

NRM on farms



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

June 2017

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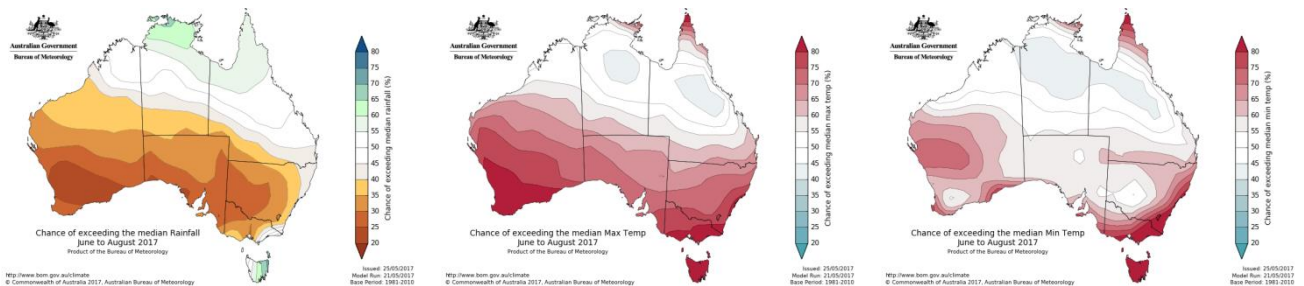
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CLIMATE

Below average rainfall for southern Australia



The seasonal outlook continues to be drier and warmer than average for the southern half of mainland Australia. Climate influences include warmer than average tropical Pacific Ocean sea surface temperatures and a cooler eastern Indian Ocean

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

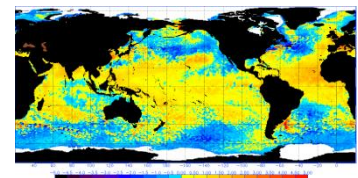
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

There has been a general cooling across all areas, with average temperatures in the west, and weak warm anomalies in the east, south of the equator, and around NZ 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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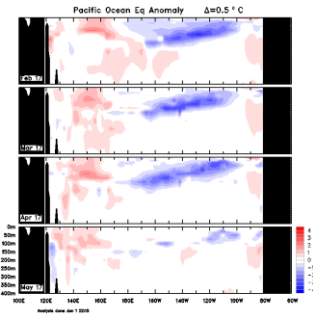


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Average subsurface temperatures

Water temperatures in the sub-surface of the equatorial Pacific are generally near average.

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



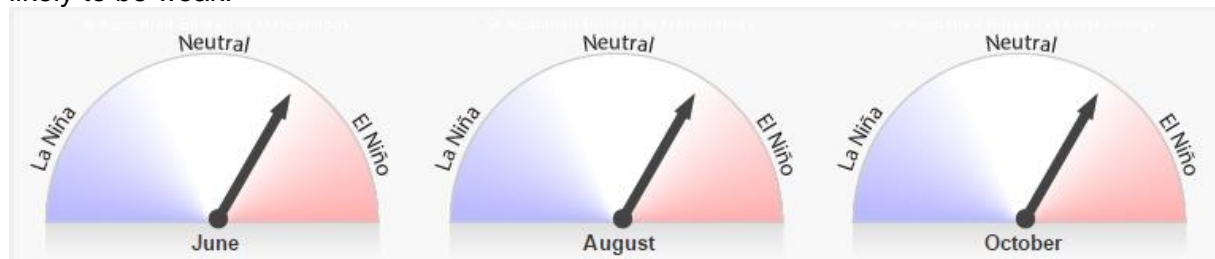
El Nino indicators have stalled

Several El Niño indicators have shown little or no increase for several weeks, suggesting El Niño development has stalled for now. El Niño WATCH status remains in place.

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

Models reduce possibility of El Nino

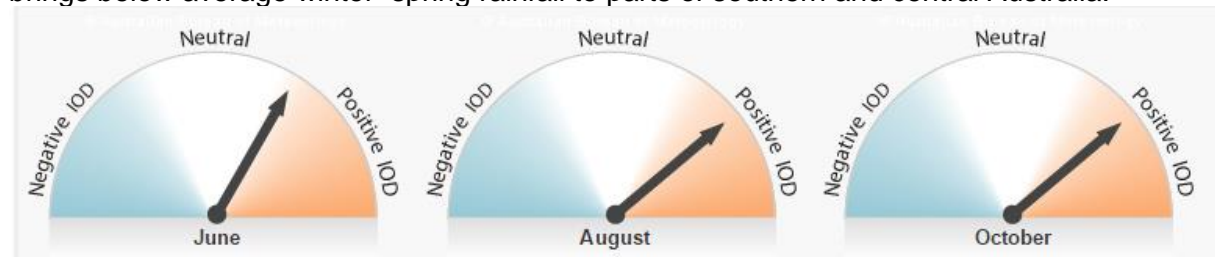
Four of eight international climate models suggest tropical Pacific Ocean temperatures may exceed El Niño thresholds during the second half of 2017, down from seven of eight models that were forecasting a possible event in April. Virtually all models have reduced the extent of predicted ocean warming compared to earlier in the year, indicating that if El Niño forms, it is likely to be weak.



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

Positive IOD may develop over winter

The Indian Ocean Dipole (IOD) is currently neutral, but four of the six surveyed models indicate a positive IOD is likely to form during winter. However, model skill is low at this time of year, so caution should be exercised when using these forecasts. A positive IOD typically brings below average winter–spring rainfall to parts of southern and central Australia.

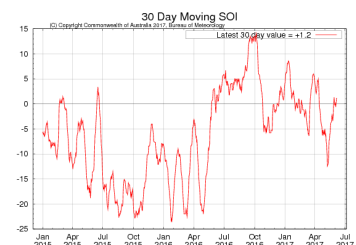


<http://www.bom.gov.au/climate/enso/#tabs=Indian-Ocean>

SOI moves back to neutral

After diving into negative in May, the SOI has returned to neutral territory, not indicating El Niño or La Niña.

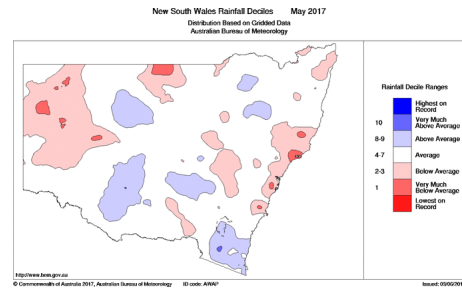
<http://www.bom.gov.au/climate/enso/#tabs=SOI>



Average month for NSW

Rainfall was average to below average across much of NSW during May, although daily rainfall records were broken in parts of central NSW on the 20th. Daytime temperatures were warmer than average, particularly in the north of the State, while overnight temperatures were close to average with a cool end to the month.

<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.

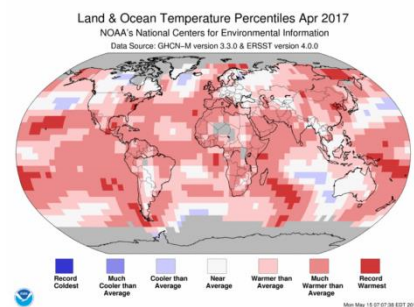
<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

GLOBAL CLIMATE

Global temperatures in April

Global temperatures in April were the second highest for April in 138 years of record, just behind April 2016. Land surface temperatures were the fourth highest for April, tying with 2000 and 2010; ocean temperatures were the second highest, behind 2016.

<https://www.ncei.noaa.gov/news/global-climate-201704>



Centre for Southern Hemisphere Oceans Research

Recent research has highlighted the profound influence of the southern oceans on climate variability and change, but much remains unknown. The new Centre for Southern Hemisphere Oceans Research will focus on future El Niño-La Niña cycles, the effect of interactions of El Niño, IOD and southern annual mode on climate variability, and the role of oceans north of Australia in influencing regional and global climate, as well as sea level rise, and ocean warming and acidification. The centre, to be based in Hobart, is a partnership between Qingdao National Laboratory for Marine Science and Technology in China and CSIRO, UNSW and University of Tasmania.

<https://blog.csiro.au/new-research-centre-focuses-on-the-ocean-hemisphere/>

CLIMATE IMPACTS

Projected drop in global crop production in future decades

New analysis of global crop production for maize, wheat, rice, and soybeans estimates that climate change could reduce production by 9% in the 2030s and by 23% in the 2050s due to extreme temperature and precipitation during crop growing months which, in turn, exacerbate year-to-year fluctuations of food availability and increase price volatility.

<https://link.springer.com/article/10.1007/s41885-017-0005-2>

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European wheat and barley yields will decline

US research estimates that climate change will likely cause wheat and barley yields in Western Europe to decline by 17-33% by the end of the century, and will lessen the rate of any yield improvements that will be achieved by technological advances.

<http://iopscience.iop.org/article/10.1088/1748-9326/aa6b0c>

Limiting warming will reduce heat extremes

Australian research shows that limiting global warming to 1.5 °C, relative to 2 °C, would perceptibly reduce the frequency of extreme heat events in Australia. Events similar to the record hot summer of 2012–2013 and warm seas associated with bleaching of the Great Barrier Reef in 2016 would be about 25% less likely if warming is kept to lower levels. The benefits of limiting warming on hydro-meteorological extremes are less clear.

<https://www.nature.com/nclimate/journal/v7/n6/full/nclimate3296.html>

Event		Associated impacts	Natural	Current	1.5 °C	2 °C
Angry summer 2012–2013		Severe heatwaves, Power blackouts, Bushfires	3% (1–5%)	44% (36–52%)	57% (50–65%)	77% (70–84%)
Coral Sea heat JFM 2016		Worst coral bleaching event on record	0% (0%)	31% (22–40%)	64% (53–76%)	87% (78–93%)
NE Australia rain December 2010		Widespread floods, Dozens of deaths	1% (0–2%)	2% (0–2%)	1% (1–1%)	1% (1–2%)
SE Australia drought 2006	Low rainfall	Water restrictions, Reduced crop yields	1% (1–2%)	2% (1–3%)	3% (1–4%)	3% (1–4%)
	High temperatures		1% (0–1%)	35% (28–42%)	52% (45–59%)	74% (67–81%)

Higher temperatures reduce gut microbiota diversity

European research has found that 2–3 °C warmer climates cause a 34% loss of gut microbiota diversity of the common lizard. The mechanisms driving this decline are not clear, but potential pathways include changes to the hosts' environment (for example, altered prey) or changes to the hosts themselves (for example, immunity). Irrespective of the pathway, higher gut bacterial diversity tends to be beneficial to hosts so climate-driven diversity reduction could turn out to be detrimental.

<http://www.nature.com/nclimate/journal/v7/n6/full/nclimate3311.html>

Deadliest weather events

The World Meteorological Organisation's world weather & climate extremes archive has announced the highest reported historical death tolls from tropical cyclones, tornadoes, lightning and hailstorms since 1873 when the International Meteorological Organisation was established. These occurred during the 1970 Bangladesh cyclone, the 1989 Bangladesh tornado, lightning strikes in Egypt in 1994 and Rhodesia in 1975, and the 1888 hailstorm in India.

<https://wmo.asu.edu/>

CLIMATE TOOLS

Shady practice to combat apple sunburn

A recent Australian study has shown that sunburn risk will increase as climate change progresses. Netting can provide protection from this risk, but the degree of protection depends on the growing region and future time period.

<https://landcareaustralia.org.au/project/shady-practice-combat-apple-sunburn/>

Australian farmers are adapting to climate change

ABARES analysis of Australian crop yields has found that after controlling for climate, there has been relatively strong productivity growth on cropping farms over the past decade, because the farms have improved productivity under dry conditions and minimised their exposure to climate variability.

This contrasts with the 1990s, when farms focused more on maximising performance in good conditions at the expense of increasing their exposure to drought. Farmers are adapting to new seasonal trends of rainfall, which for most cropping farms means less rain in winter and more in summer. Winter cropping farms now better exploit soil moisture left from the summer period and have shifted to conservation tillage, so that crop residues are left in a field when planting the new crop.

<https://theconversation.com/australian-farmers-are-adapting-to-climate-change-76939>



Spring temperatures are important grape maturity indicator

A new Victorian study found that springtime temperatures are important for calculating maturity timing, while mean January temperatures showed little correlation. All regions studied are experiencing warming temperatures during the growing season, emphasising the need to re-evaluate climate indicators in viticulture.

<https://link.springer.com/article/10.1007/s00484-017-1370-9>

CoastAdapt final version released

The final version of CoastAdapt has been released after extensive consultation. It includes new temperature and rainfall extremes data, new case studies and snapshots, and a guide to hazard mapping for local councils.

<https://coastadapt.com.au/>

Disaster and climate resilience group

The Australian Government has established a Disaster and Climate Resilience Reference Group to integrate risk and resilience considerations into planning, policies and programs of government departments to meet commitments under the Sendai Framework and the Paris Agreement on climate change. The Sendai Framework is a 15-year, voluntary, non-binding agreement which recognises that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government and the private sector.

<http://www.unisdr.org/archive/52874>

US agricultural views and decisions on climate change

This review finds that although the majority of US farmers believe the climate is changing, many are sceptical, and uncertain about its causes. Mitigation and adaptation decisions vary widely and are often correlated with belief or personal experience. The findings highlight the importance of understanding farmers' views, actions and issue framing, and the implications for researchers, extension and policy makers.

<http://onlinelibrary.wiley.com/doi/10.1002/wcc.469/abstract?campaign=wolearlyview>

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Gardening in a changing climate

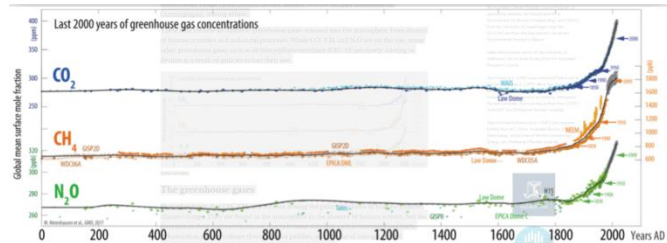
This UK publication by the Royal Horticultural Society provides details on climate change and impacts, and appropriate strategies for gardeners.
<https://www.rhs.org.uk/science/pdf/RHS-Gardening-in-a-Changing-Climate-Report.pdf>



EMISSIONS

2000 years of greenhouse gases

Australian analysis of 2000 years of records of 43 greenhouse gases in current and archived air samples, air trapped in bubbles in ice cores, and compacted snow show that the growth of greenhouse gases began with the onset of the industrial era around 1750, took a sharp turn upwards in the 1950s, and still continues today. The aggregate warming effect of carbon dioxide, methane and nitrous oxide today is higher than at any time over the past 800,000 years, according to ice core records.
<https://theconversation.com/global-stocktake-shows-the-43-greenhouse-gases-driving-global-warming-77796>

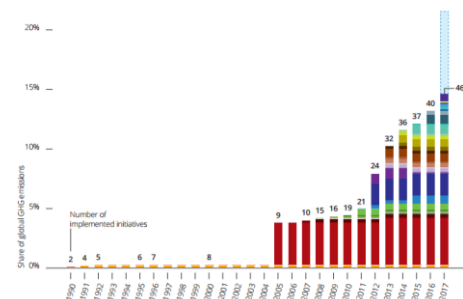


The Paris climate agreement at a glance

With the Paris climate agreement in the news, this infographic is a useful summary of the agreement's key points. Signed by 196 nations, it is the first comprehensive global treaty to combat climate change, and will follow on from the Kyoto Protocol when it ends in 2020. It will enter into force once it is ratified by at least 55 countries, covering at least 55% of global greenhouse gas emissions.
<https://theconversation.com/the-paris-climate-agreement-at-a-glance-50465>

Global carbon pricing initiatives

Some 40 national and over 20 sub-national jurisdictions responsible for almost a quarter of global greenhouse gas emissions are putting a price on carbon. These initiatives cover about 12% of global emissions. Australian initiatives are shown as bright purple in the chart at right, above Japan's initiatives in dark blue and EU initiatives in red.
<https://openknowledge.worldbank.org/handle/10986/26565>



Carbon sequestration for mitigation and adaptation

This new book quantifies changes in different reservoirs and fluxes of carbon, especially after the industrial revolution, and covers the role of different mitigation options – natural ecological, engineered, and geo-engineered processes as well as the emerging field of climate engineering in avoiding dangerous abrupt climate change.
<http://www.springer.com/gp/book/9783319538433>

SOILS

Soil organic carbon responds to rainfall

NSW research into soil organic carbon levels around Guyra over three years found no change under agricultural systems, but native woodland systems showed a significant increase in response to high rainfall in 2010–11. Researchers concluded that the quantity of soil carbon and its component fractions has natural variability and responds rapidly to rainfall, but these effects are moderated by land use and SOC inputs.

<http://www.publish.csiro.au/SR/SR16205>

Biochar and compost use in horticulture

NSW DPI research into the impacts of compost and biochar on banana, blueberry and melon crops found that biochar increased soil C stock (0-30cm) and helped retain higher C levels for longer than compost. Changes in some soil and crop quality properties over the two years of the project suggested potential longer term improvements, including increased soil moisture and CEC, higher soil pH, and superior crop quality. However, there were no yield gains over the two years which, given the costs of the biochar and compost, might preclude grower use.

https://www.youtube.com/watch?v=7ktDdY_nsJ4

Compost and chicken litter benefit soil

A Victorian organic amendments trial has found that application of compost and chicken litter can increase organic carbon, crop biomass and yield in a cropping system, although the extra production does not cover for the cost of organic materials used.

<http://www.wgcma.vic.gov.au/for-landholders/gippsland-soil-trials/organic-amendments-to-increase-carbon-in-cropping-soils>

\$9.2 million for dung beetle project

Meat & Livestock Australia will receive \$9.2 million to look at ways to use dung beetles to increase farm productivity and profitability. This project will roll-out dung beetle services to a network of over 1000 producers and producer groups. Dung beetle activity can improve soil and pasture health, reduce spread of flies, pests and diseases, and reduce nutrient run off into waterways. CSIRO's 1965-1985 dung beetle project introduced 23 species of dung beetles to Australia, improved the quality and fertility of Australian cattle pastures, and reduced bushfly numbers by around 90%.

<http://minister.agriculture.gov.au/joyce/Pages/Media-Releases/dung-beetles-rd.aspx>

All the Dirt newsletter

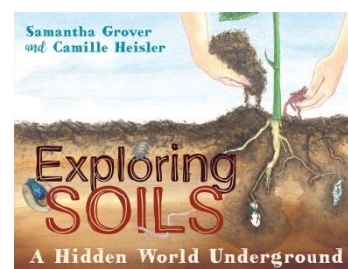
All the Dirt is a free quarterly NSW DPI newsletter covering latest soil research, publications, web resources and coming events. It is edited by DPI soil development officer Abigail Jenkins. Subscribe at the link below.

<http://mailchi.mp/54f769084b4a/autumn-2017-issue-of-all-the-dirt?e=94436609ea>

Exploring soils: children's book

La Trobe University soil scientist Samantha Grover has written a children's book on soils, road-tested on her children.

<http://www.publish.csiro.au/book/7464/>



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How soil health sparked agriculture change

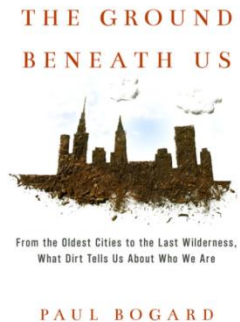
This article outlines how the US soil health movement has introduced agroecological farming practices to mainstream agriculture.

<https://ensia.com/features/soil-health/>

Why you need more dirt in your life

This National Geographic article features an interview with Paul Bogard, author of a new book, 'The ground beneath us'. His research was stimulated by the realisation that Westerners spend 90% of their time inside, separated from the natural world.

<http://news.nationalgeographic.com/2017/04/soil-dirt-ground-beneath-us-bogard/>



WATER

NSW water storage levels

Accessible volume - New South Wales



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

Local data helps farmers irrigate and maintain flow

Combining local data from public and private water meters, rain gauges, soil moisture sensors, rainfall and streamflow forecasts into a real time website, has enabled a group of Tasmanian irrigators to closely manage their pumping practices so that they can irrigate and maintain river flow. The scheme has been so successful that in one of the driest periods in recent history for Tasmania, the group got through most of the year without any 'cease to take' orders from the water regulator.

<https://blogs.csiro.au/ecos/sense-t/>

Inquiry into water use efficiency

A parliamentary inquiry into WUE in Australian agriculture is seeking feedback from farmers, irrigators and community leaders around Australia on how the Government can invest in water infrastructure to enable farmers and communities to extract the maximum value out of each drop of water. So far it has received 41 submissions.

<http://www.aph.gov.au/wue>

Centre of Irrigation Excellence

Irrigation Australia's new Centre of Irrigation Excellence website is a platform for industry knowledge, training and development. The Centre aims to become a one-stop shop for irrigation employers/employees, students and industry stakeholders to find and learn more about training, industry knowledge, career pathways, career development and study tour programs.

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



MDB river stories

River Stories is an online exhibition of people and their links with the rivers in the Murray-Darling Basin, curated by ANU historian Cameron Muir. It provides local 'lived' history in parallel with key political events set against the background of changing perspectives on water and the environment, under the themes of vision, striving, heartbreak, care and joy.

<http://riverstories.mdba.gov.au/home/>

Global network of water museums

A recent workshop in Venice aims to develop a global network of water museums and major archaeological sites related to water civilisations. The current network features mainly Italian museums, but it is hoped this will expand to include other countries' museums.

<http://www.watermuseumofvenice.com/network-en>

BIODIVERSITY

Review of travelling stock reserves

The NSW Government is currently seeking community input to determine which TSRs are still used or required for their original purpose, and whether they are important for other reasons. There are more than 6,500 TSRs on Crown land in NSW, covering approximately two million hectares. Submissions close at 5 pm Thursday 22 June 2017.

<https://www.nsw.gov.au/improving-nsw/have-your-say/nsw-travelling-stock-reserve-review/>

Pestpoint: online pest identification

Pestpoint provides a secure web-space for online communities to identify damaging plant pests. It comprises a web browser for connecting people so that they can diagnose a pest problem and an iPad app for collecting field information.

<http://www.pbcrc.com.au/pestpoint>

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

Dingoes and biodiversity

A two year Australian study into the impact of predator-friendly farming practices concludes that protecting dingoes and improving husbandry practices, such as dam maintenance, is likely to increase survival and welfare of cattle significantly, as well as improve economic outcomes on large stations. Ending lethal control and allowing the predator's social structure to stabilise can reduce livestock losses.

<https://phys.org/news/2017-02-predator-friendly-farminggood-livestock-dingoes-bottom.html>

<https://theconversation.com/why-do-some-graziers-want-to-retain-not-kill-dingoes-77457>

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Changed practices improve farming life and biodiversity

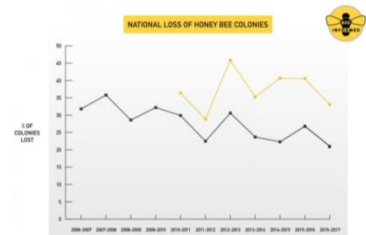
This case study from the ANU ecology group working with farmers to monitor biodiversity on farms has found that changing from cropping to grazing helped one farmer rejuvenate the landscape, and improve livestock health and farming lifestyle.

<http://reporter.anu.edu.au/saving-farm-and-farmers>

US beekeepers lose a third of their bees

US beekeepers across the United States lost 33 percent of their honey bee colonies in the 12 months to April 2017. However, rates of both winter loss and summer loss improved compared with last year. Winter losses were the lowest recorded since the survey began in 2006-07.

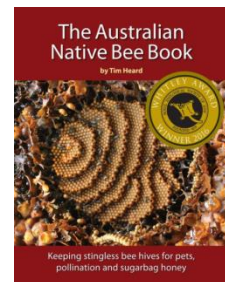
<https://www.sciencedaily.com/releases/2017/05/170525100249.htm>



Australian native bee book wins book award

The Australian Native Bee Book by former CSIRO entomologist Tim Heard has won the Small Publishers' Adult Book of the Year at the 2017 Australian book awards. The book aims to present enough technical information to satisfy a scientific readership, while creating an accessible, practical manual for anyone keeping backyard bees.

www.nativebeebook.com.au



NSW nature conservation in the 1950s-60s

This book, by Allen Strom, NSW's chief guardian of fauna during the 1960s and 60s has just been published as an e-book, 37 years after it was written, after the manuscript was found recently. The book describes Allen's experiences with the NSW Fauna Protection Panel developing national parks, nature reserves and wildlife refuges before NSW National Parks and Wildlife Service was established in 1967.

<https://www.amazon.com.au/Aspects-Nature-Conservation-South-during-ebook/dp/B071RNRK8H>

Functional diversity matters more than numbers

Researchers are increasingly realising that the health of an ecosystem may depend not only on the number of species present, but also on the diversity of their traits. This concept is known as functional-trait ecology, and may be necessary for understanding and forecasting how plants and animals cope with a changing climate. The TRY database is an international network of plant scientists who have been building a publicly accessible database of traits and functions which now contains records for 100,000 plant species.

<http://www.nature.com/news/biodiversity-moves-beyond-counting-species-1.22079>

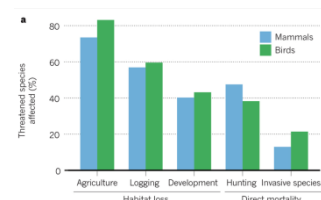
<https://www.try-db.org/TryWeb/Home.php>



Insights on biodiversity

The latest edition of Nature features a section on biodiversity and its importance for the future of the planet.

<http://www.nature.com/nature/supplements/insights/biodiversity/index.html>



The business case for landscape connectivity

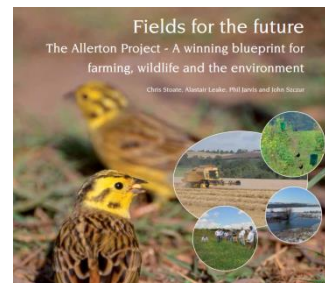
The World Business Council for Sustainable Development has published a report highlighting the business case for landscape connectivity, detailing bankable returns when investing in wildlife corridors on marginal and less productive lands.

<http://www.wbcsd.org/Projects/Climate-Smart-Agriculture/Resources/Landscape-Connectivity-A-call-to-action>

The Allerton Project

The UK Allerton Project uses a commercial farm to conduct research and educate the public about different farming methods and their effects on the environment and both flora and fauna. The project is now 25 years old. Its research covers landscape management, wildlife population dynamics, pest control, bee foraging, soil biology etc.

<https://www.gwct.org.uk/allerton/>



UK Agricolgy

Agricolgy is a UK website that shares information, resources and case studies of good farming practice based on agroecological principles.

<http://www.agricology.co.uk/>

ENERGY

Future security of the national electricity market

The Australian Government's independent review into the future security of the national electricity market will be released on Friday 9 June. The review will develop a national reform blueprint to maintain energy security and reliability in the national electricity market, for consideration by the Council of Australian Governments through its Energy Council. The review panel, chaired by Australia's Chief Scientist Dr Alan Finkel, released a preliminary report in December; and has now incorporated feedback from that report into the final review.

<http://www.environment.gov.au/energy/national-electricity-market-review>

FOOD

NSW food waste study

NSW EPA is working with households across the state to discover how much food waste is going to landfill each year. The three month study finishes on 30 June.

<http://www.lovefoodhatewaste.nsw.gov.au/get-involved/love-food-hate-waste-campaigns.aspx>

Feeding the nation: labour constraints

This recent UK report highlights the difficulties Britain will have in feeding itself if free movement of European labour stops post-Brexit. Around 20% of all employees in British agriculture come from abroad, as do 63% of meat processing staff, and more than 30% of people in food manufacturing.

<https://www.publications.parliament.uk/pa/cm201617/cmselect/cmenvfru/1009/1009.pdf>

The future of eating is flexitarian

This report from the UK's Eating Better Alliance features food businesses leading the way in helping people make the shift to healthy and sustainable food choices.

<http://www.eating-better.org/blog/142/The-future-of-eating-is-flexitarian.html>

New book: Hot hungry planet

Subtitled 'The fight to stop a global food crisis in the face of climate change', this book focuses on three key concepts to support food security and resilience in a changing world: social, educational, and agricultural advances; land use and technical actions by farmers; and policy nudges that have the greatest potential for reducing adverse environmental impacts of agriculture while providing more food.

<https://blogs.scientificamerican.com/observations/feeding-a-hot-hungry-planet/>

LAND USE

Right to Farm policy update

The NSW Right to Farm Policy supports farmers in operating their lawful businesses to minimise conflict or interference from other land users. It was launched in December 2015 and this yearly update reviews what has been achieved since then, and priorities for the upcoming 12 months.

http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/717565/Right-to-farm-policy-yearly-update-2016-17.pdf

Landscapes with more diversity produce more nutrients

New research quantifying the contribution of agriculture, livestock and fisheries to global nutrient production, showed that landscapes with more diversity produce more nutrients, and that diversity of agricultural and nutrient production diminishes as farm size increases.

Globally, farms smaller than 50 hectares, particularly in Africa and Asia, produce 51-77 per cent of nearly all commodities and nutrients, including cereals, livestock, fruits, pulses, roots and tubers and vegetables. Farms larger than 50 hectares, which dominate production in North America, South America, and Australia and New Zealand, contribute between 75 and 100 per cent of all cereal, livestock and fruit production.

<https://blogs.csiro.au/ecos/small-farms-need-protection-to-safeguard-nutrients-and-diversity/>

SUSTAINABILITY

Water and emissions intensity drop

Australia's latest environmental-economic accounts show that in the past two decades agricultural water intensity and greenhouse gas emission intensity decreased, while energy intensity increased.

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4655.0>

2017 Landcare awards: nominations open

This year's awards offer nine national categories, open to each state and territory. They cover sustainable farm practices, innovation in agriculture land management, individual

landcarer, community group, junior team, young landcare leader, indigenous land management partnerships, and coastcare. Nominations for NSW awards close on 16 June.
<https://landcareaustralia.org.au/landcare-awards/>

ENSIA magazine

Ensia is an independent, nonprofit US magazine presenting new perspectives on environmental challenges and solutions to a global audience.

<https://ensia.com/>

EVENTS

July 25-26	NSW Grasslands conference, Cowra http://grasslandnsw.com.au/news/?page_id=7
August 10-12	Australian and New Zealand Biochar conference, Murwillumbah https://anzbc.org.au/
September 24-28	Australian Agronomy conference, Ballarat http://www.agronomyconference.com/
September 25-28	Australian Rangeland Society conference http://www.austrangesoc.com.au/
October 16-19	NSW Weeds Conference, Armidale http://conferencecompany.com.au/weedsconference/
October 25-27	NSW Landcare and Local Land Services conference, Albury http://nswlandcareconference.com.au/

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