

NRM on farms



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

March 2016

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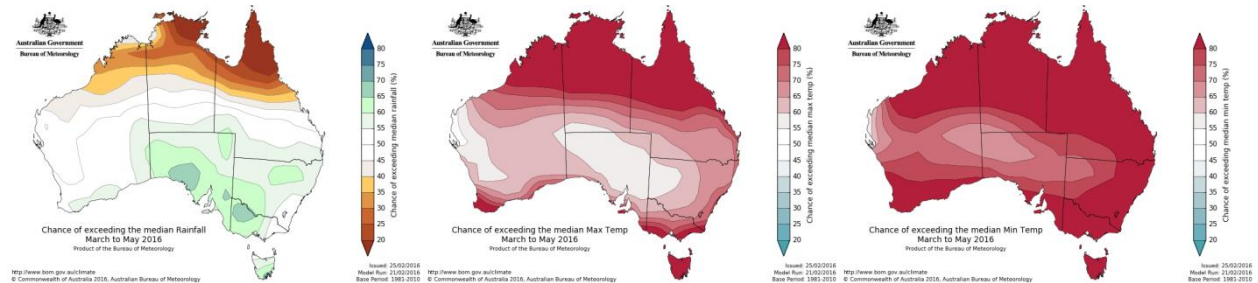
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CLIMATE

NSW seasonal outlook

March to May favours above average to slightly above average rainfall in NSW and warmer than average temperatures day and night. Climate influences include a very warm Indian Ocean, a weakening El Niño and warm sea surface temperatures surrounding much of Australia.



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

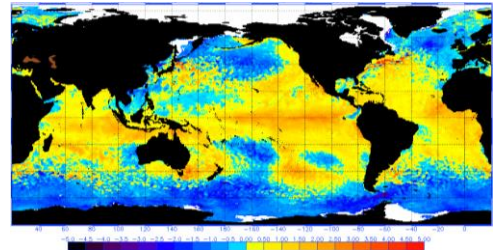
Video: <http://www.bom.gov.au/climate/outlooks/#/overview/video>

Ocean temperatures

Warmer than average temperatures in the Indian Ocean and around Australia are likely to reinforce above average air temperatures in NSW.

<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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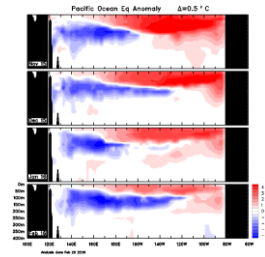


Department of
Primary Industries

Subsurface temperatures

The four-month sequence of sub-surface temperature anomalies to mid-February shows the cooling trend in central and eastern Pacific. Cool anomalies in the western Pacific, around 100 m below the surface, are extending eastwards.

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

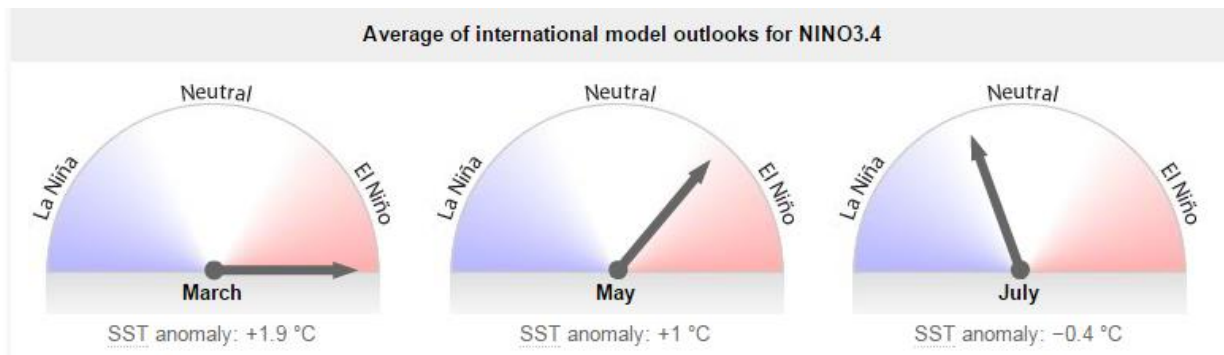


El Niño continues to decline

The 2015–16 El Niño is now at moderate levels, and is likely to end in the second quarter of 2016. Neutral conditions are slightly favoured ahead of La Niña for the second half of 2016. The Nino3.4 index, a key El Niño Indicator, is now below +2 °C for the first time since September 2015, suggesting moderate El Niño levels. Likewise, the Southern Oscillation Index remains negative at moderate levels. In Australia, the breakdown of strong El Niño events has historically brought average to above average rainfall to many locations.

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

Model outlook indicates waning El Niño

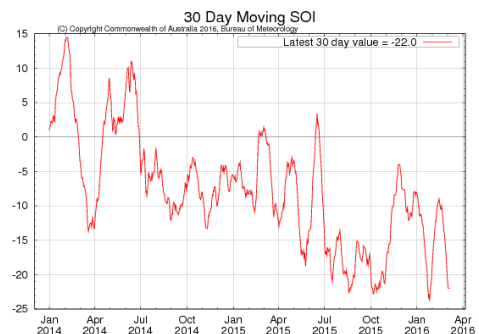


<http://www.bom.gov.au/climate/model-summary/>

SOI fluctuating but still negative

After dipping to -23.6 in 26 January, the 30-day Southern Oscillation Index rose to -9.0 before falling back to -17.3 on 28 February. SOI fluctuations during Australia's northern wet season (October-April) are not unusual as the passage of tropical systems near Darwin and Tahiti affects atmospheric pressure. During this period, the SOI should be used cautiously; 90-day values are a more reliable guide. The current 90-day SOI is -16.3.

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



Warm Indian Ocean makes southern rain more likely

Unusually warm temperatures in the Indian Ocean are likely to increase the available moisture for weather systems travelling across Australia in coming weeks and months, increasing the likelihood of good falls occurring across southern Australia during autumn. The Indian Ocean Dipole is neutral. The IOD does not typically influence Australian climate between December and May, when the monsoon trough is in the southern hemisphere.
<http://www.bom.gov.au/climate/enso/#tabs=Indian-Ocean>

NSW's driest February in 38 years

NSW experienced its driest February since 1978, with the statewide average rainfall 69% below the historical average. Many stations recorded their driest February on record or in at least twenty years. The statewide average maximum temperature was 1.9°C above the historical average and the minimum temperature 0.6°C above average. Some stations recorded their longest spell on record above moderate thresholds, including 19 days above 30°C at Grafton and 25 days above 26°C at Sydney.
<http://www.bom.gov.au/climate/current/annual/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 RESOURCES

Climate zones head south

Analysis by the Australian Grains Export Innovation Centre shows that Australia's climate zones have moved significantly in the past 15 years. Mediterranean climate and winter dominant rainfall is contracting in a south-westerly direction, while summer dominant and neutral rainfall zones have expanded south.

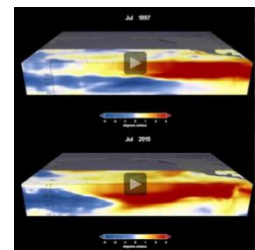
<http://www.aegic.org.au/media/news/2016/02/new-australian-climate-developing.aspx>



Warmer sea temperatures in 2015 El Nino

New NASA visualisations show how the 1997 El Nino started from colder-than-average sea surface temperatures while the 2015 event started with warmer-than-average temperatures in the Pacific, Atlantic and Indian Oceans. The 1997 event (top right) was much stronger in the Eastern Pacific; in 2015 (below right), the warmest waters are instead in the Central Pacific and extend west of the International Date Line.

<http://phys.org/news/2016-02-nasa-kind-el-nino.html>



Weather stations on Riverina farms

A weather black spot has led to six weather stations and moisture probes being installed on properties between Wagga Wagga and Corowa. Funding for the project was provided by Riverina and Murray Local Land Services through funding from the Australian Government's National Landcare Programme.

<http://203.24.62.96/rivplains/rivplainsPCDeviceList.html>

Climate modelling for cattle producers

The future of climate modelling for cattle producers is in providing detailed, tailored products that cover the key climate factors of regions, including the expected pasture growth from predicted rainfall. According to CSIRO such models will form the basis of an integrated system, incorporating analysis of data on everything from soil moisture and the quality of the pasture the year before to the current condition of stock, to predict liveweight gains.

Producers will be able to run simulations of different management strategies for the year ahead to estimate how much beef they can produce.

<http://www.theland.com.au/story/3708507/forecasting-more-than-just-rain/?cs=4932>

Cotton climate change facility

The Australian Cotton Research Institute's new climate change facility is using in-crop chambers to study the effects of elevated CO₂ and warmer temperatures on cotton grown in the field. In the first year of the trials, elevated CO₂ increased total vegetative biomass by 57 percent compared with plants in the ambient CO₂ chamber, but there were no effects on fruit number or fruit biomass.

http://www.crdc.com.au/sites/default/files/pdf/AA_Spot_Aut%20sc3.pdf

WA productive future farms forum

WA's Northern Agricultural Catchments Council recently held a forum on opportunities to be embraced in a changing wheatbelt climate. Suggestions included finding value and multiple benefits in modified farming systems, using sheep within an integrated farming system, sharing weather observations and improving seasonal forecasting, rewarding farmers for restoring landscape health on behalf of all Australians, educating the next generation on soil health, and developing and testing new ideas.

<http://www.nacc.com.au/forum-sheds-light-climate-change-agriculture/>

Climate impact on agriculture may be underestimated

Studies of how climate change might affect agriculture generally look at crop yield, but climate change may also influence how much land people choose to farm and the number of crops they plant each growing season. A new study takes these variables into account, and suggests researchers may be underestimating the climate impact on the world's food supply.

<https://news.brown.edu/articles/2016/03/matogrosso>

Facts and myths about bushfires and climate change

This factsheet from The Climate Institute considers common statements about bushfires, and climate change caused by carbon and other greenhouse gas pollution.

http://climateinstitute.org.au/verve/resources/2016_Bushfire_Factsheet_FINAL.pdf

Natural disasters and insurance

Insurer MunichRe has developed a web portal to examine the facts and economic impacts of natural disasters in Australia, many of them climate-related. The portal looks at how to communicate risk and includes an interactive graphic to explore the interplay between hazards, exposure and vulnerability.

<http://www.munichre.com/australia/homepage/index.html>

CSIRO cuts will damage Australia's climate effort

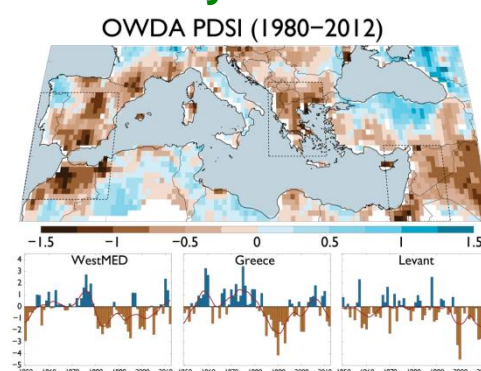
The Climate Council has produced a report on the impacts of proposed cuts to CSIRO's Climate Science research program. The Council says the cuts will damage Australia's ability to understand, respond to and plan for a changing climate and leave a gaping hole in international science community's ability to understand climate change in the Southern Hemisphere.

<https://www.climatecouncil.org.au/csiro-report>

Middle East is in worst mega drought for 900 years

A NASA study shows the Middle East is in the grip of a mega-drought that began in 1998. A wide-reaching drought spanning more than 15 years has not been seen for more than 900 years. The drought is about 50 per cent drier than the driest period in the past 500 years, and 10 to 20 per cent drier than the worst drought of the past 900 years. Drought conditions in this region are likely to be further exacerbated in the future with climate change amplifying the potential for sociopolitical and economic disruption.

<http://onlinelibrary.wiley.com/doi/10.1002/2015JD023929/full>



FAO's work on climate change

This report outlines FAO's most recent support to help countries face the impacts of climate change. It also brings together the most relevant knowledge on climate change including tools and methodologies FAO can offer to countries to report on their greenhouse gas emissions coming from the agriculture, livestock and forestry sectors.

<http://www.fao.org/3/a-i5165e.pdf>

EMISSIONS

Farmer participation in carbon farming

A WA survey of farmers' adoption of carbon farming practices found that farmers consider improved soil quality as the most important benefit from carbon farming. They were most likely to adopt practices that support production objectives, revealing preferences for retaining stubble and no-till cropping. Policy uncertainty is a barrier to farmers participating in carbon farming policy programs.

<http://www.sciencedirect.com/science/article/pii/S0264837716000181>

Carbon-neutral wool farming

Analysis of the carbon balance of a wool case study farm, Talaheni, in the Yass Valley, found that sheep farms can be carbon neutral by sequestering carbon in trees and soils, which offsets the emissions from sheep, fuel and electricity. The study showed that there are substantial gains to be made in soil carbon stocks where initial soils are eroded and degraded and there is the opportunity to increase soil carbon either through planting trees or introducing perennial pastures to store more carbon under pastures. Further research would be beneficial on the carbon-neutral potential of farms in more fertile, high-rainfall areas. These areas typically have higher stocking rates than the present study and would require higher levels of carbon stocks for the farm to be carbon neutral.

<http://www.publish.csiro.au/nid/72/paper/AN15541.htm>

Forages help reduce emissions

Victorian and WA research of 10 alternative forage species has found that chicory, broccoli and plantain forages could help cows emit less methane, but further studies are needed to confirm these effects.

<http://www.publish.csiro.au/paper/AN15486.htm>

The latest science on agricultural emissions

The latest journal of Animal Production Science covers many of the papers delivered at the greenhouse gas and animal agriculture conference held in Melbourne in February. The conference included papers on measurement of methane and nitrous oxide, biology and biochemistry of livestock emissions, mitigation of ruminant emissions, mitigation of emissions from excreta and manure management, and whole farm modelling of mitigation options.

<http://www.publish.csiro.au/nid/73/issue/7675.htm>

ERF resources for agriculture

The Clean Energy Regulator has created new resources to assist in participating in the Emissions Reduction Fund. Agricultural resources include guides for estimating sequestration of carbon in soil, definitions of new activities for forest regeneration projects, beef cattle herd management and revised savanna burning.

<http://www.cleanenergyregulator.gov.au/ERF/News-and-updates#February-2016>

<http://www.publish.csiro.au/paper/AN15486.htm>

The influence of food choices on nitrogen emissions

This report quantifies the losses of reactive nitrogen from EU agriculture and food systems by food type, and assesses the impact of alternative diets on the environment (through nitrogen emissions, greenhouse gas emissions and land use) and human health. Reactive nitrogen losses associated with agriculture refer mainly to the release of ammonia and nitrous oxide into the air, and nitrates into the ground.

http://www.pbl.nl/sites/default/files/cms/publicaties/Nitrogen_on_the_Table_Report_WEB.pdf

WATER

NSW rice industry using less water

DPI researchers have helped the NSW rice industry establish that direct drilling and delayed permanent water can deliver water use efficiency outcomes and increase gross margins by up to 59 per cent, and give rice growers long-term, viable water management solutions. Up to 80 percent of crops in the Coleambally area are now drill sown and delayed permanent water can reduce ponding by one month, which in turn results in reduced evaporation and water loss. Rice crops handle moisture stress well, so further water savings can be achieved by having longer intervals between flushes, and holding off permanent water application.

<http://www.dpi.nsw.gov.au/aboutus/news/all/2016/direct-drill-dividend>

Future water demand in southern MDB

A RIRDC study of contemporary trends and drivers of irrigation in the southern MDB estimates that, by 2020-21, water use will have declined 8-11 per cent in dairy and 12-16 per cent in rice due to higher water prices induced by competition from other industries. Water use is estimated to increase by 61-67 per cent for cotton, and 17-18 per cent for fruits and nuts, increases that would have been larger if not for the anticipated increase in water prices. Water use by grapes is estimated to fall by 14-15 per cent due to contraction in demand and higher water prices.

<https://rirdc.infoservices.com.au/items/16007>

Water-specific renewable energy priorities

The Australian Renewable Energy Authority, ARENA, has identified four priority areas for water-specific funding: renewables in water pumping and irrigation, bioenergy in wastewater treatment, storage technologies and demand management, and water specific technologies (including mini-hydro, floating solar PV and small scale desalination).

<http://arena.gov.au/resources/renewable-energy-opportunities-in-the-australian-water-sector/>

WA Water for Food program

WA's Water for Food initiative is a four-year \$40 million program to identify water and land to increase productivity in agriculture, while building export supply chains and encouraging capital investment in regional industries. The funds will direct state investment into crucial areas of agriculture, including market development, science, infrastructure and water investigations. It will create the potential for new irrigation precincts and the expansion of agricultural and pastoral opportunities in existing districts across the state.

<http://www.waterforfood.wa.gov.au/>

Smart water use offers more water in future

Improved agricultural water management could halve the global food gap by 2050 and buffer some of the harmful climate change effects on crop yields. Scientists investigated the worldwide potential to produce more food with the same amount of water and concluded that the yield increase potential of crop water management is particularly large in water-scarce regions such as in China, Australia, the western US, Mexico, and South Africa.

<https://www.sciencedaily.com/releases/2016/02/160215210709.htm>

Water footprints

Water footprints assess the potential environmental impacts associated with water along the supply chain. The international standard ISO 14046 was published in August 2014. Case studies of NSW wheat, with limited use of supplementary irrigation, showed water footprint ranges of 0.9 to 152 L H₂Oe per kg grain (cradle to farm gate). Footprints of six NSW beef cattle production systems showed similar variation, from 3.3 to 221 L H₂Oe per kg live weight (cradle to farm gate). Lamb cuts produced in western Victoria and exported to the USA for consumption had a footprint of 44 L H₂Oe per kg (cradle to grave); Gippsland milk had a footprint of 1.9 L H₂Oe per L (cradle to farm gate).

<http://www.fcrn.org.uk/fcrn-blogs/brad-ridoutt/update-water-footprints>

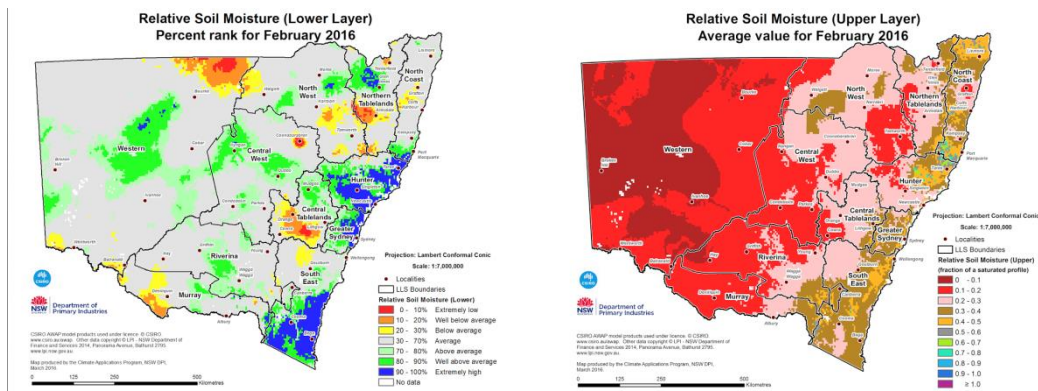
Adaptation is all about water

This article from the World Economic Forum argues that climate change adaptation is all about water, and that talking about water could be the best way to engage people on climate issues.

<http://www.weforum.org/agenda/2016/01/five-things-you-need-to-know-about-water-and-climate>

SOILS

Soil moisture for February

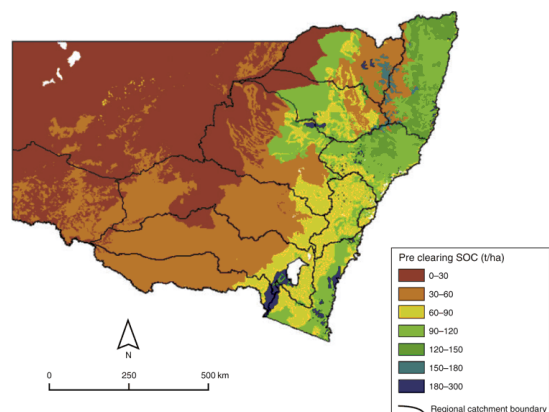


<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

Soil carbon stocks and decline in NSW

Digital soil models and maps for pre-European levels of soil organic carbon in NSW show an average loss of ~0.53 Gt SOC has occurred since clearing. The extent of SOC decline was highly dependent on the climate, soil type and land-use regime, being greatest at 44.3 t/ha under cooler (moist) conditions over mafic parent materials under regular cropping use.

<http://www.publish.csiro.au/nid/84/paper/SR14307.htm>



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Soil carbon is linked to climate, not management

Measurement of soil carbon in farm paddocks across Victoria found that carbon levels were very strongly related to climate, weakly related to soil type, very weakly related to type of farming (cropping, mixed farming, sheep and beef, dairy), and not measurably related to farm management practices. Because management effects are very small, they cannot be measured unless climate and soil effects are accounted for.

<http://www.publish.csiro.au/nid/84/paper/SR15008.htm>

Building carbon maps

Using satellite images and field study data covering a 10-year period from 2000 to 2010, researchers have constructed maps that show where - and for how long - carbon is stored in plants, trees and soils. The maps reveal that the biological properties of leaves, roots and wood in different natural habitats affect their ability to store carbon, and show that some ecosystems retain carbon for longer than others.

<http://www.pnas.org/content/113/5/1285.abstract>

Super fungi may be key to plant survival

A SUPER fungi subset discovered in two-million year old soils along WA's coastal plains, may be the key to plant survival in nutrient deficient soils. Scientists now know the survival of plants in even the most impoverished soils is often based on the co-existence between mycorrhizal fungi and the roots of a plant.

<http://www.sciencewa.net.au/topics/environment-a-conservation/item/3916-fungi-aids-plants-in-scavenging-nutrients-from-ancient-soils>

How to build healthy soil biology

A new guide from CSIRO Publishing, Soil health, soil biology, soilborne diseases and sustainable agriculture, provides growers and their consultants with holistic solutions for building an active and diverse soil biological community capable of improving soil structure, enhancing plant nutrient uptake and suppressing root pests and pathogens.

<http://www.publish.csiro.au/pid/7358.htm>

Soil recovery after wildfire

SOILS affected by wildfires undergo significant changes within one year after a fire with that same soil partially regenerating after around five years, according to a study examining how semi-arid soils recover from natural fire events.

<http://www.sciencewa.net.au/topics/environment-a-conservation/item/4039-pilbara-soils-indicate-post-wildfire-recovery-timeline>

Gippsland soil trials and demonstrations website

This website provides information from Gippsland based trials, demonstrations and research on soil, pasture, crop and nutrient management to assist farmers in making decisions.

<http://www.wgcoma.vic.gov.au/for-landholders/gippsland-soil-trials>

Earth matters: How soil underlies civilisation

This new book by ecologist Richard Bardgett shows how soil and the organisms that live in it control biogeochemical cycles on which the functioning and future health of the Earth

depends. The book describes the fundamental role of soil in climate change mitigation, food security, water quality and the restoration of biodiversity, and explains why future sustainable management of soils is key to human wellbeing.

<https://global.oup.com/academic/product/earth-matters-9780199668564?cc=au&lang=en#>

Seven ways to save our soils

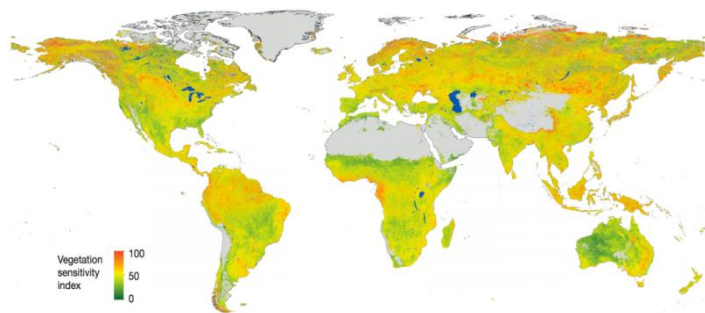
This Soil Association report outlines key ways to increase soil organic matter in UK arable and horticultural soils by 20% over the next 20 years.

<http://www.soilassociation.org/Portals/0/pdf/7WaysFinal.pdf>

BIODIVERSITY

Eastern Australia highly sensitive to climate change

Eastern Australian ecosystems are among the world's mostly highly sensitive to climate change according to a new study published in *Nature*. Researchers estimated how plant growth across the world has varied with fluctuations in temperature, water availability and cloud cover and which of the three climate variables is most important for each ecosystem. Understanding vegetation responses to current climate variability will help improve predictions of future consequences of such variability on our planet's ecosystems and biodiversity, and our security and welfare.



<http://theconversation.com/rising-extreme-weather-warns-of-ecosystem-collapse-study-54898>

NZ bees affected by chlorpyrifos

NZ research has found that honeybees suffer severe learning and memory deficits after ingesting very small doses of the pesticide chlorpyrifos. The study identified the threshold dose for sub-lethal effects of chlorpyrifos on odour-learning and recall as 50 picograms of chlorpyrifos ingested per bee, thousands of times lower than the lethal dose of pure chlorpyrifos, which is around 100 billionths of a gram.

<http://www.otago.ac.nz/news/news/otago595819.html>

Break crops benefit low rainfall wheat

GRDC research has found including break phases in low rainfall crop sequences is a reliable management tool for increasing the yields of subsequent wheat crops in paddocks where constraints such as grass weeds, declining soil fertility and root disease are affecting yields of continuous cereals. These wheat yield benefits are commonly 1–2t/ha over two to three seasons following the break phase.

<https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2016/02/The-value-of-break-crops-in-low-rainfall-farming-systems-and-which-ones-perform-the-best>

LLS tracks wild dogs in southern NSW

Wild dogs have been fitted with GPS collars in southern NSW to measure the dogs' activity ranges and identify high risk incursion pathways. The information will help Riverina and Murray LLS improve wild dog management. Another 22 dogs will be added to the program in coming months.

<http://murray.lls.nsw.gov.au/resource-hub/media-releases/2016/wild-dog-tracking-begins>

Pest and weed drought funding available

Local Land Services is administering funding for pest and weed control in drought affected areas. Funding will be used to reduce grazing pressure from pest animals, reduce stock losses from pest animals, and reduce the spread of weeds. Individuals, groups and organisations are welcome to apply for apply before 4 April 2016 for funding to be allocated through competitive assessment.

<http://www.lls.nsw.gov.au/agriculture/seasonal-conditions/droughts>

Economic benefits of shelter belts

This report was produced for The Basalt to Bay Landcare Network to provide the agricultural industry and individual land managers with an educational resource that could potentially bring about changes in thinking and practice.

<http://basalttobay.org.au/index.php/download-reports>

More than honey

This book, subtitled 'The survival of bees and the future of our world' examines the history and current status of our relationship to and reliance on bees, and the human behaviours that are contributing to the decline of the bee population.

<http://www.publish.csiro.au/nid/18/pid/7599.htm>

BioNet

BioNet is a web portal for accessing government-held information about plants and animals in NSW. It comprises the Atlas of NSW Wildlife, Threatened Species Profile Database, VIS Flora Survey, VIS Classification and VIS Map Catalogue. Data is collected and shared via BioNet to meet a range of regulatory, research and open data needs across a broad spectrum of users.

<http://www.bionet.nsw.gov.au/>

Help create a feather map of Australia

ANSTO and UNSW researchers are calling on people to collect wetland bird feathers to help track the movement of waterbirds around Australia. This information will be used to inform water and wetland managers about the importance of different wetlands in the lifecycles of waterbirds and to ensure that populations of Australia's waterbirds are maintained or increased.

<https://www.ecosystem.unsw.edu.au/content/rivers-and-wetlands/wetland-ecology-and-stable-isotopes/feather-map-of-australia>

ENERGY

Biofuel resource use

A recent global assessment of biofuel crop production has found that bioethanol is mostly produced with domestic crops. Altogether, biofuels rely on about 2-3% of the global water and land used for agriculture. The study evaluates the food-energy tradeoff and the impact an increased reliance on biofuel would have on the number of people the planet can feed.

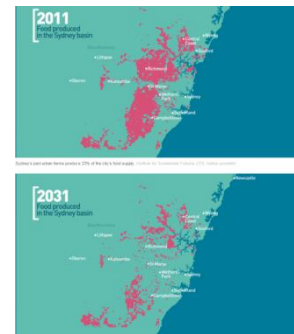
<http://www.nature.com/articles/srep22521>

FOOD

Sydney's food futures

A new study suggests Sydney stands to lose more than 90% of its current fresh vegetable production due to its expanding population unless agriculture is protected from urban sprawl. The pink areas in this map (right) show food production areas in 2011 and expected food production in 2031 under current rates of development.

<http://www.sydneyfoodfutures.net/>



Climate change impacts on yields and diet

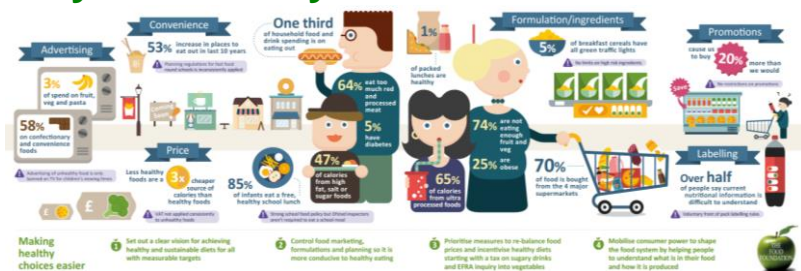
A Oxford University study has investigated the impact on crop yields and diet due to climate change. The study concludes that by 2050, climate change will lead to per-person reductions of 3.2% in global food availability, 4.0% in fruit and vegetable consumption, and 0.7% in red meat consumption. The health effects of climate change could be substantial, and exceed other climate-related health impacts that have been estimated. Strengthening of public health programmes aimed at preventing and treating diet and weight-related risk factors could be a suitable climate change adaptation strategy.

[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01156-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01156-3/abstract)

Force-fed: the unhealthy UK food system

This report looks at what typical British families eat, what is influencing their choice of food and drink, how easy it is for them to choose a healthy diet, and what government can do to make healthy choices easier.

<http://foodfoundation.org.uk/food-foundation-launches-its-first-report-force-fed/>



LAND USE

NSW right to farm policy

The NSW Government has developed a right to farm policy to assist farmers to undertake lawful agricultural practices without conflict or interference arising from complaints from neighbours and other land users. The policy covers rights and responsibilities, land use conflict, land use planning, education and awareness, and legislative options.

<http://www.dpi.nsw.gov.au/agriculture/resources/lup/legislation/right-to-farm-policy>

Native vegetation adds to value of rural properties

Analysis of the sale of 7200 rural properties in north central Victoria over 20 years has found that native vegetation could add up to 25 per cent to the value of a rural property. The study showed that landholders were willing to pay more for land in central Victoria that had some native woody vegetation on it, than land that did not.

<http://ajae.oxfordjournals.org/content/97/1/299>

Digital imagery shows land use changes at fine scale

It is now possible to adapt digital aerial photography to monitor changes as small as 10-20cm in both land use and vegetation in three dimensions. The scale of the imagery is especially suited to local government and mining companies reporting to regulators, as it can help separate mine impacts from climate, fire, grazing or other disturbances.

<http://theconversation.com/the-planners-new-best-friend-we-can-now-track-land-use-changes-on-a-scale-of-centimetres-53493>

Long term impacts of human land use

US research into the long-term effects humans have had on the land in the Mediterranean has led to some surprising reasons why communities survive or fail. One suggestion is that there are thresholds that separate success from failure. Farmers and herders can find a balance in working the land that keeps it productive. But as communities grow, they may pass unforeseen thresholds where the land-use practices that once allowed them to thrive begin to destroy the productivity of the land that supports them. Modelling experiments show that while farmers or herders can be successful, those who try to do an equal amount of both eventually fail.

<https://www.sciencedaily.com/releases/2016/01/160127141946.htm>

The science of open spaces

This US book proposes that we return to the fundamental physical laws of the universe and think about complex systems from the ground up. The book applies thermodynamics, ecology, sociology and resilience theory to real-world examples of large-scale, place-based collaborative research programs.

<http://www.publish.csiro.au/nid/18/pid/7463.htm>

SUSTAINABILITY

Agricultural sustainability is research focus

Research into soil, water and management of natural resources will have a stronger focus under the government's Agricultural Competitiveness White Paper. RDCs will be required to plan and report on RD&E expenditure against the new priorities, which also include advanced technology, biosecurity, industry promotion and on-farm adoption of R&D.

<http://minister.agriculture.gov.au/joyce/Pages/Media-Releases/awp-delivers-new-direction-for-rde.aspx>

Analysis shows organic agriculture is more sustainable

Analysis of 40 years of research comparing organic and conventional agriculture across sustainability parameters of productivity, economics, environment, and community well being, has found that organic farms tend to store more soil carbon, have better soil quality, and reduce soil erosion. Organic agriculture creates less soil and water pollution and lower greenhouse gas emissions, and is associated with greater biodiversity of plants, animals, insects and microbes as well as genetic diversity..

<https://www.sciencedaily.com/releases/2016/02/160203085855.htm>

Framework for assessing trade-offs in ecosystem services

This paper draws from economics and ecology and concludes that optimal sustainable solutions are identified by considering the linkages between natural capital, provision of ecosystem services and human well-being.

<http://www.ecologyandsociety.org/vol20/iss1/art17/>

The little sustainable landscapes book

Sustainable landscapes are a source of multiple social, economic and environmental benefits and this free book shares best practices of integrated landscape management to reconcile economic development and environmental sustainability.

http://globalcanopy.org/sites/default/files/documents/resources/GCP_Little_Sustainable_LB_DEC15.pdf

Steps to sustainable livestock conference UK

The first Steps to Sustainable Livestock conference, held in UK in January, confirmed that grazing systems provide environmental and social benefits. Grazing converts high-cellulose plant materials into high quality meat and milk, enabling productive use of land unsuitable for crops; improves biodiversity above and below the ground); and sequesters carbon. New research is investigating the potential of alternative livestock diets and breeding strategies to reduce methane emissions. The conference emphasised the need to need to consider all GHG emissions and environmental impacts associated with all stages of any given production system. Presentations will be available online soon.

<http://www.farmingfutures.org.uk/blog/sustainability-complex-there-single-diet-solution>

<http://www.globalfarmplatform.org/steps-to-sustainable-livestock-conference-2016-concluded/>

EVENTS

March 14-16	National Seed Science Forum, Mt Annan NSW http://seedpartnership.org.au/seedsienceforum
April 27-28	Climate Change Research Strategy for Primary Industries, Sydney http://www.ccrspi.net.au/event/ccrspi-2016-primary-industries-striving-climate-resilience
May 1-3	PIEFA food and fibre matters conference, Canberra http://www.piefa.edu.au/conference2016/
May 24-26	Irrigation Australia International Conference and exhibition, Melbourne http://irrigationaustralia.com.au/
June 6-8	6th National NRM Knowledge conference, Coffs Harbour http://conference.nrmregionsaustralia.com.au/
July 5-7	Climate change adaptation 2016 conference, Adelaide http://climate-adaptation.org.au/events/climate-adaptation-2016/
September 28-30	Bushfire conference, Brisbane http://www.fireandbiodiversity.org.au/bushfire-2016
December 4-8	7th International Nitrogen Initiative Conference, Melbourne http://www.ini2016.com/

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