

NRM on farms



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

May 2017

CONTENTS

[Biodiversity](#)

[Climate](#)

[Climate impacts](#)

[Climate tools](#)

[Emissions](#)

[Energy](#)

[Events](#)

[Food](#)

[Land use](#)

[Soils](#)

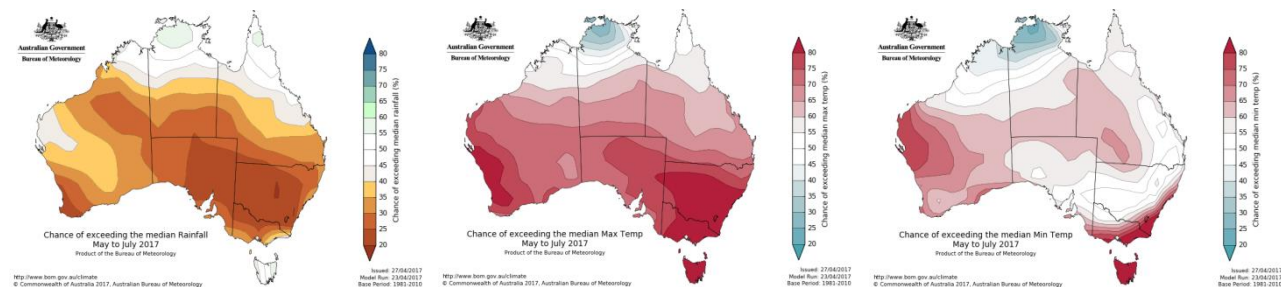
[Subscribe](#)

[Sustainability](#)

[Water](#)

CLIMATE

Drier and warmer outlook for NSW



The seasonal outlook continues drier and warmer than average for NSW although night-time temperatures are likely to be average except for warmer temperatures along the central and southern coast. This outlook is influenced by warming in tropical Pacific sea surface temperatures and a cooler eastern Indian Ocean.

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

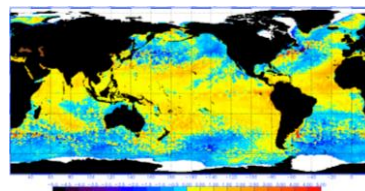
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

Pacific sea surface temperatures have warmed since the start of the year, but remain below El Niño thresholds.

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

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



1

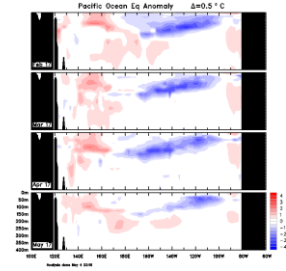


Department of
Primary Industries

Pacific subsurface cooling

Pacific subsurface temperatures have returned to near average temperatures, particularly in the central Pacific. Weak warm anomalies have eased slightly and shifted eastwards.

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

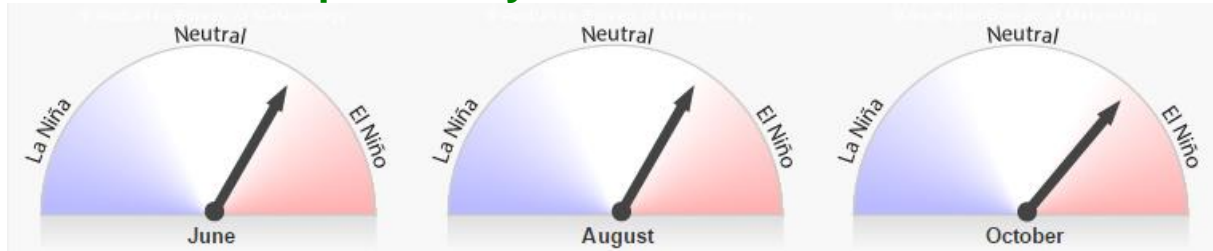


ENSO outlook: Watch

The Bureau's ENSO Outlook remains at El Niño WATCH, meaning there is around a 50% chance that El Niño may develop in the coming months. Despite the likelihood of El Niño easing in some models, an event in 2017 cannot be ruled out.

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

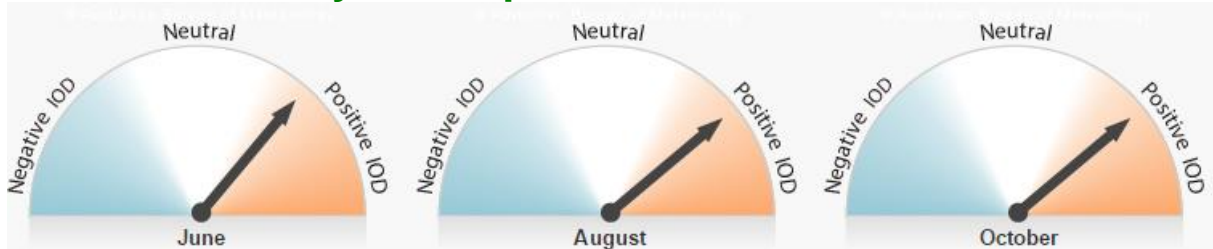
Models reduce possibility of El Niño



Some international climate models have reduced the likelihood of El Niño this year. However, five of eight models still indicate the tropical Pacific Ocean may exceed El Niño thresholds during the second half of 2017. It should be noted that models have lower accuracy forecasting El Niño through the autumn months.

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

Positive IOD may develop over winter



The Indian Ocean Dipole (IOD) remains neutral, but four of six climate models suggest a positive IOD is likely to develop during winter. Generally, when a positive IOD coincides with El Niño, the pattern of below average rainfall extends further west than it typically would under El Niño alone.

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

SOI moves to negative

The 30-day SOI to 7 May was -8.9 , the most negative value since May 2016. Sustained negative values below -7 typically indicate El Niño.

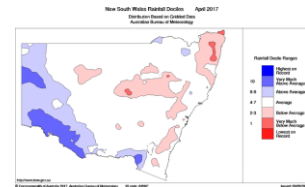
<http://www.bom.gov.au/climate/enso/#tabs=SOI>



NSW April was dry and cool

NSW rainfall was below average during April, although rain was above average in parts of the far west. Temperatures were close to average, despite widespread cool weather at the end of 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.

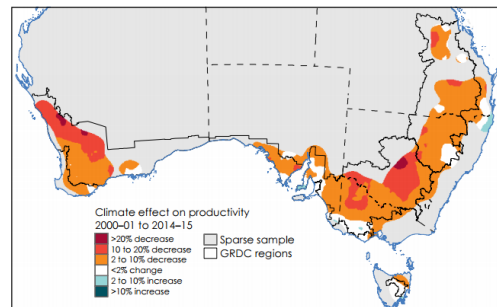
<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

CLIMATE IMPACTS

Cropping productivity and climate

A new study of Australia's cropping productivity in the past 40 years, adjusted for climate, shows that 91% of growth occurred in 1987–88 to 1993–94 and 2007–08 to 2013–14. The same two periods account for 91 per cent of total gains in climate-adjusted wheat yields. These results demonstrate the importance of controlling for climate when measuring agricultural productivity.

http://data.daff.gov.au/data/warehouse/9aas/2017/FarmPerformanceClimate/FarmPerformanceClimate_v1.0.0.pdf



Challenge to increase production and cut emissions

In his Hector and Andrew Stewart Memorial Lecture at UWA recently, Professor 'Snow' Barlow said the primary challenge for agriculture will be managing the dual responsibilities of cutting emissions and increasing production. Climate change will have significant impacts on how farming is conducted by 2050, and assisting agriculture to adapt to maintain its social licence to operate in a changing environment could be as great a challenge as maintaining nutrition and quality in the food it produces.

<http://www.farmweekly.com.au/news/agriculture/agribusiness/general-news/ag-on-target-to-lead-greenhouse-emissions/2755064.aspx>

Extreme weather events

This overview from University of Melbourne outlines extreme weather preparedness. Farmers need a range of risk management options, including access to an improved forecasting system, practical and proven on-farm measures to mitigate the magnitude of an extreme event, and, pre-, intra- and post- event risk management scenarios.

<https://pursuit.unimelb.edu.au/articles/extreme-weather-why-the-impact-will-be-felt-more-widely>

Extreme weather and storm types

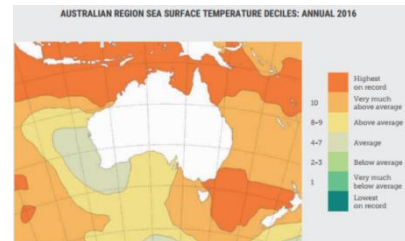
A recent study of storm types involved in extreme weather found that the highest risk of extreme precipitation and extreme wind speeds is associated with a triple storm type characterised by concurrent cyclone, front and thunderstorm occurrences.

<https://www.nature.com/articles/srep40359>

Rising temperatures drive bleaching

Intensifying climate change remains the biggest threat to coral reefs around the world, with rising sea surface temperatures driving widespread bleaching events, according to the Climate Council's latest report.

<http://www.climatecouncil.org.au/climate-change-threat-to-reef>



Mental health and climate change

The mental health impacts of climate change and how to build resilience in the community were highlighted in a recent report by the American Psychological Association.

<http://www.popsci.com.au/science/climate-change-contributes-to-mental-illness,456634>

CLIMATE TOOLS

Frost initiative update

GRDC's 5 year National Frost Initiative, begun in 2014, is focusing on three areas: cereal genetics, agronomic practices and climate tools.

<https://www.bcg.org.au/project-in-focus-grdcs-national-frost-initiative/>

Senate report into carbon risk disclosure

A new Senate economics committee report into carbon risk disclosure recommends it legal and regulatory changes around how companies consider and disclose climate risks.

http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Carbonriskdisclosure45/Report

Climate visuals

Climate Visuals is an evidence-based resource for visual climate change communication, based on social research. The website contains a growing library of photographs to provide inspiration and guidance for communicating climate change. Many of the images are free to use under Creative Commons licensing.

<http://climateoutreach.org/climatevisuals/>



EMISSIONS

Fifth ERF auction results

The fifth Emissions Reduction Fund auction held last month resulted in 31 contracts for 38 projects at an average price per tonne of abatement of \$11.82. Most contracts were for vegetation.

<http://www.cleanenergyregulator.gov.au/ERF/Auctions-results/april-2017>

Breakdown of activity by method			
Fifth auction 5-6 April 2017 - Released 13 April 2017			
	Total bids	Accepted bids	Abatement contracted
Vegetation	24	19	8.53 million tonnes
Landfill and waste	6	6	2.04 million tonnes
Agriculture	3	1	0.38 million tonnes
Energy efficiency	3	2	0.15 million tonnes
Industrial fugitives	1	1	0.1 million tonnes
Savanna burning	4	2	0.06 million tonnes
Total	41	31	11.25 million tonnes

Reducing carbon emissions on land

Submissions to the Climate Change Authority's recent issues paper on ways to better coordinate action to reduce carbon emissions on the land are now available online. This research initiative builds on a recommendation from the Authority's Special Review, which called for further work on ways that low-cost emissions reductions can benefit agricultural productivity while furthering objectives such as enhanced biodiversity, soil condition and water quality.

<https://prod-climatechangeauthority.gov-au.energy.slicedtech.com.au/submissions/submissions-received#mar2017>

Grains practices to reduce emissions

CSIRO investigation of management practices in the grain industry found that practices that sequester carbon can provide abatement in dryland farms in NSW, while practices that reduce nitrous oxide emissions can provide abatement in irrigated farms.

<http://www.publish.csiro.au/CP/CP17026>

Crop carbon sequestration

Global analysis of 389 field trials to determine how major crops correlate to soil carbon found that all crops allocate more carbon to shoots than roots. On average, plants allocate 76% of C stocks to shoots and only 24% to the roots. Natural grasses have the highest biomass accumulation and root biomass because they are perennials with extensive root systems that are used as energy reserves. Annual crops typically have lower root biomass because they do not need to store energy in the same way. Oil and legume crops accumulate lower average biomass, because of the energy used to synthesise proteins, compared to fibre crops, cereals and grasses.

<http://www.sciencedirect.com/science/article/pii/S0167880917301639>

Greenhouse gases: not just hot air

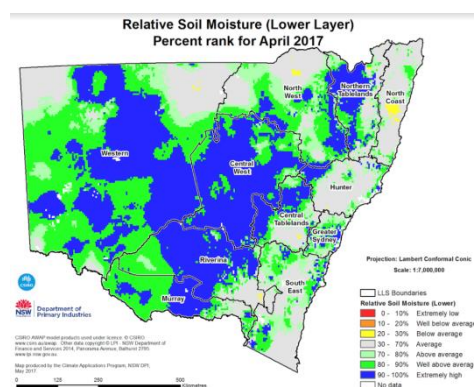
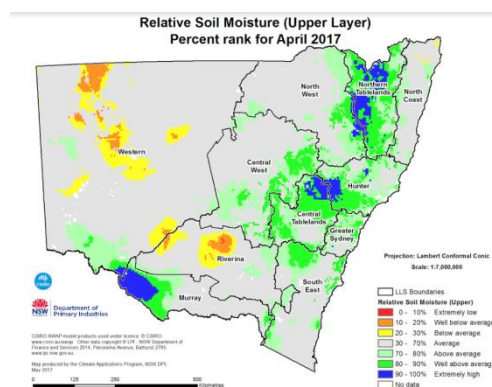
This UNSW animation explains how greenhouse gases are warming the earth.

https://www.youtube.com/watch?v=ZNPhn3TBOZE&feature=em-sub_digest



SOILS

NSW soil moisture



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

Plant–soil–biochar interaction build soil carbon

DPI research published recently in Nature Climate Change found that biochar addition to a subtropical ferralsol pasture built soil carbon by forming organo-mineral microstructures (<53 µm) that enhanced the retention of root-derived carbon by 20%. Over time field-aged biochar enhanced belowground recovery of new root-derived carbon, retained more of it in the stable organo-mineral fraction, and slowed mineralisation of soil organic carbon.

<http://www.nature.com/nclimate/journal/v7/n5/full/nclimate3276.html>

<http://www.dpi.nsw.gov.au/about-us/media-centre/releases/2017/nsw-biochar-research-internationally-recognised>

Soil carbon in cropping systems

This report summarises the key findings from the Riverine Plains Inc project evaluating the potential for increasing soil carbon by adding stubble residues and nutrients to soils during the summer fallow period. While the results were inconclusive, several practical, scientific and economic lessons were learnt along the way, and the report includes several case studies of participating farmers.

https://riverineplains.org.au/wp-content/uploads/2017/05/Soil-Carbon-booklet_LR.pdf

Australia's soil and landscapes now on Google Earth

TERN, the Terrestrial Ecosystem Research Network has made detailed information on Australia's soil and landscapes available through Google Earth. Users can now quickly complete large parallel image processing tasks and use all of the Google Earth's imagery archive. For example, CSIRO is now working with the IrriSAT project to automatically estimate irrigation timing (refill points) for Australian farmers.

<http://www.tern.org.au/Newsletter-2017-Feb-Soil-Grid-Google-Earth-Engine-pg31854.html>

Soil health research landscape tool

This initiative of the US-based Soil Health Research Institute consolidates and categorises publicly available information as a first step to identifying and addressing priority gaps in soil health research.

<http://www.soilhealthinstituteresearch.org/Home/Search>

The science of soil health

These US videos outline the science underpinning soil health and feature practices of leading farmers around the US.

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1245890>

Void space, usually filled with gas or water, is where soil microbes live. ow.ly/10qxLH



Fact sheet on erosion headcuts

Using rock to reduce soil loss from erosion in headcuts less than one metre deep is an adaptation used for over a century.

<https://arcc.com.au/product/rivers-carbon-headcut-fact-sheet-pdf-copy/>

Soil health and intensification of agroecosystems

This book examines climate, environment, and human effects on agroecosystems, and explores how sustainable agroecosystems that promote biodiversity, sustain soil health, and enhance food production may mitigate some of these effects.

<https://www.elsevier.com/books/soil-health-and-intensification-of-agroecosystems/al-kaisi/978-0-12-805317-1>

Soil mates

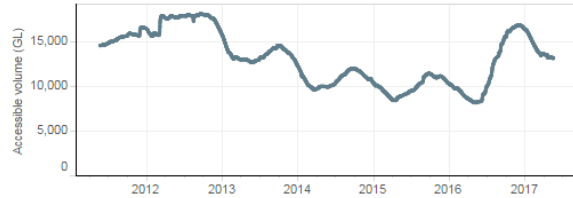
A US soil appreciation campaign offers five indicators of soil support.
<https://www.usda.gov/media/blog/2017/02/13/five-signs-you-might-be-perfect-soil-mate>



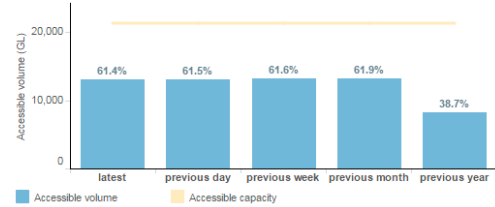
WATER

NSW water storage levels

Accessible volume - New South Wales



History - New South Wales

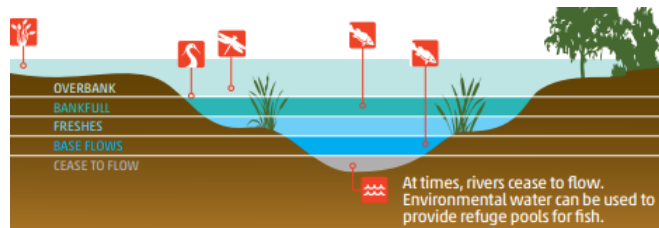


<http://www.bom.gov.au/water/dashboards/#/water-storages/summary/state>

MDB environmental watering 2015-16

This report outlines the logistics and outcomes of environmental watering in 2015-16.

<http://www.environment.gov.au/water/cewo/publication/s/restoring-our-rivers-pulse-2015-16>



BIODIVERSITY

Inspirational ideas for IPM

Integrated pest management involves monitoring of pests and pest predators. This can be quite labour-intensive and difficult, and several new tools have been developed for farmers to make this easier and more economically attractive. Find out some examples below.

<https://ec.europa.eu/eip/agriculture/en/news/inspirational-ideas-ideas-ipm>

Living with fruit bats

A Parliamentary inquiry considered the Commonwealth and state protections afforded to the two threatened flying-fox species, the interaction between state and Commonwealth regulatory frameworks, and the varied approaches to managing the camps that cause tensions. The focus of the inquiry was to ensure that the regulatory framework enables effective management of flying-fox camps, while securing environmental protections.

http://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/Flyingfoxmanagement/Report_1

Restore and renew plant genetics project

Sydney's Royal Botanic Garden project 'Restore and renew' is collecting thousands of plant specimens from hundreds of species across NSW, for genetic analysis. This information will be used to create a publicly available online resource where plants can be selected to suit

7

specific sites. The recommended species will be genetically-appropriate and suited to the user's location and conditions. Climate modelling will also allow practitioners to plant according to future forecasts, increasing the likelihood that the species will cope with a changing climate.

<https://www.rbgsyd.nsw.gov.au/Science-Conservation/Restore-Renew>

Bird feeding report

The summer report of the Australian bird feeding and watering study focusses on the relationship between the human feeders and birds.

<https://csdb.org.au/feedingbirds/home.aspx>

Dazed by dieback

NSW ecologist David Curtis has written a graphic novel about New England dieback and the efforts of scientists, farmers and the community to reverse it.

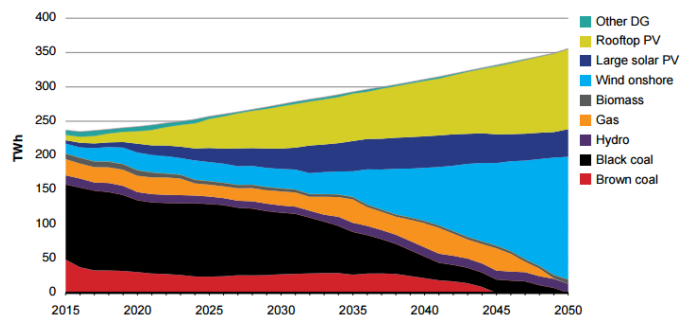
https://www.writersandebooks.com/bookshop/catalog/product_info.php?products_id=130

ENERGY

Electricity network roadmap

CSIRO and Energy Networks Australia have developed an electricity network transformation roadmap based on customer-oriented electricity, power system security, carbon abatement, incentives and network regulation, and intelligent networks and markets. The roadmap provides detailed milestones and actions to guide an efficient and timely transformation over 2017-27.

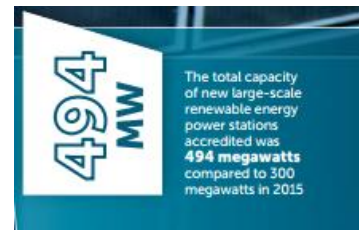
http://www.energynetworks.com.au/sites/default/files/entr_final_report_april_2017.pdf



Renewable Energy Target report

The RET is reviewed against its objectives to encourage generation of electricity from renewable sources; reduce emissions of greenhouse gases in the electricity sector; and ensure generation of electricity from ecologically sustainable renewable energy sources.

<http://www.cleanenergyregulator.gov.au/About/Accountability-and-reporting/administrative-reports/tracking-towards-2020-encouraging-renewable-energy-in-australia>



The cost of investing in gas

The Climate Council looks at the drawbacks of investing in gas as opposed to renewable energy.

<http://www.climatecouncil.org.au/price-of-gas>

Better energy, greater prosperity

The Energy Transitions Commission, a coalition of major firms, NGOs and academics, says global coal use must be cut by 70% within 25 years, oil use must fall 30% and gas can increase by only 2% out to 2040, if the Paris climate goals are to be achieved. Immediate action is needed to accelerate clean electrification, decarbonisation beyond power, and energy productivity improvement. The group's 28 'commissioners' include mining giant BHP Billiton, oil major Shell and the utility firm General Electric.

<http://www.energy-transitions.org/better-energy-greater-prosperity>

Climate Council report on coal mining

The Climate Council makes an emphatic case against development of the proposed Carmichael mine, or any other coal deposits in Queensland's Galilee Basin, or elsewhere in the world.

<http://theconversation.com/climate-council-climate-health-and-economics-are-against-carmichael-mine-77940>

FOOD

Fruit and veg make you happier

A large-scale study University of Warwick UK and University of Queensland has found that participants who upped their intake of fresh fruit and vegetables from near-nothing to eight daily portions reported measurable increases in corresponding levels of wellbeing – essentially, the more fruit and veg people ate, the happier they felt.

<http://www.aginnovators.org.au/news/more-fruit-and-veg-improves-mood-and-mojo>

Interactive food statistics website

A new website from the International Centre for Tropical Agriculture (CIAT), presents interactive visual information and statistics on how food supplies around the world have changed in the past 50 years. On average, food supplies from both plant and animal sources grew consistently in terms of calories, protein, fat, and food weight, with oils as a food group having the most dramatic increase.

<http://ciat.cgiar.org/the-changing-global-diet/>

Moreland food systems strategy

The City of Moreland in Victoria has adopted Australia's first Food Systems Strategy, which aims to build a sustainable, just and vibrant food system.

<http://www.circlesoffood.org/2017/04/27/moreland-food-systems-strategy/>

Nature on food security

Food security is the focus of a recent Nature Outlook supplement. The open access articles cover agrobiodiversity, sustainability, nutrition, bioengineering, and technology.

<https://www.nature.com/nature/outlook/food-security/index.html>

New journal on planetary health

Planetary health has been defined as the health of the human civilisation and the state of the natural systems on which it depends; a new open access e-journal The Lancet Planetary

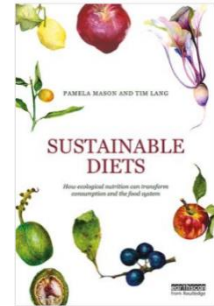
Health, publishes research with potential to change or challenge the interplay between the environment and human health.

<http://www.sciencedirect.com/science/journal/25425196>

New book on sustainable diets

The authors outline why food is now such a cause for concern and why all participants in the food system (governments, producers, civil society and consumers) need to take action. They propose a multi-criteria approach incorporating nutrition and public health, the environment, socio-cultural issues, food quality, economics and governance.

<https://www.routledge.com/p/book/9780415744720>



LAND USE

Agricultural land use mapping resources

NSW DPI has developed a guide to current datasets and terminology used to map land used for agricultural purposes; and a guideline for identifying important agricultural lands in NSW. The guideline will assist decision makers to develop strategic plans to retain important food and fibre production lands, and to avoid land use conflicts and the associated community and environmental impacts, particularly in regions where competition for land is significant.

<http://www.dpi.nsw.gov.au/land-and-water/land-use/lup>

SEED: Sharing and enabling environmental data

The NSW SEED portal offers a single access point for users to explore publicly available information about land, air and water resources through a range of datasets of known quality, and to visualise the data on the user-friendly map interface.

<https://www.seed.nsw.gov.au/>

Tree crop mapping app

The Queensland land use mapping program has developed a land use survey app to help identify tree crops around the nation. The app enables growers and the community to capture on-ground land use observations, location information, add comments and provide a photograph.

<https://www.qld.gov.au/environment/land/vegetation/mapping/qlump-app/>

SUSTAINABILITY

Australian Beef Sustainability Framework

The first-ever Australian Beef Sustainability Framework has been developed through public, industry and stakeholder consultation to align efforts through the value chain to improve sustainability. Its four themes are animal welfare, environmental stewardship, economic resilience, and people & the community.

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



Free range eggs stocking rates

Under new Federal Government legislation, any eggs labelled free range will require a stocking density outdoors of 10,000 hens or fewer per hectare. The stocking density has to be prominently displayed on the packaging and hens must have meaningful and regular access to the outdoors.

<https://www.legislation.gov.au/Details/F2017L00474>

Hunter Valley farmer wins environmental prize

Hunter Valley farmer Wendy Bowman, 83, has received the US Goldman Environmental Prize for fighting to save prime farmland, water, and rural villages from the impacts of open-cut coal mining — inspiring a community movement along the way. The award recognises unsung individuals who are striving to protect the natural environment in the face of overwhelming odds, and is awarded annually to a grassroots environmental leader from each of the world's six inhabited continental regions, offering financial support to pursue their vision.

<http://www.goldmanprize.org/recipient/wendy-bowman/>

Visit my farm

Visit my farm is an agritourism trial to strengthen the connection between rural and urban people, increase visits to farms, and provide an agritourism income stream for farmers. VMF's online platform gives consumers the opportunity to book unique agricultural experiences directly with participating farmers in areas they visit.

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



Risks of mixed farming

A southern Qld project has found that mixed farming can reduce risk, but the right scales of livestock and cropping enterprises are critical. Too little cropping decreases profits and increases risk due to higher overheads than more intensive cropping or livestock-only enterprises.

<http://www.publish.csiro.au/CP/CP16193?jid=CPv68n4&xhtml=8C817FCB-C0A5-4CF8-8FFB-10505E3B5923>

Rural living guide

South East Local Land Services' rural living guide outlines responsibilities of land owners, and provides advice on property management, lifestyle expectations, and neighbour relations.

http://southeast.lls.nsw.gov.au/_data/assets/pdf_file/0009/710100/rural-living-guide.pdf



International agritourism case studies

The World Farmers Organisation has published a booklet on agritourism around the world. The case studies provide a virtual tour from Mauritius to USA, from Japan to Mozambique, Germany, Italy and Caribbean, showing the potential of tourism across different regions and the interlinkages with agricultural systems.

<http://www.wfo-oma.com/press/new-wfo-booklet-showcases-farmers-success-stories-on-agri-tourism.html>

Sharing our stories

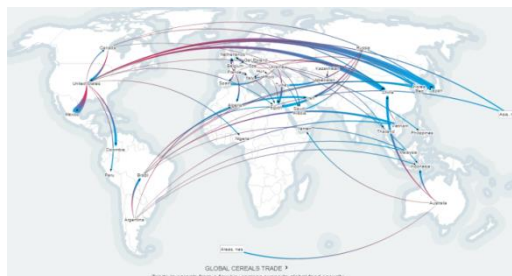
Sharing our stories is the theme of the NSW Landcare and Local Land Services Conference in October in Albury. Organisers are seeking people interested in sharing their stories on biodiversity, agriculture, water and Aboriginal landcare. Expressions of interest are due by Friday 26 May.

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

Natural resource trading

International think tank Chatham House has developed an interactive website showing global trade in natural resources, including food and agricultural commodities such as the cereals trade shown at right. Users can explore the dynamics of international trade, the sustainability implications of such trade, and the related interdependencies that emerge between importing and exporting countries and regions. It also includes indicative data on the land and water embodied in some of these agricultural flows to show the environmental significance of resource trade.

<https://resourcetrade.earth/>



Shanghai agricultural district

Shanghai is planning a 250-acre agricultural district. In the mid-1990s, Shanghai's government designated a 3.6-square-mile area of the city for agricultural production, hoping that bioengineering and biopharmaceutical companies would set up research facilities working in tandem with city greenhouses.

<https://www.businessinsider.com/sunqiao-shanghai-farming-district-2017-4#w5PsTilKSIIzjcxV.99>

EVENTS

- | | |
|-----------------|--|
| July 25-26 | NSW Grasslands conference, Cowra
http://grasslandnsw.com.au/news/?page_id=7 |
| September 24-28 | Australian Agronomy conference, Ballarat
http://www.agronomyconference.com/ |
| September 25-28 | Australian Rangeland Society conference
http://www.austrangesoc.com.au/ |
| October 25-27 | NSW Landcare and Local Land Services conference, Albury
http://nswlandcareconference.com.au/ |

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>

12



Department of
Primary Industries