

NRM on farms



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

November 2016

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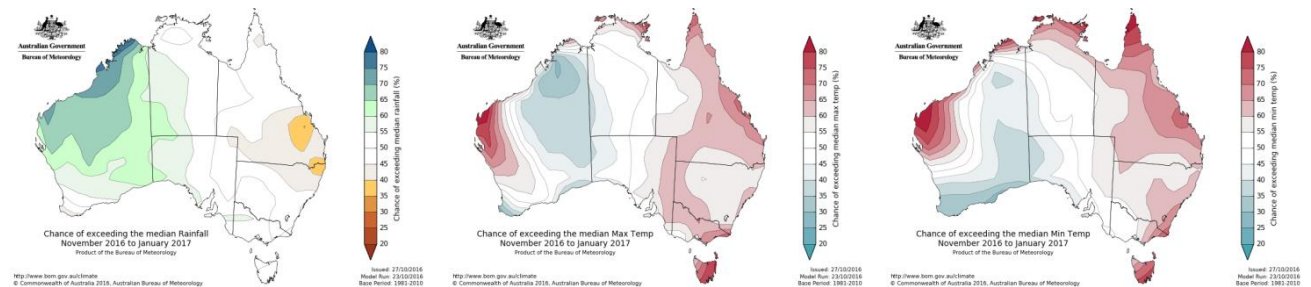
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CLIMATE

NSW seasonal outlook



The NSW seasonal outlook for November to January indicates average rainfall for the state apart from drier than average on the far north coast, and average to warmer than average temperatures. Climate influences include a weakening negative IOD, an ENSO-neutral tropical Pacific, and warm seas around northern Australia.

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

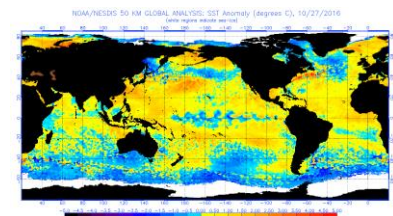
<http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

Sea surface temperatures remain cooler in the central tropical Pacific, and warmer than average in the western Pacific. Very warm waters in the eastern Indian Ocean mean the negative IOD event continues.

<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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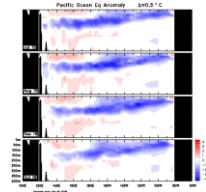


Department of
Primary Industries

Pacific subsurface cooling

Cool anomalies span the equatorial Pacific, while warm anomalies continue in the west

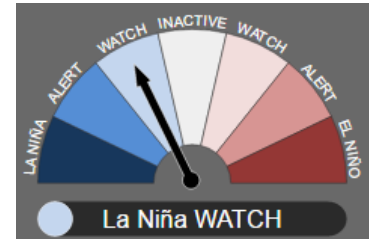
<http://www.bom.gov.au/climate/enso/>



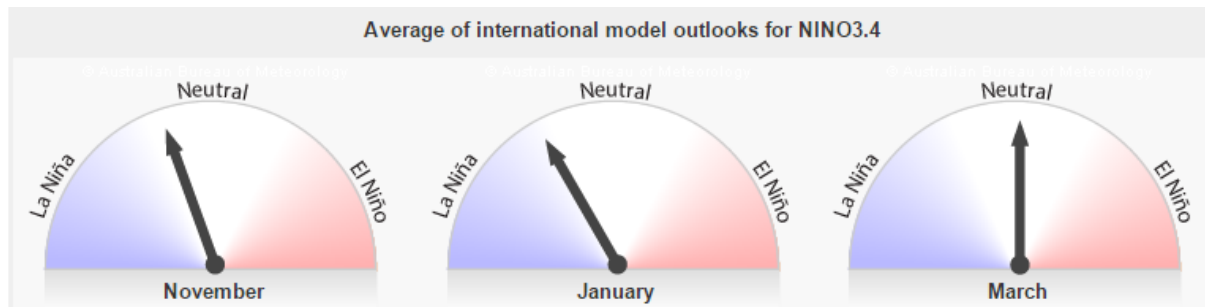
ENSO outlook remains at La Niña watch

Most climate models predict ocean temperatures will remain cooler than average until the end of the 2016–17 summer. Warmer than average sea surface temperatures to Australia's north suggest that some La Niña-like impacts are likely, even if an event never fully develops, so the ENSO outlook remains at La Niña Watch.

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



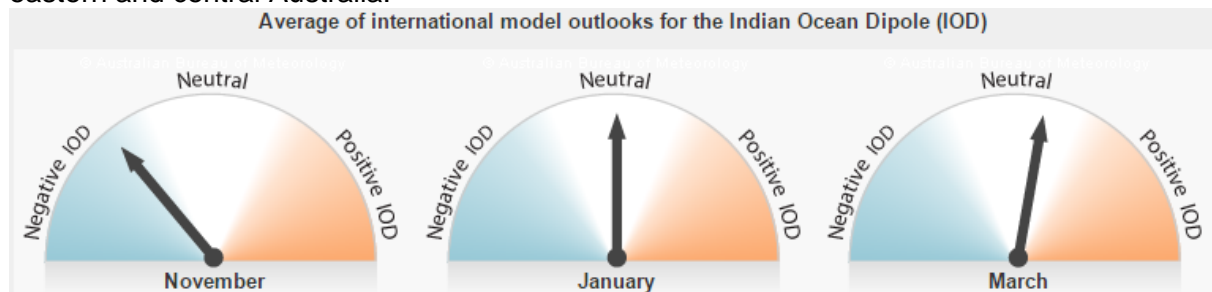
Model outlook



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

IOD

The negative IOD event in place since late May is expected to return to neutral by the end of spring. A negative IOD and La Niña typically contribute to increased rainfall in spring for eastern and central Australia.

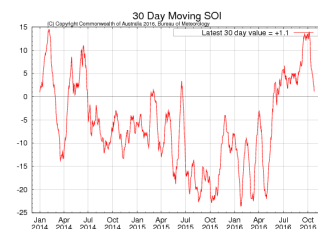


<http://www.bom.gov.au/climate/enso/#tabs=Indian-Ocean>

SOI drops back to ENSO neutral

After a peak of +13 in September, the SOI has dropped to +2.6, in neutral ENSO range.

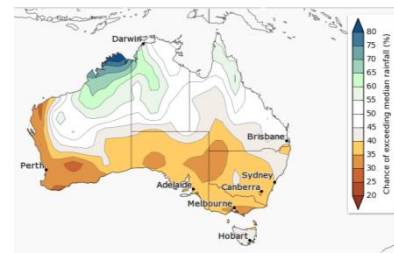
<http://www.bom.gov.au/climate/enso/#tabs=SOI>



Northward shift in SAM in November

A northerly shift in the average position of westerly winds and high pressure systems (known as the Southern Annular Mode or SAM) is forecast for November. When this shift (a negative SAM phase) occurs in spring, this typically means southern mainland Australia becomes drier than usual.

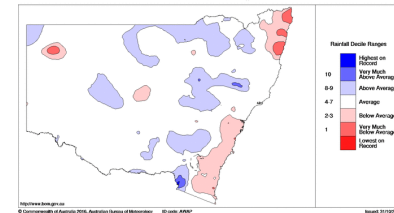
<http://www.bom.gov.au/climate/outlooks/#/overview/influences>



NSW in October

NSW rainfall was below-average near the coast, particularly in the north, and close to average elsewhere during October. Temperatures remained below average; the average minimum temperature was the coolest since 2003.

<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.

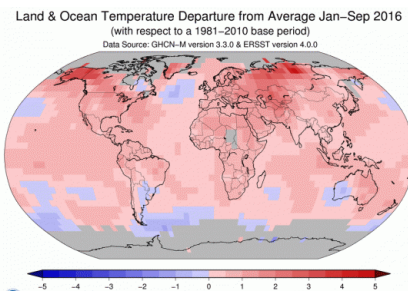
<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

GLOBAL CLIMATE

Record heat for January-September

NOAA reports that globally, January-September 2016 was the hottest such period on record, 0.89°C above the 20th century average of 14.1°C. Most land surfaces recorded record warmth for this period, and average surface temperature was the highest in 137 years of records.

<http://public.wmo.int/en/media/news/january-september-2016-hottest-record>

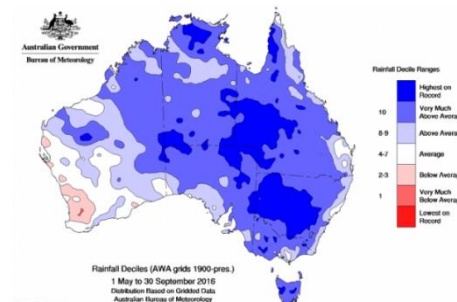


CLIMATE IMPACTS

Wettest May-September on record

May to September was Australia's wettest on record, with each of the five individual months ranking in the 10 wettest in the last 117 years. A major influence during this period was a strong negative phase of the Indian Ocean Dipole, with abnormally warm waters in the eastern tropical Indian Ocean between WA and Indonesia. The IOD index reached some of its lowest values since reliable records began in 1960.

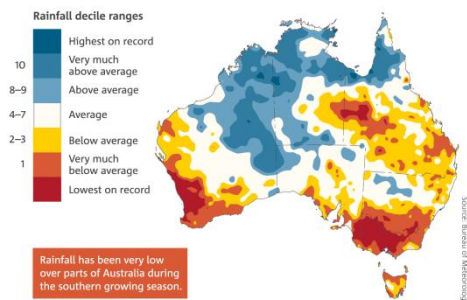
<http://www.bom.gov.au/climate/current/statements/scs58.pdf>



2016 State of the Climate

The 2016 State of the Climate report from BoM and CSIRO finds that Australia's climate has warmed in both mean surface air temperature and surrounding sea surface temperature by around 1 °C since 1910. The duration, frequency and intensity of extreme heat events have increased across large parts of Australia, with an increase in extreme fire weather and a longer fire season since the 1970s. April–October growing season rainfall in southeast Australia has declined 11 per cent since the mid-1990s (picture).

<http://www.bom.gov.au/state-of-the-climate/>



Warm seas increase cyclone potential

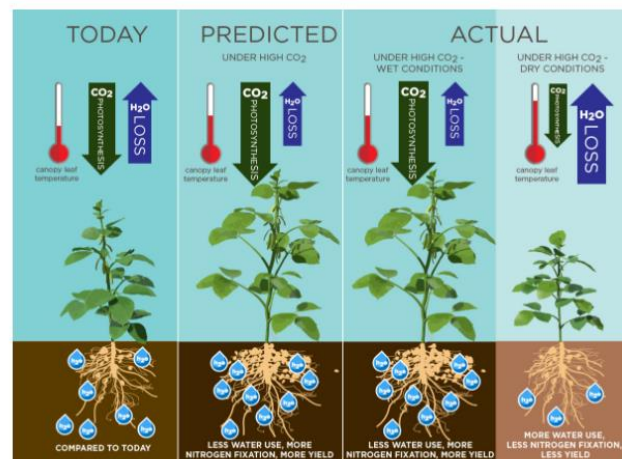
Warmer-than-average sea surface temperatures around northern Australia and neutral to weak La Niña conditions in the Pacific indicate that tropical cyclones may be more likely over summer.

<http://www.bom.gov.au/climate/cyclones/australia/#tabs=Outlook>

Drought eliminates CO₂ benefits for soybean

An eight-year study of soybeans grown outdoors in a carbon dioxide-rich atmosphere has found that higher atmospheric CO₂ concentrations will boost plant growth under ideal growing conditions, but drought will cause yield losses sooner than anticipated. Plants may use the CO₂ to grow more leaf and root nodules early in the season, but then be unable to sustain the extra growth when soil moisture drops.

<https://illinois.edu/blog/view/6367/399078>



Trees help create clouds

The Europe-based CLOUD research program has recently discovered that terpenes, gases emitted by trees, can stick together to make new seeds for clouds in the atmosphere – without needing any help from other pollutants as was previously thought. Even today trees produce a large fraction of cloud seeds over the cleanest forested parts of the world.

<https://theconversation.com/trees-are-much-better-at-creating-clouds-and-cooling-the-climate-than-we-thought-66713>

PICCC agricultural climate research findings

Recent presentations covering six years of climate research in horticulture, viticulture, dairy, grazing, livestock and grains industries, and nitrous oxide, soil carbon and methane, are available online at Victoria's Primary Industries Climate Challenges Centre website.

<http://www.piccc.org.au/resource/piccc-workshop-key-messages>

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World Weather Attribution

World Weather Attribution is an international effort designed to sharpen and accelerate the scientific community's ability to analyse and communicate the possible influence of climate change on extreme-weather events such as storms, floods, heat waves and droughts.

Recent analyses include the Great Barrier Reef coral bleaching and the Louisiana floods.

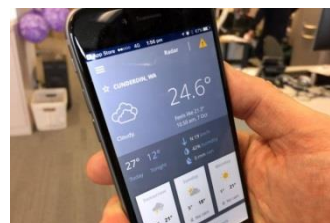
<https://www.climatecentral.org/about/>

CLIMATE TOOLS

New BOM weather app

BOM Weather is a new app featuring temperature, wind and humidity, and chances of rain for any location in Australia. It also provides radar images, warnings, and three-hourly and week ahead forecasts.

<http://www.bom.gov.au/app/>



Find out your location's seasonal outlook at CliMate

The CliMate website helps you find out what the current ENSO and Indian Ocean conditions mean for your growing season rainfall. The "skill" of these statistical probabilities can vary through the year, so may be useful to revisit when skill levels are higher than normal.

<http://www.australianclimate.net.au/Analyses/HowLikely>

DPI weather stations network

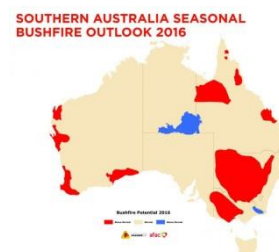
DPI weather stations network is another useful resource produced by DPI for the state's viticulturists. Located across six NSW wine growing regions, 38 weather stations provide up-to-date weather information to help growers make informed pest and disease management decisions. The DPI weather station network can be viewed at the AWRI website.

http://www.awri.com.au/industry_support/weather-nsw/

Bushfire outlook

This map shows the bushfire outlook for southern Australia through to the end of 2016. The outlook will be reviewed towards the end of spring to take into account the impacts of actual temperatures and rainfall in the lead-up to summer.

<http://www.bnhcrc.com.au/hazardnotes/019>



Climate Dogs update on Climate Kelpie

The Managing Climate Variability program has updated and launched Climate Dog animations at Climate Kelpie. It also includes Mojo and Eastie from an eastern Australian perspective.

<http://www.climatekelpie.com.au/understand-climate/climatedogs#roundup>

Tips for climate communication

In her communication to farmers about managing their climate risk and adapting to inevitable climate change, science communicator Jenni Metcalfe has discovered that there are messages that work to facilitate change and others that will more likely entrench the status quo, as shown at right.

Focus on	Avoid
Solutions	Problems
Facts + emotions + values	Facts only
Local impacts	Global impacts
Many solutions	One solution
It's all about you	It's all about the science
Costs of inaction	Costs of action
Show the trends	Argue the details
People benefiting from change	People suffering from impacts of not changing

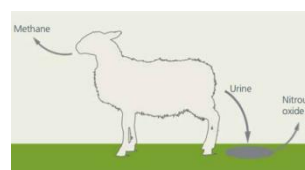
<http://us2.campaign-archive1.com/?u=80edb393a2b36cc622ea94b53&id=e331c1b05e&e=4423a448f8>

EMISSIONS

NZ agricultural emissions

The NZ report from the Parliamentary Commissioner for The Environment provides a useful easy to follow guide to the science of agricultural methane and nitrous oxide and options to reduce them.

<http://apo.org.au/files/Resource/climate-change-and-agriculture-web.pdf>



Seaweed may reduce cows' emissions

Australian scientists have found that the seaweed *Asparagopsis taxiformis* reduces methane production by more than 99% in the lab. *Asparagopsis* produces bromoform, which reacts with vitamin B12 and prevents methane production. Researchers are now examining how feeding seaweed to cattle affects production.

<https://theconversation.com/seaweed-could-hold-the-key-to-cutting-methane-emissions-from-cow-burps-66498>

Food-related emissions

This Climate Council piece looks at ways to reduce emissions from food production and consumption.

<https://www.climatecouncil.org.au/from-farm-to-plate-to-the-atmosphere-reducing-your-food-related-emissions>

SOILS

Seven farming practices that definitely build soil health

A UK review of 27 farming practices considered to maintain or enhance elements of soil health found that only 7 had a substantial body of research supporting the effectiveness of the practice. These included the use of integrated nutrient management (organic and inorganic amendments); cover crops; crop rotations; intercropping between crop rows or underneath the main crop; formulated chemical compounds (such as nitrification inhibitors); control of traffic and traffic timing; and reducing grazing intensity.

<http://www.soil-journal.net/2/511/2016/>

Similar soil C levels under high/low intensity grazing

A NSW DPI study assessment of soil carbon in high and low grazing intensity grazing systems on basalt soils on the New England tablelands found few differences in soil carbon stocks, soil pH or nutrient levels, possibly due to the high native soil fertility and enough rainfall to maintain growth of perennial grasses and clovers through most of the year.

<http://www.publish.csiro.au/SR/sr15316>

Soil microbes flourish in no-till systems

Analysis of 62 studies examining the effect of tillage on soil microbes has found that no-till systems had greater soil microbial biomass and enzymatic activity. Tilled systems that used a chisel plow were equivalent to no-till systems in terms of microbial biomass.

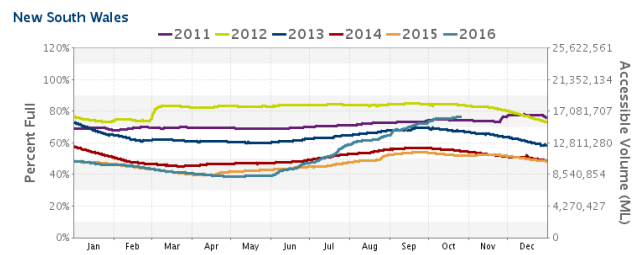
<https://www.sciencedaily.com/releases/2016/10/161004125836.htm>

WATER

NSW water storages

NSW's water storages are now over 75% capacity; 25% fuller than 12 months ago.

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



Soil moisture network for Southern Tablelands and Monaro

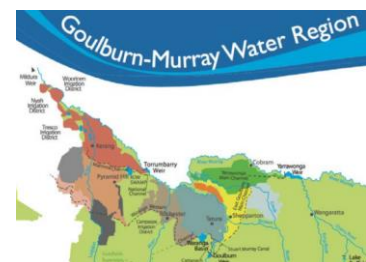
A network of moisture probes across the Southern Tablelands and Monaro is providing real-time information to graziers on soil moisture and temperature down to one metre, along with hourly rainfall. Fourteen probes have been installed at Boorowa, Bigga, Taralga, Laggan, Wheeo, Grabben Gullen, Bannister, Gunning, lake Bathurst, Braidwood, Cooma (two), Delegate and Bombala. A dedicated website to host the probe information and seasonal outlook reports will be up and running in early 2017. Site descriptions for each probe will also feature on the website, containing photos and specific information regarding soil type, pasture, paddock history, grazing management, livestock enterprise and surrounding landscape and vegetation. This information will help producers interpret the data and put it into context.

http://www.tablelandsfarmingsystems.com.au/wp-content/uploads/2016/10/Seasonal-report_spring-2016_20.9.16.pdf

Basin Plan effect on Goulburn-Murray horticulture

A socio-economic study of the effect of the Basin Plan across the Goulburn-Murray Irrigation District has found that, due to water recovery and continued expansion of horticulture, the impact of the next drought will be twice as severe as the last one, with horticulture now needing 75% of available water compared with 40% used in the Millennium drought.

http://apo.org.au/files/Resource/basin_plan_impact_gmid_final_14_october_2016.pdf



Review of current irrigation technologies

Collaboration between DPI Agriculture Water & Irrigation Unit, Irrigation Australia Limited and Greater Sydney Local Land Services has resulted in a successful project - 'Review of current irrigation technologies in the Aust. vegetable industry'. One of the outputs from the project is a series of YouTube videos.

http://www.soilwealth.com.au/imagesDB/news/HIAVG14048ReviewofIrrigationTechnologiesSummary_Final.pdf

<https://www.youtube.com/watch?v=y2rzh7vz1A>

Millennium Drought impact on water reform

This review looks at the impact of the Millennium Drought on Australia's water reform program. Subsequent investment and policy decisions include modernising irrigation systems, managing urban demand, introducing a range of water supply options, introducing decision frameworks for environmental water, and implementing water sharing rules during drought. The prospect of climate change means there is still work to be done to improve water-use efficiency and build greater drought resilience.

<http://waterpartnership.org.au/wp-content/uploads/2016/08/AWN-Building-Resilience-to-Drought.pdf>

Environmental water in flood years

The Commonwealth Environmental Water Holder's spring update explains that the real value of environmental water during wet conditions lies in its ability to extend the duration of larger flows to restore some of the natural variability that once existed around big floods.

<http://www.environment.gov.au/water/cewo/publications/cewh-update/spring-2016>

Water in Australia 2014–15

Water in Australia 2014-15 describes Australia's water resources, availability and use in the context of longer-term trends and climate influences. The information focuses on the period from 1 July 2014 to 30 June 2015, the latest planning year for which national-level water-use data were available at the time of writing.

<http://www.bom.gov.au/water/waterinaustralia/files/Water-in-Australia-2014-15-spreads.pdf>

Kini: Sharing and solving water problems

The Australian Water Partnership is inviting participation in an online community of practice, Kini, to share information and expertise on water reform and management relevant to the Asia Pacific and Australia.

http://waterpartnership.org.au/kini-initiative/?mc_cid=a978078b53&mc_eid=e475465799

BIODIVERSITY

Alert your neighbours to feral animals

Landholders can now use the FeralScan pest mapping program to alert their neighbours and local authorities about local pest animal incidents, such as wild dog attacks on livestock. The 'alert' emails all members of a landholder group when pest problems are reported in their area, ensuring that everyone can quickly see the location and photos, and take action. For information about how to setup an alert for your landholder group, contact Peter West, FeralScan Project Manager at the Invasive Animals CRC.

peter.west@invasiveanimals.com

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Vertebrate populations have declined 58% in 40 years

A new WWF report finds that global populations of vertebrates -- mammals, birds, reptiles, amphibians, and fish -- have declined by 58 percent between 1970 and 2012. Animals living in the world's lakes, rivers, and freshwater systems have experienced the most dramatic population declines, at 81 percent. Without immediate intervention, global wildlife populations could drop two-thirds by 2020.

<https://www.sciencedaily.com/releases/2016/10/161027113306.htm>

Multiple pesticides affect bee colonies

US investigation into pesticide levels in 91 honey bee colonies over one season found that the number of different pesticides within a colony, regardless of dose, closely correlated with colony death, as did some fungicides, often regarded as safe for bees. A total of 93 different pesticide compounds found their way into the colonies over the season.

<https://www.sciencedaily.com/releases/2016/10/161007115919.htm>

Diversity as natural pesticide

US research into why a variety of plants tends to attract fewer insect pests than a monoculture suggests that it may be due to the nutritional needs of insects. If an insect likes the crop, that insect has a large food supply to draw from in one place. Conversely, a field containing a variety of plants does not offer a large block of food for the insect, so it will not get the nutrients it needs to survive and thrive.

<https://www.ucdavis.edu/news/diversity-natural-pesticide/>

Agricultural biodiversity around the world

This publication from the Global Alliance for the future of food advocates strengthening agricultural biodiversity with action at local, regional, national and international levels, particularly community-based seed systems.

http://futureoffood.org/wp-content/uploads/2016/09/Future_of_Food_Seeds_of_Resilience_Report.pdf

Total new native bee book

Combining the substantial expertise of Australia's leading native bee researchers, this book is a guide to observing and keeping Australia's broad range of native bee species.

<http://www.tocal.nsw.edu.au/publications/list/animals/australian-native-bees>



ENERGY

Solar powered tomato farm opens at Port Augusta

Sundrop Farms has opened a \$200 million 20-hectare greenhouse and solar farm in Port Augusta. It uses a 115m high solar tower with 23,000 mirrors pointed at it to for power. At its peak it produces 39 megawatts of thermal energy, which is used for electricity, heating and desalinating seawater. The farm grows 15 million kg of truss tomatoes annually using more than 450,000m³ of desalinated water.

<http://reneweconomy.com.au/2016/world-first-solar-tower-powered-tomato-farm-opens-port-augusta-41643>

Farm energy case studies

These case studies cover different ways to save energy costs in a range of agricultural enterprises.

<http://www.qff.org.au/policy-projects/our-projects/energysavers/energy-case-studies/>

<http://www.aginnovators.org.au/case-studies/energy>

FOOD

World Food Day

Adapting to climate change was the theme of this year's World Food Day celebrated on Sunday 16 October.

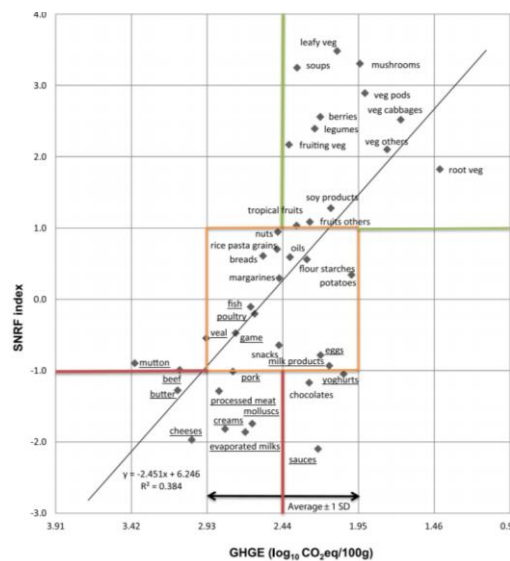


<http://www.fao.org/world-food-day/2016/climate-actions/en/>

Food-climate index

A Netherlands study into the climate impact of food products has proposed a sustainable nutrient rich foods index (SNRF) based on greenhouse gas emissions (GHGEs) and nutrient density. Products lower in (metabolic) energy density, with less saturated fatty acids, sodium and added sugar, and products higher in plant protein, essential fatty acids and dietary fibre contribute to a diet with lower GHGEs and a higher health score.

<http://www.sciencedirect.com/science/article/pii/S0921800916300830>



Discretionary foods have environmental impact

New Australian research has found that discretionary foods such as cakes, pastries, confectionery, soft drinks and alcohol account for a significant levels of diet-related water use (35%), energy use (39%), carbon dioxide equivalent (33%) and land use (35%). A more sustainable food system would focus on non-discretionary food groups -fruit, vegetables, cereals, legumes, nuts and seeds, dairy and fresh meat – with discretionary products seen as occasional treats rather than a significant part of daily food intake.

<http://www.sciencedirect.com/science/article/pii/S0921800916303615>

Food security and health in rural and remote Australia

This RIRDC report makes the case for food security considerations to be incorporated into an integrated national discussion about health, agriculture, water resource management, supply chains, taxation and trade.

<https://rirdc.infoservices.com.au/items/16-053>

Investing in food protein

Producing protein in ways that stay within our planet's limited resources is an essential challenge for today's food companies, capital markets and society. This briefing highlights how investors can understand and address the related risks, and take advantage of the resulting opportunities.

<http://www.fairr.org/wp-content/uploads/FAIRR-and-ShareAction-Protein-Briefing-September-2016.pdf>

10 tips for eating sustainably

This guide from University of Wollongong researchers suggests ways to eat locally and cut energy used to produce your food, including buying from local farmers, growing your own and eating less processed food.

<https://theconversation.com/10-tips-for-eating-locally-and-cutting-the-energy-used-to-produce-your-food-67060>

LAND USE

CSG impacts on regional communities

Research into the impacts on regional communities of major coal seam gas projects in south east Queensland showed that most respondents were concerned about the rising cost of living in the area, the long-term impacts on groundwater, and the impact on their community. Perceptions of fairness and inequity weighed heavily, especially on farmers, and correlated to negative psychosocial effects. Unresolved concerns about environmental and social issues and the loss of confidence in the local government, contributed to lower life-satisfaction, inhibited ability to plan for the future, and lead to a weaker local economy.

<http://www.sciencedirect.com/science/article/pii/S0921800916310886>

SUSTAINABILITY

Sustainable farming Landcare Award winners

Winner of the 2016 national Landcare awards for innovation in sustainable farm practices is WA enterprise Southampton Farm which combines pasture-raised poultry and a small dairy herd using holistic management, micro-abattoir, and direct-selling of their produce to the community. The farm was regenerated from a former pine plantation and now sells 12,000 chickens a year. Owners Jeff Pow and Michelle McManus have a values-based approach, and are part of a leading trend in farming, 'bringing the Terms of Trade back onto the farm', taking responsibility for the growing and the processing of all food on the farm in their micro-abattoir, and selling their produce directly to the community. The farm also won the People's Choice Award. Other farm-based winners included WA farmer Rhonda Williams, landcarer of the year; and Qld farmer Stephen Burgess, Bob Hawke landcare award.

<http://www.nationallandcareconference.org.au/2016-national-landcare-award-winners/>

<http://bobhawkelandcareaward.com.au/award-finalists/>

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Sustainability risks facing the red meat industry

New reports from the Australian Meat Processor Corporation highlight climate change, changing consumption patterns and social licence to operate as three of six critical strategic risks to the industry. Issues affecting the industry's social licence to operate include use of land to produce grain feed, efficiency of food production, emissions production, water usage and animal welfare.

http://www.ampc.com.au/uploads/cgblog/id65/42161_AMPC_RiskDocumentvLR.pdf

<http://feastofideas.com/assets/src/AMPC-SR16-Sustainability-Report.pdf>

Landsmart app for land managers

The Landsmart app provides information about smart land management practices on rural properties to help land managers, particularly absentee owners, look after their land sustainably and responsibly. Features include upcoming events and workshops, nearby LLS offices and landcare groups, and factsheets.

<https://itunes.apple.com/au/app/landsmart-smart-land-management/id1091143980?mt=8>

Costly environmental impact of NZ dairy intensification

A national assessment of the environmental costs of NZ's recent increase in dairy intensification found significant nitrate contamination of drinking water, nutrient pollution to lakes, soil compaction, and greenhouse gas emissions. The estimated cost of some environmental externalities surpasses the 2012 dairy export revenue of NZ\$11.6 billion and almost reaches the combined export revenue and dairy's contribution to Gross Domestic Product in 2010 of NZ\$5 billion.

<http://link.springer.com/article/10.1007%2Fs00267-015-0517-x>

Farming together collaboration

The Australian Government has invested \$15 million in a two-year Farming Together pilot program to provide farmers with knowledge, skills and materials on co-operatives, collective bargaining and other forms of collaboration. Funding is available for product marketing, consultancy and research and development.

<https://farmingtogether.com.au/about>

Immigrant farmers increase productivity

A new RIRDC-funded study finds immigrant farmers are contributing to the productivity of Australian agriculture by bringing new skills and overcome labour shortages in rural and regional Australia.

<https://rirdc.infoservices.com.au/items/16-027> and a summary of the research is

at <https://rirdc.infoservices.com.au/items/16-018>.

Positive projects for the environment

An international project seeking community projects that offer a positive future for the environment has identified six major themes in the projects contributed to date: agroecology, green urbanism, future knowledge, urban transformation, fair futures, and sustainable futures. The projects are all available to view on the website Seeds of Good Anthropocenes, and contributions are invited.

<https://goodanthropocenes.net/>

New book on sustainable urban agriculture

This book shows how urban agriculture provides opportunities to develop and enhance the quality of urban environments, with case studies from around the world, including Australia.

<https://www.routledge.com/Sustainable-Urban-Agriculture-and-Food-Planning/Roggema/p/book/9781138183087>

EVENTS

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|-------------------|--|
| November 21 | Urban agriculture forum, Melbourne
http://www.uaf.org.au/ |
| December 2 | AdaptNSW 2016, Sydney
https://www.eventbrite.com.au/e/adaptnsw-2016-registration-26745916757 |
| December 4-8 | 7th International Nitrogen Initiative Conference, Melbourne
http://www.ini2016.com/ |
| December 7 | Community forum: Good food for 9 billion, Melbourne
http://fvas.unimelb.edu.au/news-and-events/good-food-for-9-billion-community-forum |
| February 5-9 2017 | Restoring ecological processes, ecosystems and landscapes, Armidale
http://conferencecompany.com.au/revegconf2017/ |
| May 1-4 | Australasian Vertebrate Pest Conference, Canberra
http://avpc.net.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.