed in Australia. Submissions close on 5 June with the report due in late July.

<https://www.science.org.au/supporting-science/other-initiatives/australian-climate-science-capability-review>

Mapping grassroots adaptation

NSW residents are invited to record their climate adaptation activities on the interactive social pinpoint platform run by CSIRO and the Institute for Sustainable Futures. Farming adaptations noted so far include earlier cherry picking, reduced stocking, rotational grazing, revegetation and soil moisture capture.

<https://csiro.mysocialpinpoint.com/adapt#/>



Climate change and housing

A new Climate Institute report details the risks housing faces with a changing climate, and the role of banks and insurers in promoting risk reduction and climate adaptation for Australian housing.

http://www.climateinstitute.org.au/verve/_resources/TCI-There-goes-the-neighbourhood-FINAL-300516.pdf

Climate impacts on food security and livelihoods in Asia

This booklet reviews the current state of knowledge on the relationship between climate change and food security in Asia.

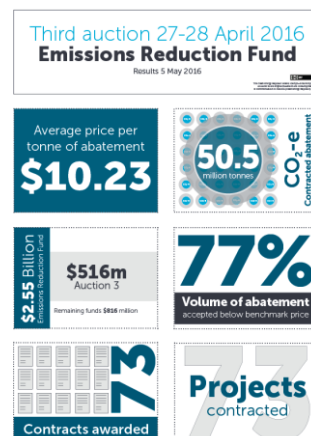
<http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp281745.pdf>

EMISSIONS

ERF auction results

The third Emissions Reduction Fund auction saw 73 Carbon Abatement Contracts awarded to 33 participants. The auction contracted 50.4 million tonnes of abatement at an average price per tonne of abatement of \$10.23 for a total value of \$516 million. After three auctions a total of 309 carbon abatement contracts have been awarded to deliver 143.2 million tonnes of abatement. Most contracts are for vegetation methods. The Clean Energy Regulator has committed a total of \$1.7 billion from the \$2.55 billion allocated to the fund.

<http://www.cleanenergyregulator.gov.au/ERF/Auctions-results/april-2016>



Farmer behaviour under climate policy

NZ modelling of farmers choosing to abandon or afforest marginal land under emissions policy found that farmers in intensive farm classes such as dairying tend to bear the costs of emissions because their opportunity cost of exiting pastoral agriculture is high. In more extensive systems the dominant response is land abandonment or afforestation, depending on location.

http://motu-www.motu.org.nz/wpapers/16_09.pdf

Energy indicator dashboard

Carbon Brief's new dashboard for key energy indicators includes data on energy generation and consumption and greenhouse gas emissions around the globe.

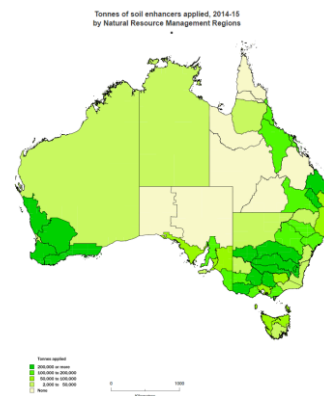
<http://www.carbonbrief.org/data-dashboard-energy>

SOILS

On farm use of soil enhancers 2014-15

ABS statistics show that 22% of all agricultural businesses in Australia used soil enhancers on 4.6 million hectares of land in 2014-15, a 19% increase in the number of businesses and a 12% increase in land area compared with 2013-14. Use of Lime and/or dolomite accounted for 53% of the area on which all soil enhancers were applied.

<http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4627.0Main%20Features62014-15>



APsoil database

APSoil is a database of soil water characteristics to estimate plant available water capacity for individual soils and crops. It covers many cropping regions of Australia and is regularly updated. Users can view individual soil and crop species data, develop personal APSoil directories of locally relevant soils and modify soils to fit local conditions.

<http://www.apsim.info/Products/APSoil.aspx>

Churchill tour of compost facilities around the world

Jono Craven, agribusiness manager with Gippsland Water, is travelling the world on a Churchill fellowship investigating compost facilities, and documenting his findings in videos.
http://www.touchcast.com/jonos_ccc/

UK Soil Farmer of the Year

Staffordshire cropper Clive Bailye is the winner of the inaugural UK soil farmer of year competition to find farmers and growers engaged with and passionate about managing their soils to support productive agriculture, reduce greenhouse gas emissions and build soil organic matter and carbon.
<http://www.farmcarbontoolkit.org.uk/component/content/article/3-news/546-130516-soil-farmer-of-the-year-announced>

WATER

Australian Landscape Water Balance

BoM's Australian Landscape Water Balance is an interactive website which provides Australia-wide information on key landscape water balance components including soil moisture, runoff, evapotranspiration, deep drainage and precipitation in near real time. Information can be visualised, investigated and downloaded at the continent, catchment and point scale.
<http://www.bom.gov.au/water/landscape/>

Lucerne can recover from water deficit

A five year field trial into irrigated lucerne in Victoria has found that while production is directly related to total water use, plants are able to fully recover once a full irrigation regime is resumed. This makes lucerne an ideal forage species when water is limiting.
<http://www.publish.csiro.au/nid/40/paper/CP15159.htm>

Causes of Murray algal blooms

The Murray River has seen four major algal blooms since 2007. The first three in 2007, 2009 and 2010 occurred during the Millennium Drought after the Lake Hume water level was drawn to below 10% of the lake's capacity, enabling mixing of warm surface waters with nutrient rich subsurface water. This year's bloom was different in that it featured *Chrysosporium ovalisporum*, a species not seen since monitoring began in 1978, but which flourishes when water temperatures reach 26 degrees. While the exact cause of the 2016 bloom is not yet known, both the maximum and minimum temperatures in the Riverina were consistently above the long-term average in the past few months, as was the amount of sunlight reaching the surface of Lake Hume.
<https://theconversation.com/are-toxic-algal-blooms-the-new-normal-for-australias-major-rivers-59526>

WA online soil water tool

WA grain farmers can now access an online soil water tool to identify how soil water that has accumulated from 1 November through the grain growing season. Growers can view the model results for 10 different soil types, which take into account evaporation rates based on either a fallow or cropped scenario.
<https://www.agric.wa.gov.au/climate-weather/soil-water>

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Cheapest and most effective ways to restore rivers

Research into the cheapest and most effective way to address threats to freshwater biodiversity recommends restoring rivers. This might include fencing out livestock, stabilising river banks, removing weeds, replanting native vegetation and expanding floodplain areas. Restorative farm practices include rotating pasture, reducing erosion through smart burning practices, and better management of pesticides and nutrients.

<https://theconversation.com/we-all-live-downstream-its-time-to-restore-our-freshwater-ecosystems-58934>

Artesian Basin atlas

The Hydrogeological Atlas of the Great Artesian Basin condenses geological and hydrogeological data into a series of 55 maps for use by water managers, researchers, industry, farmers, community groups and the general public.

<http://www.ga.gov.au/news-events/features/navigating-australias-largest-groundwater-resource>



BIODIVERSITY

New atlas of soil biodiversity

This new atlas, available free online, is an excellent introduction to soil biota from burrowers to microbes, with close up photographs and colourful maps. The atlas illustrates the diversity of soil organisms, explains their distribution and the ecosystem functions and services they provide, outlines the threats they face, and shows what we can do to help.

<http://esdac.jrc.ec.europa.eu/content/global-soil-biodiversity-atlas>

Rising CO2 reduces pollen protein concentration

US analysis of goldenrod pollen from 1842 to 2014 has found a strong significant correlation between recent increases in atmospheric carbon dioxide and reduced concentrations of pollen protein concentration in goldenrod, a widely available autumnal food source essential to native bee and honeybee health and winter survival.

<http://rspsb.royalsocietypublishing.org/content/283/1828/20160414>

Living with flying foxes

This overview by NSW wildlife ecologists explains why flying foxes move into urban areas and the need for a uniform federal approach for managing flying-foxes in human landscapes.

<https://theconversation.com/not-in-my-backyard-how-to-live-alongside-flying-foxes-in-urban-australia-59893>

First report on the state of the world's plants

This report assesses current knowledge on the world's plant diversity, the threats that plants face, and effectiveness of current policies to protect them. Science has documented around 391,000 vascular plants with 2000 new species described annually. At least 31,000 species have a documented use for medicines, food, materials and so on. Plant species of critical importance to global food security are the wild relatives of current crops.

<http://www.kew.org/discover/news/state-worlds-plants-report-released-kew>

WA biodiversity hotspot declining due to low rainfall

A quarter of the woody vegetation of WA's global biodiversity hotspot has disappeared in the past 16 years and the decline is likely to continue due to decreasing rainfall in the region. The hotspot stretches from Shark Bay in the Gascoyne to beyond Esperance in the south-east and to the south-west corner. It is one of only 34 hotspots around the world—areas that are under threat and recognised for their incredible biodiversity and for homing plant and animal life that occurs nowhere else on the globe.

<http://www.sciencewa.net.au/topics/environment-a-conservation/item/4153-biodiversity-hotspot-vegetation-has-shrunk-by-a-quarter>

ENERGY

Tiered approval for renewable energy systems

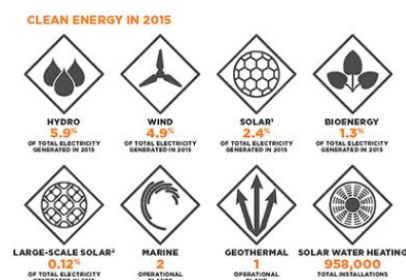
The NSW Government has introduced a tiered approvals regime for renewable energy systems. Large-scale proposals are considered as state significant development under the Environmental Planning and Assessment Act 1979. Small-scale proposals covered by the Infrastructure SEPP such as photovoltaic systems, solar hot water systems, solar air heating systems, small wind turbine systems and wind monitoring towers may be classified as exempt, complying or permitted.

<http://www.planning.nsw.gov.au/Policy-and-Legislation/Renewable-Energy>

Clean Energy Australia 2015

The Clean Energy Australia Report 2015 reports that five new wind farms were completed in 2015, along with eight solar farms larger than 1 megawatt of capacity. Two of the three largest solar plants in the country, at Nyngan and Broken Hill became operational during 2015, while the Moree Solar Farm officially launched in early 2016.

<https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>



Increasing support for renewable energy

Australian states and territories are increasingly supporting renewable energy according to the Climate Council's recent report. Most states are now setting targets, implementing policies or providing financial support for local renewable energy

<http://www.climatecouncil.org.au/uploads/2acac0b824742ec83f99676255ae5a81.pdf>

Energy efficiency training and resources

The NSW Office of Environment and Heritage offers training and resources to help agribusiness improve energy efficiency, including workshops for farmers to reduce electricity and diesel costs.

<http://www.environment.nsw.gov.au/business/efficient-agribusiness-irrigation.htm>

FOOD

Dietary guidelines around the world

A new report from FAO and the Food Climate Research Network evaluates government-issued food-based dietary guidelines from across the globe, including Australia, looking in particular at whether they make links to environmental sustainability as well as personal health.

http://www.fcrn.org.uk/sites/default/files/ppp_final_10-5-2016.pdf

Foodbytes online resource

Foodbytes is a free online learning resource that provides a clear and scientifically robust overview of the many interlinked issues connected to our food system. It describes why and how food has become a focal point for social, environmental and ethical concerns.

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

LAND USE

NSW Coastal Management Act 2016

NSW's new Coastal Management Act, replacing the Coastal Protection Act, has been introduced to Parliament and is awaiting assent. The Act recognises natural coastal processes and the locally and regionally dynamic character of the coast, and promotes land use planning decisions that accommodate them. The new Act will be supported by a redesigned package of land-use planning instruments.

<http://www.environment.nsw.gov.au/coasts/coastreforms-act.htm>

ABS land use statistics 2014-15

In 2014-15 384.6 million hectares of Australian land were owned or operated by 123,000 agricultural businesses, a 5.3% reduction in land area and a 4.2% reduction in the number of agricultural businesses since 2013-14. Over 80% of the land was used for grazing. Improved pastures decreased by 25% and cropping land decreased by 2.8% overall, although Tasmania reported a 3.9% increase in land used for crops.

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

Land use change can increase returns

CSIRO modelling of land use change and sustainability for Australia to 2050 found substantial potential for land-use transition from agriculture to carbon plantings, environmental plantings, and biofuels cropping under certain scenarios. Land-use responses can substantially increase and diversify economic returns to land and produce a much wider range of ecosystem services such as emissions abatement, biodiversity, and energy, without major impacts on agricultural production. However, better governance is needed for managing potentially significant water resource impacts.

<http://www.sciencedirect.com/science/article/pii/S0959378016300231>

SUSTAINABILITY

Learning from agri-environment schemes

What have we learned from more than two decades of agri-environment schemes in Australia? This book, available free online, provides short, engaging chapters that cover a wide spectrum of environmental, agricultural and social issues involved in agri-environment schemes.

<http://press.anu.edu.au/publications/learning-agri-environment-schemes-australia/download>

Tas Farming Futures

Tas Farming Futures provides information on farming systems, including case studies, based on the understanding that soil and crop health, and pasture and livestock health and productivity, are critically linked to profitability and long term viability.

<http://www.tasfarmingfutures.com.au/>

National principles for environmental information

Australia's ten principles for environmental information aim to make national environmental information easy to access and use.

<http://www.bom.gov.au/environment/doc/national-principles-for-environmental-information.pdf>

Primary industries education conference

Presentations from the Primary Industries Education Foundation Australia conference held in Canberra in May are now available online.

<http://www.piefa.edu.au/conference2016/>

EVENTS

May 24-26	Irrigation Australia International Conference and exhibition, Melbourne http://irrigationaustralia.com.au/
June 6-8	6th National NRM Knowledge conference, Coffs Harbour http://conference.nrmregionsaustralia.com.au/
July 5-7	Climate change adaptation 2016 conference, Adelaide http://climate-adaptation.org.au/events/climate-adaptation-2016/
September 28-30	Bushfire 2016, Brisbane http://www.bushfire2016.org/
December 4-8	7th International Nitrogen Initiative Conference, Melbourne http://www.ini2016.com/
March 26-28, 2017	2nd Agriculture and Climate Change Conference, Barcelona http://www.agricultureandclimatechange.com/

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.

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