

NRM on farms



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

September 2014

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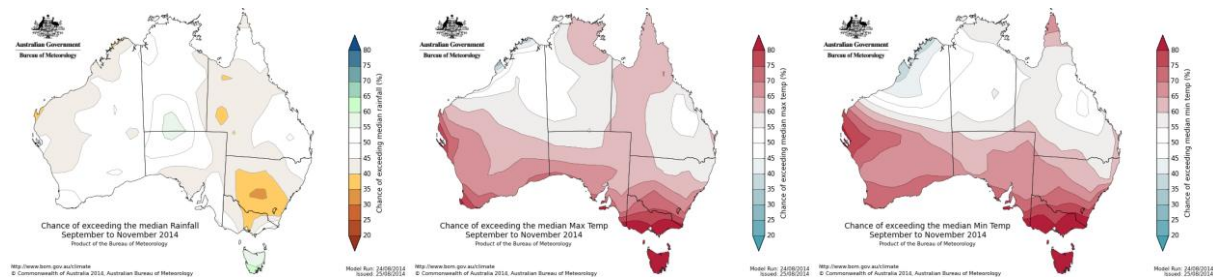
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CLIMATE

Seasonal outlook



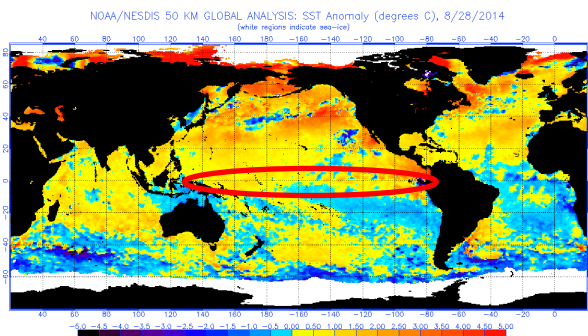
A drier than normal September to November is likely for most of NSW (above left), particularly in the central and southern regions, and particularly in September. Warmer than average days (above centre) and nights (above right) are also likely over most of the state. Climate influences include a weakening negative Indian Ocean Dipole, and near-average to warm temperatures in the tropical Pacific Ocean.

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

Ocean temperatures

Sea surface temperatures have cooled in the eastern tropical Pacific and warmed in the far western tropical Pacific.

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



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Department of
Primary Industries

El Niño still possible

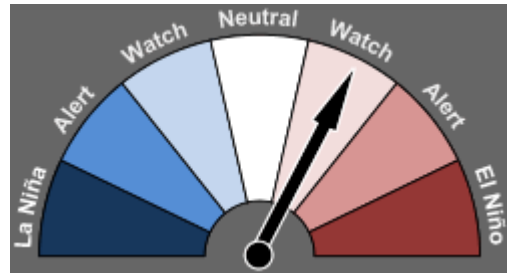
Despite tropical Pacific Ocean temperatures remaining at neutral levels, climate models suggest El Niño development remains possible during the coming months. El Niño-like weather patterns can occur even if an event hasn't become fully established. In 2014, these patterns have included below-average rainfall across parts of eastern Australia, above-average daytime temperatures and a number of significant frost events.

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

El Niño Tracker is on watch

The ENSO Tracker status is currently at an El Niño watch level. This means the chance of an El Niño developing in 2014 is at least 50% (which is double the normal chance of an event). Given current observations and model outlooks, if an event is to occur it is unlikely to be strong.

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



Model outlook

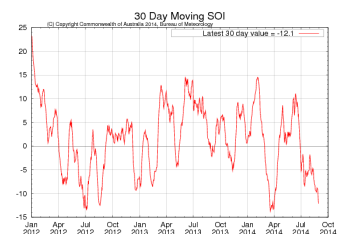


<http://www.bom.gov.au/climate/ahead/model-summary.shtml>

SOI drops to -9.3

At 24 August the 30-day SOI value was -9.3. Sustained negative values below -8 may indicate an El Niño event.

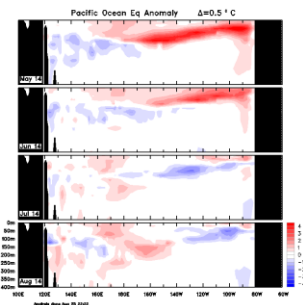
<http://www.bom.gov.au/climate/enso/#tabs=SOI>



Pacific Ocean subsurface warmth

Warm anomalies are developing in the central Pacific along with cool anomalies in the far western and shallow eastern equatorial Pacific.

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



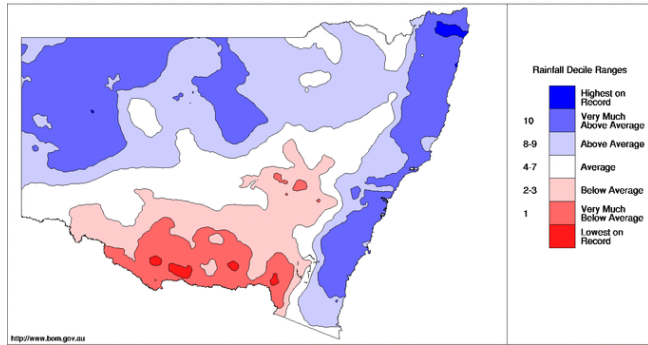
Negative IOD

The Indian Ocean Dipole remains negative but model outlooks suggest it will return to neutral in early spring. A negative IOD pattern typically brings wetter winter and spring conditions to inland and southern Australia.

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

NSW August conditions

NSW had its wettest August for 11 years, 33% above average. Most of the coastal regions recorded at least double the August average, and northern inland totals were well above average. In contrast, rain was well below average in the southwest, including the driest August since at least 1982 in Albury. Maximum and minimum temperatures were around average except in the southern inland regions, where nights were more than 5°C below normal in early August.



<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.

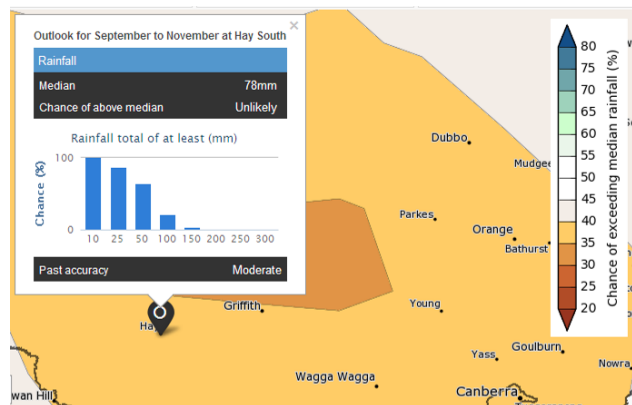
<http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>

CLIMATE RESOURCES

New BoM outlook website

The Bureau of Meteorology has a new climate outlook website which provides rainfall and temperature outlooks for three-months ahead, plus new outlooks for individual months, and maps that can be tailored for any location as shown at right. In addition, short videos feature Bureau climatologists explaining the outlook and how to interpret climate information for decision-making. You can subscribe to receive the outlook each month.

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



Atlantic warming is cooling the Pacific

UNSW research has found that rapid warming of the Atlantic Ocean has turbocharged Pacific Equatorial trade winds. This has caused eastern tropical Pacific cooling, amplified the Californian drought, accelerated sea level rise three times faster than the global average in the Western Pacific and slowed the rise of global average surface temperatures since 2001. It may even be responsible for making El Nino events less common over the past decade due to its cooling impact on ocean surface temperatures in the eastern Pacific.

<http://newsroom.unsw.edu.au/news/science/atlantic-warming-turbocharges-pacific-trade-winds-0>

Improving crop adaptation to water-limited environments

The latest edition of CSIRO's Crop and Pasture Science journal presents papers from the 2013 Interdrought IV conference in Perth, a platform for presenting and debating key issues and strategies relevant to increasing the yield and stability of crops under drought conditions by system, crop, and plant manipulation approaches.

<http://www.publish.csiro.au/pid/7389.htm>

Useful to Usable US climate tools

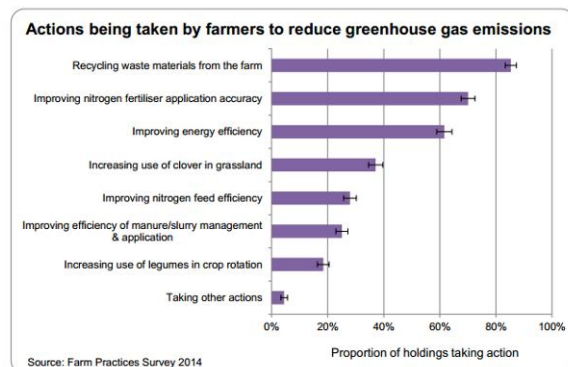
Useful to Usable (U2U) is an integrated research and extension project working to improve farm resilience and profitability in the North Central US by transforming existing climate data into usable products for the agricultural community. The project aims goal is to help producers make better long-term plans on what, when and where to plant, and also how to manage crops for maximum yields and minimum environmental damage.

https://mygeohub.org/groups/u2u/decision_resources

UK agricultural statistics and climate change

This report summarises statistics that relate to emissions, and links to statistics on farmer attitudes to climate change mitigation and uptake of mitigation measures. It also incorporates information on developing research and provides some international comparisons.

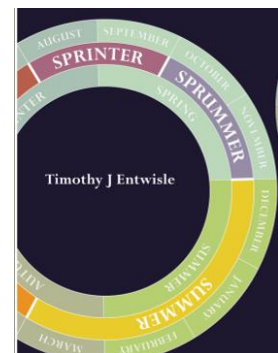
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337803/Agriclimite-5edition-30jul14.pdf



Sprinter and Sprummer: Australia's changing seasons

This new book challenges the concept of four seasons, and suggests it would be better to divide up the year based on what Australian plants do rather than ancient rites of the Northern Hemisphere. Tim Entwistle, Director of the Melbourne Botanic Gardens, proposes a new five-season approach, explaining the characteristics of each season, along with the biological changes that define them. The final chapter considers climate change and how the seasons are shifting whether we like it or not.

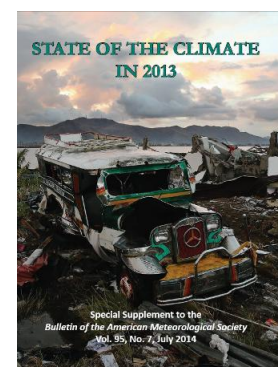
<http://www.publish.csiro.au/nid/18/pid/7221.htm>



Global state of the climate in 2013

In 2013, most global climate indicators continued to reflect trends of a warmer planet, according to the American Meteorological Society's 2013 State of the Climate report. Greenhouse gases continued to climb, warm temperature trends continued near the Earth's surface, sea surface temperatures increased, and sea level continued to rise.

http://www.noaanews.noaa.gov/stories2014/20140717_stateoftheclimate.html



EMISSIONS

New CFI methodology for feeding nitrates to beef cattle

The Clean Energy Regulator has released a new CFI methodology to reduce greenhouse gas emissions by feeding nitrates to beef cattle. Projects using this methodology avoid emissions by replacing urea supplements with nitrate supplements, which reduces the methane generated by the cattle's digestive system.

<http://www.cleanenergyregulator.gov.au/Carbon-Farming-Initiative/methodology-determinations/Pages/default.aspx>

CFI methodology decision tree now available

The Clean Energy Regulator has developed a sequestration methodology decision tree to help users choose the right sequestration methodology for their situation.

<http://www.cleanenergyregulator.gov.au/Carbon-Farming-Initiative/methodology-determinations/sequestration-offsets-projects/Documents/CFI%20decision%20tree.pdf>

Australian emissions policy overview

This short article from ANU researchers provides a plain English overview of policy approaches to reducing emissions in Australia.

<https://theconversation.com/stopgap-carbon-policies-far-from-perfect-but-better-than-nothing-29982>

WATER

Water monitoring framework

The NSW Government has announced a water monitoring framework to map and protect NSW underground water resources. The maps will analyse where industries such as agriculture and mining draw their water from and the volume allocated within the different systems. Monitoring bores will be installed across the key basins and real-time data from these bores will be published on the NSW Office of Water website. The data will quickly identify any threats to these water resources. Mapping will start in the Gunnedah, Gloucester and Clarence Moreton basins.

<http://www.water.nsw.gov.au/Water-management/Groundwater/Water-Monitoring-Framework>

Bioregional water assessment

The Australian Government is undertaking a program of bioregional assessments to understand the potential impacts of coal seam gas and large coal mining developments on water resources and water-related assets. The program has a new website, and context statements for the Galilee, Gloucester, Maranoa-Balonne-Condamine and Namoi subregions, and the Clarence-Moreton bioregion are available.

<http://www.bioregionalassessments.gov.au/>



Review of Australian Environmental Water Management

Since the 2012 review, NSW has released 17 new water sharing plans which brings the total number of water sharing plans to 74, covering 95 per cent of water extracted in NSW. The 2014 review contains detailed information about water sharing in each state, and includes case studies that provide examples of good practice, such as establishing targeted monitoring programs and improving confidence in the ecological objectives of environmental water provisions (commonly identified as needing further improvement).

<http://www.nwc.gov.au/publications/topic/sustainability-and-groundwater/AEWM-2014-review>

MDBA environmental watering outlook

The MDBA has released its 2014-15 Basin environmental watering outlook. The outlook identifies specific priority watering needs for the 12 months and complements the state watering priorities, which take a more local perspective.

<http://mdba.gov.au/what-we-do/environmental-water/environmental-watering-priorities/priorities-14-15>

Diet changes reduce water use

A European study into the impact of diet change on global water resources found that by reducing the animal product contribution in the diet, global rainwater consumption decreased up to 21 % and irrigation water demand decreased by up to 14 %. However, there were substantial regional differences in water savings.

<http://www.aalto.fi/en/current/news/2014-08-04/>

SOILS

The influence of land use and management on soil carbon

A study of soil carbon levels under different land uses in central west NSW found that cropping systems had lower soil organic carbon stocks than pasture systems. In cropping systems, higher amounts of P fertiliser were associated with higher organic carbon, and higher amounts of N fertiliser were associated with lower carbon. In pastures, the proportion of bare ground was associated with lower carbon levels. These associations indicate there is an opportunity to increase soil organic carbon by converting cropping land to permanent pasture, increasing the frequency of pasture phases, changing crop fertiliser regimes and reducing bare ground in pastures, but further work is needed to verify the causality behind these associations.

<http://www.sciencedirect.com/science/article/pii/S0167880914003569>

NSW carbon farming soil findings

Research into the influence of 'carbon farming' practices on soil carbon stocks in northern NSW, compared with conventional grazing and cropping, found that higher enzyme activity and indication of greater efficiency of microbial populations on carbon farming sites suggests a greater potential to build soil carbon under these practices. Further research is required to investigate whether the indicative trends observed reflect real effects of management.

<http://www.publish.csiro.au/paper/SR13043.htm>

CO₂, water and energy fluxes in irrigated broad-acre crops

A study of rice, wheat and maize grown in the Coleambally Irrigation Area found that all three crops acted as a net carbon sink over the growing season, with the rate of carbon assimilation affected by seasonality and the plant's photosynthetic pathway. Maize, a C₄ plant, exhibited the greatest capacity for carbon uptake during the summer months, and C₃ winter wheat exhibited the least.

<http://link.springer.com/article/10.1007%2Fs12665-014-3547-4#page-1>

Soil carbon storage is ineffective

A review of research into the effects of agricultural management practices such as conservation tillage, residue retention, pastures and nitrogen fertiliser on soil carbon sequestration in Australia found these strategies would result in only 53.3 million tonnes of CO₂ equivalent sequestered in soil and would therefore not meet the 85 million tonnes targeted in the Coalition's Direct Action Plan. The review also found that even at the relatively high carbon price of \$23/tonne, all practical soil management practices lost at least \$3 per hectare per year, and under normal cropping practices, farmers would need about \$36 per hectare to break even on carbon payments.

<http://www.futurity.org/should-australian-farms-store-carbon-in-soil/>

No till mitigation claims overstated

An international review has concluded that claims for climate change mitigation from converting to no-till agriculture have been over-stated. No-till agriculture has a role to play in global food security and protection of soils, and thus building agricultural systems that are more resilient to climate and weather variability. Climate change mitigation is a small, but useful, additional benefit, not the key policy driver for its adoption.

<http://www.rothamsted.ac.uk/news/role-no-till-agriculture-climate-change-mitigation-may-be-over-stated>

Soil amendments rebalance nematode populations

Organic soil amendments (biochar, composts and rice hulls) applied to soil in a Riverina vineyard increased the ratio of beneficial to parasitic nematodes associated with grapevine roots. The findings offer an alternative nematode pest management strategy to pesticides.

<http://www.publish.csiro.au/nid/84/paper/SR14041.htm>

Plant growth responses to biochar in Australian soils

This review concludes that moving towards effective integration of biochar as a management tool will not only require stratification based on soil types, but wider consideration of the main plant production constraints, such as pH, pertinent to a particular system.

<http://link.springer.com/article/10.1007%2Fs00374-014-0921-z#>

Earthworms encourage microbial activity

French trials of earthworm impacts in different tropical soils found that worm activity increased soil microbial activity, and nitrogen and phosphorus availability, in more fertile soil. The earthworms did not affect intrinsic biological properties which were controlled mainly by quality of soil organic matter, and carbon availability. Inputs of labile organic matter are likely to be required to further increase nutrient availability in infertile tropical soil.

<http://www.publish.csiro.au/nid/84/paper/SR14034.htm>

Soil microbes convert nitrous oxide to nitrogen

French researchers have found that the ability of soils to eliminate nitrous oxide can be explained by microorganisms that transform it into atmospheric nitrogen. The scientists identified several groups of microorganisms that could act as bio-indicators for the capacity of European soils to transform nitrous oxide into nitrogen. The team is currently working on identifying farming practices that could stimulate these microorganisms, to ensure sustainable agricultural production.

<http://presse.inra.fr/en/Resources/Press-releases/Greenhouse-gases-a-new-group-of-soil-micro-organisms-can-contribute-to-their-elimination>

Understanding dispersive soils

This digital book is an introduction to dispersive soils and their management. It relates mostly to Queensland but the principles are applicable to other areas. The file is large, so is best downloaded rather than viewed online.

<http://landcare.org.au/resources-links/achieving-soil-conservation-in-queensland/>

Papers on soil carbon and methane

Plant and Soil journal has published two free virtual issues of papers on soil carbon, and factors affecting methane fluxes in terrestrial ecosystems.

Soil carbon: <http://news.springer.com/re?!=D0In5sboal6hj77u7lp>

Methane: <http://www.springer.com/life+sciences/plant+sciences/journal/11104>

Soil activities ideas

A booklet of soils activities for 5-20 year olds is now available as part of the Youth and United Nations Global alliance challenge series which also includes water, forests, biodiversity and climate change.

<http://yunga-youth.weebly.com/themes.html>



ENERGY

Bioenergy potential in livestock industries

A study tour of bioenergy potential in livestock industries identified four key research areas: cost effective biogas production, the management and uses of the energy produced from biogas production, nutrient recovery and utilisation, and the processing of deep litter residues.

<http://www.issinstitute.org.au/wp-content/media/2014/06/Report-PIETSCH-FINAL-LowRes.pdf>

Energy Farmers Australia is technology finalist

Energy Farmers Australia is a finalist in the 2014 Australian Technologies competition. The WA company works with farmers, farmer groups and landholders to design and develop waste to energy and bioenergy projects in rural areas of Australia. They specialise in projects that utilise gasification, pyrolysis and anaerobic digestion technology to treat a wide range of waste streams, and integrate bioenergy and biochar into Australian farming systems.

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

BIODIVERSITY

NSW biodiversity legislation review

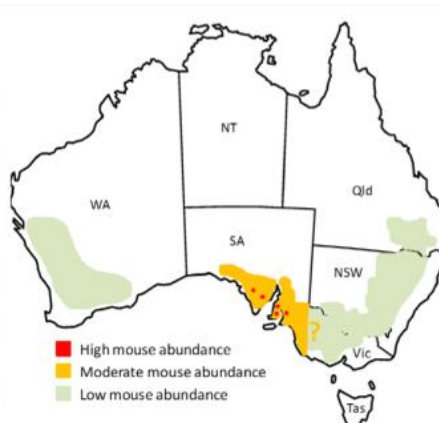
The Minister for the Environment has appointed an independent panel to undertake a comprehensive review of the Native Vegetation Act 2003, Threatened Species Conservation Act 1995, Nature Conservation Trust Act 2001 and related legislation with a view to streamlining biodiversity legislation and reducing red tape. Submissions close on Friday 5 September 2014.

<https://engage.environment.nsw.gov.au/biodiversity-legislation-review>

MouseAlert website

MouseAlert is a new interactive website allowing grain growers and farmers to record and view mouse activity in their local area. Data entered will help with early-warning of increases in mouse activity and better forecasts for plagues. Rapid response by growers can then minimise mouse damage.

www.mousealert.org.au



Report on fenthion restriction in horticulture

A Senate committee report into the implications of restricting fenthion to control fruit fly has recommended that state and territory governments consider developing legislation to compel landowners to manage their properties to an acceptable standard that does not pose a biosecurity risk to neighbouring properties and surrounding regions.

http://www.apf.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Fenthion

Regional guidelines for pest-suppressive landscapes

CSIRO research into characteristics of pest-suppressive landscapes consistently found that native vegetation supports a large number of natural enemies of crop pests, relative to the number of pest species. The research has produced region-specific guidelines outlining which weeds are key hosts for particular pest species, and which native species are best for beneficial insects.

<http://www.nipi.com.au/research/pest-suppressive-landscapes/>

French dung beetle emigrates to WA

CSIRO has introduced a French dung beetle *Onthophagus vacca* to WA to cover the early spring gap when few Australian beetles are active and migrating bush flies (*Musca vetustissima*), move in. The introduction is part of a Meat and Livestock Australia-funded dung beetle project across southern Australia.

<https://www.agric.wa.gov.au/news/new-dung-beetle-tackle-flies-great-southern>

<http://www.csiro.au/Outcomes/Food-and-Agriculture/DungBeetles.aspx>



Rice growers bring in the bitterns

Riverina rice growers are helping the endangered bittern flourish in their rice fields by adapting their practices to suit bittern breeding habits. Aerial sowing seems to encourage bittern food sources; maintaining cumbungi on the edge of the rice encourages the bitterns to roost and feed in these areas.

<http://www.rga.org.au/f.ashx/Bittern-Friendly-Rice-Growing-Tips-2014.pdf>

<http://www.ecosmagazine.com/paper/EC14195.htm>

Bird-friendly gardens in bush fire areas:

One of the main ways to reduce bushfire risk is a well-designed and maintained garden that acts as an Asset Protection Zone (APZ), a fuel-reduced area surrounding a built asset such as a house or shed. It is a key element in reducing the impact of bush fire along with house and property maintenance and a Bush Fire Survival Plan, and can also provide habitat and offer food, shelter and water for native animals.

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

Climate change adaptation plan for Australian birds

This new book from CSIRO book outlines how climate change will affect all Australian birds, explains why some species are likely to be more exposed or sensitive to it than others, and explores the theory and practice of conservation management under the realities of a changing climate.

<http://www.publish.csiro.au/nid/20/pid/6995.htm>

Biodiversity: Science and solutions for Australia

This new free e-book from CSIRO includes a chapter on retaining biodiversity in farming landscapes.

<http://www.csiro.au/biodiversitybook>

Woody weed encroachment in US grasslands

A US study of grasslands and savannahs has found that they are being taken over by woody plants such as trees and shrubs. Hypotheses as to why woody plant encroachment is happening include fire reduction, grazing intensity, climate change, and increased carbon dioxide in the atmosphere.

<http://www.pnas.org/content/early/2014/08/14/1320585111>

Feral photos 2014

The Invasive Animals CRC is calling for photographs of feral animals for its annual Feral Photos competition. Pictured is last year's competition winner,

www.invasiveanimals.com/feral-photos



FOOD

R&D decline threatens food security

This new paper from Future Directions International on declining agricultural research and development in Australia concludes that to ensure future food security, policymakers must work towards developing an integrated research and extension system that encourages the private sector to invest responsibly, and sets long-term goals for the whole agricultural sector.

http://www.futuredirections.org.au/files/sap/Declining_Research_and_Development_Investment_-_A_Risk_for_Australian_Agricultural_Productivity.pdf

Global review of food and water security

In this review, Future Direction International explores the risk of food and water crises occurring between now and 2050; the likely locations of such crises; and how we can avert them. Understanding these questions is the starting point for regenerating the global food system and seeking to sustainably reduce hunger worldwide.

http://www.futuredirections.org.au/files/Landmark%20Studies/Food%20and%20Water%20Security/FDI_Food_and_Water_WEB.pdf

International sustainable food systems panel established

An international panel on sustainable food systems (IPES-Food) has been established to engage in evidence-based advocacy on sustainable food systems and diets. At least 75 per cent of its members will be internationally recognised scientists from disciplines such as ecology, environment nutrition, food sociology, and food production and consumption. The panel will analyse and synthesize evidence in the field of sustainable food systems and diets, - Identify knowledge gaps, and develop tools for decision makers to determine national guidelines on sustainable diets.

<http://www.ecomagazine.com/paper/EC14159.htm>

We love food and fibre

The Primary Industries Education Foundation has produced a booklet of school resources on food and fibre categorised by year level and curriculum strand.

<http://www.primaryindustrieseducation.com.au/resources/general/scienceweek.pdf>

School food matters

This UK program focuses on improving school food and helping children understand where food comes from and how it grows.

<http://www.schoolfoodmatters.com/>

LAND USE

Australian land use

Agricultural land represented 52 percent of Australia's total land area in 2012-13. Around 86 per cent was used for grazing, and just under eight per cent used for crops. The remaining

land was set aside for other activities like conservation, forestry plantation or other uses. From a state perspective, the highest proportion of land managed by agricultural businesses was in Queensland (75% of state area), whilst Tasmania had the lowest proportion (24% of state area).

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

SUSTAINABILITY

Australia's environmental priorities

In this new book from CSIRO Australia's leading environmental thinkers have written provocative chapters on what must be done to tackle Australia's environmental problems – in terms of policies, on-ground actions and research. Each chapter begins with a brief overview of the 10 key tasks that need to be addressed in a given field, and then each issue is discussed in more detail. Chapters cover ecosystems, production sectors, including agriculture, and cross-cutting themes, such as climate change and water.

<http://www.publish.csiro.au/nid/18/pid/7276.htm>

Principles for regenerative landscape management

Soils for Life has published a list of principles for landscape management that are consistent across all their farmer case studies, regardless of enterprise or location.

<http://www.soilsforlife.org.au/principles>

Sustainable farming blog

Queensland cattle farmers Shane and Shan Joyce are restoring a degraded property from scratch and keeping a blog on their work to build a healthy, regenerating landscape.

<http://www.soilsforlife.org.au/blog/kumbartcho>

Pastures in a farming system

This new book from Tocal College outlines how pastures fit in a farming system for livestock, cropping and the environment. It describes how to achieve the right balance of species by careful observation and grazing management, no matter what livestock species are being grown.

<http://www.dpi.nsw.gov.au/aboutus/resources/bookshop/agguide-pastures-in-a-farming-system>

Nuffield Report on sustainable grazing

UK farmer Robert Thornhill travelled the world to find alternative forages that could prove better than straight ryegrass, increase the resilience of pasture to climatic variables, and investigate whether mixed swards could improve animal and soil health. His conclusions, published in his Nuffield Report, are that the rest period between grazings determines the health of the pasture, increasing the number of plant species in the sward brings health benefits to stock and soil, diverse pastures may help dairy farms reduce their environmental footprint, and a balanced soil is the foundation of all production. To read his full report, go to the site below, which also lists other Nuffield Reports.

<http://nuffieldinternational.org/reports/>

Revitalising grasslands

This special Issue of the journal Crop and Pasture Science journal contains a selection of papers presented at the 2013 International Grasslands Congress in Sydney.

<http://www.publish.csiro.au/nid/43/issue/7228.htm>

Australian farming population is 'competitively young'

A new RIRDC study has found that, while the number of young people entering agriculture continues to fall, Australia's farm population remains 'competitively young' compared to other developed economies. The number of farmers aged under 35 years of age has fallen by 75% since 1976, largely due to farm aggregation, along with structural ageing of the Australian workforce and delayed entry due to longer years in tertiary education.

<https://rirdc.infoservices.com.au/items/14-003>.

EVENTS

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|--------------------|---|
| September 1-4 | Australasian Weeds Conference, Hobart
http://australasianweeds2014.com.au/ |
| September 17-19 | National Landcare Conference, Melbourne
http://www.landcareonline.com.au/nationalconference |
| September 30-Oct 2 | National Climate Adaptation conference, Gold Coast
http://www.nccarf.edu.au/conference2014/ |
| November 23-27 | National Soil Science conference, Melbourne
http://www.soilscience2014.com/ |
| November 24-25 | Food, planet and people, Agrifood conference, Sydney
http://sydney.edu.au/environment-institute/events/agrifood/ |
| December 1-2 | Bioenergy Australia 2014
http://www.bioenergyaustralia.org/ |

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NRM on Farms is a monthly 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.