NRM on farms

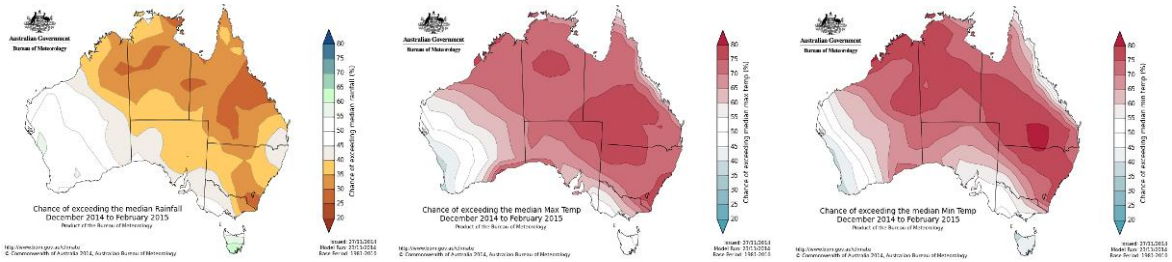
A monthly news summary about climate and natural resources in agriculture.

December 2014

CONTENTS

CLIMATE

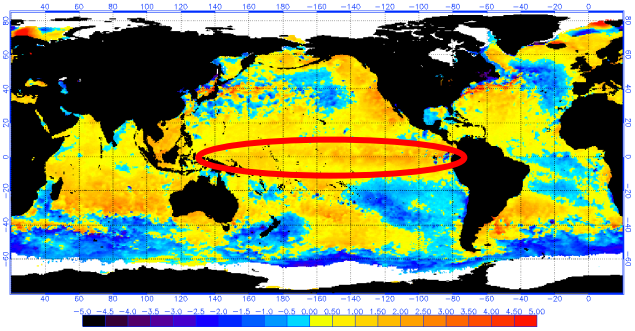
Seasonal outlook



The seasonal outlook for NSW is for a drier and warmer than usual summer. Climate influences include El Niño-like conditions in the tropical Pacific Ocean, and average to cooler waters surrounding northern Australia.
http://www.bom.gov.au/climate/outlooks/#/overview/summary/

Ocean temperatures

The Bureau's climate outlook model POAMA suggests sea surface temperatures in the tropical Pacific will persist near El Niño levels for two to three months.
http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/index.html

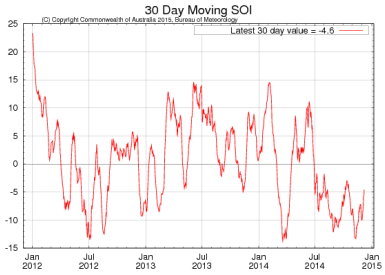


NSW GOVERNMENT Department of Primary Industries

El Nino now on alert

The Bureau's ENSO Tracker status is currently at alert, indicating at least a 70% chance that El Niño will be declared in the coming months. The chances of 2014 being considered an El Niño year have increased over recent weeks due to tropical Pacific Ocean temperatures exceeding El Niño levels for a month, and the Southern Oscillation Index remaining at or near El Niño levels for three months. Regardless of whether an El Niño is declared, El Niño-like effects are likely, as shown by the seasonal outlook for a drier and warmer summer is likely for many parts of Australia. If an El Niño is established, models suggest it will be weak, or moderate at most.

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



SOI remains negative

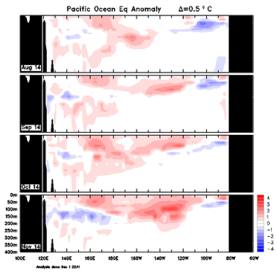
The Southern Oscillation Index has remained between around −11 and −7 in past weeks. Sustained negative values below −8 may indicate an El Niño event.

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

Models forecast weak El Nino

Most of the models surveyed forecast tropical Pacific Ocean sea surface temperatures to be close to, or exceeding, El Niño thresholds in December. Two out of eight international climate models indicate temperatures in the equatorial Pacific Ocean will exceed El Niño thresholds by February 2015, with four additional models suggesting values close to El Niño thresholds.

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



Pacific subsurface is warming

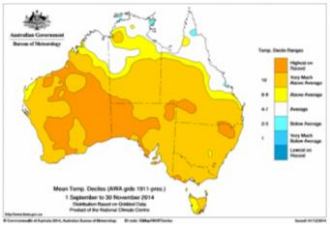
The four-month sequence of sub-surface temperature anomalies to November shows warm anomalies were present across most of top 200m of the equatorial sub-surface profile.

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

Record spring temperatures

Spring 2014 was Australia's warmest on record, 0.1°C warmer than the previous record in spring 2013. Temperatures were 1.67°C above the 1961–1990 average, the largest such departure from the long-term average observed since national records began in 1910. The previous record seasonal departure was 1.64 °C above the average in autumn 2005.

http://www.bom.gov.au/climate/current/statements/scs50.pdf



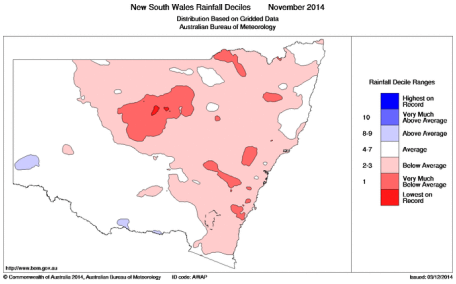
Low streamflow outlook

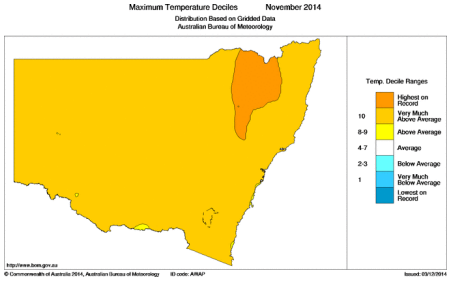
Low streamflows were recorded at almost all locations across eastern Australia in November. Over summer, low flows are forecast at 42 of the 46 locations where forecast skill is acceptable. Forecasts are not issued at 28 locations due to very low forecast skill.

http://www.bom.gov.au/water/ssf/

Warm and dry November for NSW

November in NSW was warmer and drier than average, with statewide rainfall 54% below average, the driest November since 2002. Both maximum (+4.06°C) and minimum (+2.14°C) temperatures were very much above average across the State, resulting in the fourth-warmest November on record for statewide mean temperatures.





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

AdaptNSW website launched

The Office of Environment and Heritage has launched its AdaptNSW website to help people in the state understand and adapt to the impacts of climate change. The website has information on climate projections for NSW, expected impacts, adaptation techniques and education resources.
http://climatechange.environment.nsw.gov.au/

El Nino over the past 21,000 years

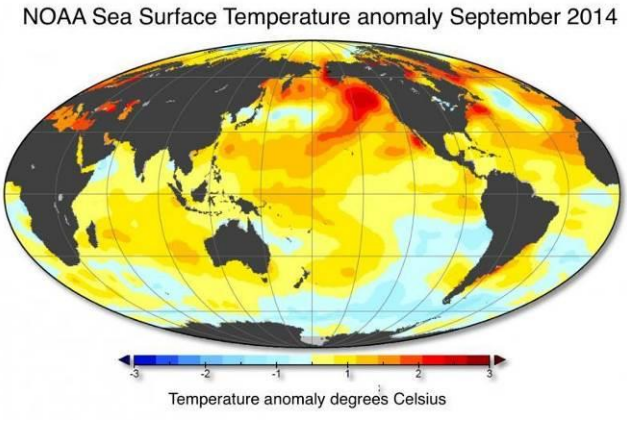
A study of El Nino over the last 21,000 years has found that before the start of the Holocene 12,000 years ago it was most strongly influenced pulses of melting water during deglaciation. Since then, changes in Earth's orbit have played the greatest role in intensifying it, and El Nino has intensified over the last 6,000 years.
http://www.news.wisc.edu/23324

Pacific warming setting up for stronger El Nino events

Salinity and temperature records from corals in a remote Pacific island in Kiribati show the ocean has warmed over the last sixty years and has set up the conditions for stronger El Niño weather events, which could significantly affect Australian weather.
http://cmbe-cpms.anu.edu.au/whats-on/all-news/ocean-primed-more-el-nino

NSW GOVERNMENT | Department of Primary Industries

North Pacific temperatures soar



2014 has seen the highest global mean sea surface temperatures ever recorded due mostly due to the North Pacific. In April and May westerly winds pushed very warm water along the equator to the eastern Pacific. This warm water has spread along the North American Pacific coast, releasing heat that had been locked up in the Western tropical Pacific for nearly a decade. Record-breaking greenhouse gas concentrations and anomalously weak North Pacific summer trade winds, which usually cool the ocean surface, have contributed further to the rise in sea surface temperatures. The warm temperatures now extend from just north of Papua New Guinea to the Gulf of Alaska.
http://www.uhm.hawaii.edu/news/article.php?aId=6860

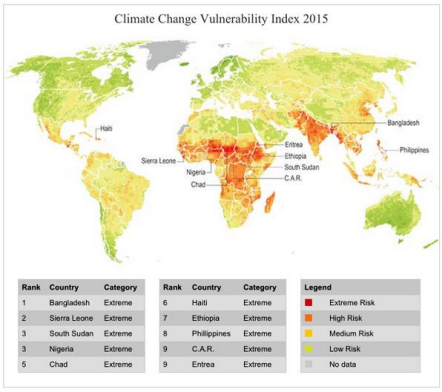
Resilience to extreme weather

The UK Royal Society's new report 'Resilience to extreme weather' looks at how improvements can be made to protect lives and livelihoods during floods, droughts and heatwaves.
https://royalsociety.org/policy/projects/resilience-extreme-weather/

Education is key to adaptation

Analysis of natural disaster data for 167 countries over the past four decades shows that in many cases education could be a better investment in protecting people from the impacts than conventional investments such as building sea walls, dams and irrigation systems.
http://www.iiasa.ac.at/web/home/about/news/20141127-Science-Pop.html

Risk of conflict in farming dependent countries



Climate change and food insecurity are 'threat multipliers', and 32 countries dependent on farming face an 'extreme risk' of conflict or civil unrest in the next 30 years, according to global analytics firm Maplecroft. A common feature of the states most affected is their dependence on agriculture; 65 per cent of their combined working populations are employed in farming, which contributes 28 percent of their overall economic output. The report suggests strategies such as drought-resistant crops, more resilient infrastructure, economic diversification and poverty reduction.
http://maplecroft.com/portfolio/new-analysis/2014/10/29/climate-change-and-lack-food-security-multiply-risks-conflict-and-civil-unrest-32-countries-maplecroft/l

Confronting the new climate normal

As the planet warms further, heat-waves and other weather extremes that now occur once in hundreds of years will become normal, according to a new World Bank report 'Turn down the heat: Confronting the new climate normal.' The consequences for development will be severe, with declines in crop yields, shifts in water resources, a rise in sea-levels and the livelihoods of millions of people put at risk. The report is the third in the World Bank's Turn Down the Heat series.
http://documents.worldbank.org/curated/en/2014/11/20404287/turn-down-heat-confronting-new-climate-normal-vol-2-2-main-report

EMISSIONS

Changes to ERF Rules

The amended Carbon Farming Initiative Amendment Bill 2014 was passed by Parliament On 24 November 2014. Once proclaimed, the Bill will establish the Emissions Reduction Fund. The Department of the Environment is seeking community views on new rules to support the operation of the Fund. These rules cover applying for and receiving credits; purchasing rules; contract length; eligible offsets project applications; and reporting, and audit requirements. Closing date for comments is 19 December 2014.
http://www.environment.gov.au/system/files/resources/5e2fe53b-9eae-4d9c-8851-80c32de9387d/files/erf-upate-special-edition-december2014.pdf

New ERF methods proposed for soil carbon and fertiliser

Four new ERF methods have been developed in consultation with industry and technical working groups, including the sequestration of soil carbon and fertiliser use efficiency in irrigated cotton. The soil carbon method uses modelled estimates of soil carbon storage and builds on the soil carbon method for grazing systems released for use under the Carbon Farming Initiative. The fertiliser method provides for reducing emissions by using synthetic fertiliser in irrigated cotton more efficiently. The draft method gives participants the flexibility to select a broad range of management actions that will achieve these emissions reductions. The other two methods relate to energy efficiency.
http://www.environment.gov.au/system/files/resources/5e2fe53b-9eae-4d9c-8851-80c32de9387d/files/erf-update-december2014.pdf

Carbon farming in NSW rangelands

Last month ABC's Landline program featured NSW rangelands farmers who are investing in fencing to remove native and feral animals from their land to reduce grazing pressure and build soil carbon, and participate in the Carbon Farming Initiative. You can read the transcript of the program at the link below.
http://www.abc.net.au/landline/content/2014/s4124482.htm

Practices to reduce carbon footprint of wheat

Canadian researchers have found that reducing the fallow period frequency of wheat crops and increasing the inclusion of nitrogen-fixing grain legumes such as lentils could remove more CO2 from the atmosphere than is emitted during production.
http://www.nature.com/ncomms/2014/141118/ncomms6012/full/ncomms6012.html

Higher CO2 reduces plant zinc and iron levels

Elevated carbon dioxide in the atmosphere results in lower concentrations of zinc and iron in C3 grains and legumes, whereas C4 crops seem to be less affected, according to a new international study. Differences between cultivars of a single crop suggest that breeding for decreased sensitivity to atmospheric CO2 concentration could partly address these new challenges to global health.
http://news.harvard.edu/gazette/story/2014/05/rising-co2-poses-significant-threat-to-human-nutrition/

Crop productivity increases carbon dioxide seasonality

US research has found that a steep rise in the productivity of crops grown for food accounts for as much as 25 percent of the increase in carbon dioxide seasonality. The study found that while the area of farmed land has not significantly increased, the production efficiency of that land has. Cropland makes up just six percent of the vegetated, or green, area of the Northern Hemisphere but is a dominant contributor to the increase in the CO2 seasonality cycle.
http://www.news.wisc.edu/23298

Dietary change needed to reduce emissions

A UK survey of public understanding of the links between livestock and climate change found that emissions from global transport were more likely to be identified contributing to climate change than meat and dairy production, despite the fact that the two sectors contribute to global emissions in approximately equal amounts. The survey concludes that addressing dietary trends has to be part of an international strategy to reduce emissions.
http://www.chathamhouse.org/

WATER

Irrigation efficiency for southern NSW

The fifth and final round of the On-Farm Irrigation Efficiency Program is open with $125 million of funding for the Murrumbidgee, NSW Murray and the Lower Darling. Eligible organisations include irrigation infrastructure operators, catchment management authorities, commodity or agricultural industry groups, and regional irrigation bodies. Water savings generated by on-farm projects will be shared between proponents and the environment, with at least 50 per cent of the savings transferred to the Federal Government. The closing date for funding applications is 19 March 2015.
http://www.environment.gov.au/water/rural-water/srwui/on-farm-irrigation-efficiency-program

Rolling water tender opens for southern NSW water

The Australian Government has commenced a water purchase tender for eligible high and general security licences in the southern NSW catchments of Lower Darling, Murray and Murrumbidgee. The rolling tender, open until 10 April 2015, includes multiple submission and evaluation periods so sellers can revise unsuccessful offers and make new submissions.
http://www.environment.gov.au/water/rural-water/restoring-balance-murray-darling-basin/water-purchase-tender-southern-nsw

Monitoring of MDB environmental water

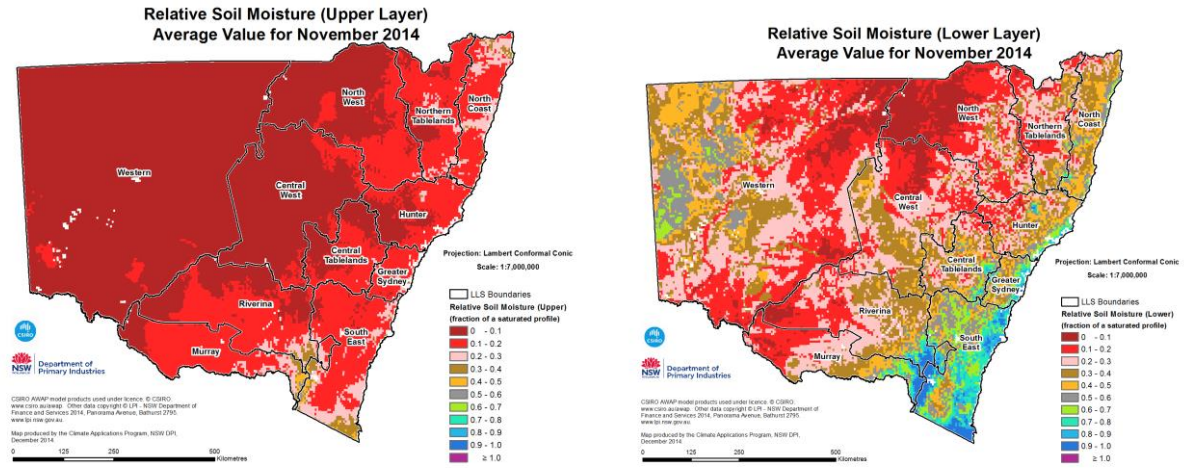
Environmental watering in the Murray Darling Basin will be monitored for the next five years to understand the impact of environmental water in the rivers and wetlands inform how environmental water is managed, provide the best environmental returns for the water used and demonstrate what is being achieved through the Basin Plan.
http://www.environment.gov.au/minister/birmingham/2014/mr20141112.html

Water and diet

Virtual water is all the water consumed during the production of a commodity or a service. This water is divided into green water (rainfall), blue water (irrigation water) and grey water (waste water). In the UK two thirds of virtual blue water consumed as food and drink is incurred overseas, particularly from other European countries or Africa, with Spain and South Africa particularly big exporters to the UK. The use of virtual water estimates and global datasets of water scarcity can help to understand the potential environmental impacts of alternative diets.
http://www.fcrn.org.uk/research-library/water/water-footprinting/impact-healthier-dietary-scenarios-global-blue-water-scarc

SOILS

Topsoil moisture low throughout NSW



Topsoil moisture was low throughout the state in November (above left), while subsoil moisture (right) was confined to the south-east of the state. Maps are provided by the NSW seasonal conditions report.
http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports

Nitrogen losses from fertiliser

NSW DPI research into ammonia losses from N fertiliser found an average loss of 11% from urea on fallowed soil and 5% in wheat crops. Surface spreading of N fertiliser in autumn-winter on medium-heavy clay cropping soils of the northern Australian grains region should not result in major nitrogen loss.
http://www.publish.csiro.au/nid/84/paper/SR14107.htm

Soil and landscape grid of Australia

Australia is now mapped on a 90 by 90 metre grid, down to two metres below the surface. The Soil and Landscape Grid of Australia draws information from several agency databases, and the information is freely available to all users.
http://www.clw.csiro.au/aclep/soilandlandscapegrid/index.html

Biochar challenges in Australia

A new review of identifies some emerging and novel applications of biochar and suggests some priority research areas that need immediate attention in order to realise the full potential of biochar technology in agriculture and other sectors in Australia.
http://www.publish.csiro.au/nid/84/paper/SR14112.htm

Removing soil organisms affects plants and productivity

A US study has found that removing soil organisms such as earthworms and beetles from soils altered the plant species that grew in the ecosystem, reduced overall productivity, and produced plants that were less responsive to common agricultural management, such as fertilisation. The researchers found that removing the animals did not affect plant yield or the rate of carbon dioxide loss from the system in the first six months but after 500 days there were huge changes in the ecosystem processes, including plant productivity
http://environment.yale.edu/news/article/study-creepy-crawlers-play-key-role-in-structure-grasslands/

Cover crops increase soil carbon

A 12-year US study has found that cover crops increase soil organic carbon but do not improve crop yields. Soil organic carbon stock gains were 30 percent higher for no-till, 10 percent higher for chisel ploughed, and 18 percent higher for mouldboard-ploughed plots.
http://news.aces.illinois.edu/news/cover-crops-can-sequester-soil-organic-carbon

Tillage method has little effect on carbon sequestration

Long term French research has demonstrated that soil carbon sequestration under continuous annual tillage, minimum tillage or no-tillage was identical after 41 years. Under minimum tillage carbon sequestration increased at the surface and decreased at depth, increased in dry years and reduced in years of significant rainfall. Over the long term, the effectiveness of tillage methods depends on climate conditions, especially rainfall.
http://www.alphagalileo.org/ViewItem.aspx?ItemId=147320&CultureCode=en

Global survey finds fungi patterns determined by climate

A genetic survey of the world's fungi has found that Earth's climate, rather than plant diversity, represents the strongest influence on global patterns of fungus distribution. Annual precipitation appears to be the strongest driver of fungal distribution, but the overall number of fungal species doesn't decline with latitude as sharply as plant species do. Ecosystem services provided by fungi, such as degradation, are probably less sensitive to climate compared to primary production of organic matter by plants. The study also shows that it's only possible to assign a species name to 10% of the fungi found in soil.
http://www.aaas.org/news/science-climate-driving-distribution-and-diversity-fungi

ENERGY

Biomass opportunities for agriculture

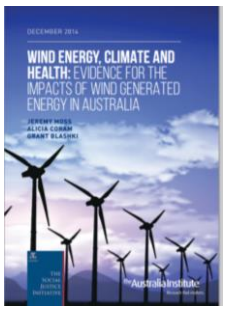
This WA report provides a summary of national and international activity in agricultural by-products used in production of bioenergy and biofuels. The three main processes for obtaining energy from these by-products appropriate for the farming sector in Western Australia include gasification of plant waste, biogas production through anaerobic digestion, and ethanol generation from crop residues.
http://www.bioenergyaustralia.org/data/Biomass_scoping_study_Western_australia_November_2014_.pdf

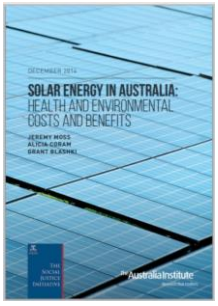
Biomass harvester trial in northern NSW

A $3.5 million project aims to collect 15,000 tonnes of chipped mallee trees at a plantation near Casino NSW during a trial of a woody biomass harvester. The chips will supplement feedstock to the 30MW bioenergy power plant at the nearby Broadwater sugar mill.
http://arena.gov.au/media/renewable-biomass-from-fast-growing-trees/

Reviews of solar and wind energy in Australia

The Australia Institute has published two reviews of the advantages and disadvantages of using solar and wind energy. The reviews find the health and environmental impacts of solar and wind energy to be minimal in comparison to fossil fuels and argues that, as the cost of gas begins to rise, solar will become an increasingly competitive and valuable energy source.
http://www.tai.org.au/





BIODIVERSITY

Australian Pastures Genebank

The Australian Pastures Genebank has been established at SARDI's Plant Research Centre at the Waite Campus in Adelaide. The genebank, with more than 70,000 varieties of pastures and forage species, will be funded Meat and Livestock Australia, Australian Wool Innovation, Grains Research and Development Corporation, Dairy Australia, and Rural Industries Research and Development Corporation.
http://www.sardi.sa.gov.au/pastures/australian_pastures_genebank

Reduction of herbicide pollution strategy

This strategy aims to raise public awareness of herbicide use in Australia and encourage adoption of environmentally benign weed management techniques.
http://weedsnetwork.com/traction/permalink/WeedsNews5257

Soil biodiversity affects all biodiversity

A new study demonstrates how soil organisms could hold the key to understanding how the world's ecosystems function and how they are responding to climate change. Evidence is mounting that the immense diversity of microorganisms and animals that live in the soil

contributes significantly to shaping aboveground biodiversity and the functioning of terrestrial ecosystems. . Evidence also points to soil biodiversity as having a key role in determining the ecological and evolutionary responses of terrestrial ecosystems to current and future environmental change.
http://www.manchester.ac.uk/discover/news/article/?id=13364

Bee decline correlated with flower decline

A Netherlands study of pollen greens on museum specimens of bees collected before 1950 has found that bees whose favourite plants have declined the most are now showing the steepest drop in population numbers. The bees were collected before 1950, and thus before many wildflower populations began to decline because of agricultural intensification. Populations of larger bees, which have greater food requirements, also showed big decreases. The findings support calls to plant specific flowers for threatened pollinators.
http://www.pnas.org/content/early/2014/11/19/1412973111.abstract

Straw and living mulch help manage weeds

US research into vineyard weed management strategies over six years found that straw and living mulch provided greater weed control than cultivation and herbicides. Straw and living mulches reduced weed populations, maintained grapevine productivity, improved several indicators of soil quality, and were viable weed management strategies for continental-climate viticulture.
http://weedsnetwork.com/traction/permalink/WeedsNews5223

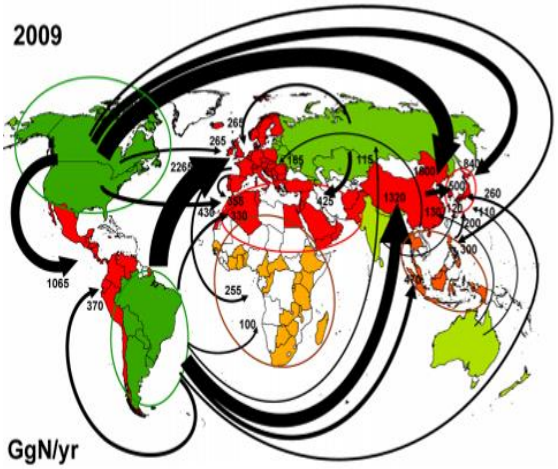
FOOD

New research precinct for food security

Australia now has a National Agricultural and Environmental Sciences Precinct located at the CSIRO's Black Mountain site in Canberra. It will bring together researchers from CSIRO and ANU to foster research and innovation essential to food security, in the context of global population growth, and manage issues such as sustainable land management and climate change. As part of the precinct, ANU and CSIRO will set up a new Centre for Genomics, Metabolomics and Bioinformatics to underpin research projects in transformational agriculture.
http://www.minister.industry.gov.au/ministers/macfarlane/media-releases/food-and-agriculture-precinct-builds-australias-strengths

Global nitrogen cycle and trade

In the period 1961-2010 the amount of nitrogen traded between countries increased from 3 to 24 Tg with the largest part corresponding to animal feed. In terms of proteins and nitrogen, a small number of countries are feeding the world.
http://link.springer.com/article/10.1007%2Fs10533-013-9923-4#page-1



LAND USE

Land management practice trends in Australia

The Department of Agriculture has launched an online database of information of trends in farmers' land management practices in broadacre cropping, dairy, grazing and horticulture industries. The information has been collected by the Australian Bureau of Statistics through five-yearly agricultural censuses and biennial surveys, and is available for the period 1995/96 to 2011-12. Additional information on biodiversity management activities on farm and farm fertiliser use will be added early in 2015, followed by the results from the 2012-13 ABS survey.

http://www.nrm.gov.au/system/files/resources/df08ac55-1229-4a8b-a643-82421475b955/files/land-management-practice-trends-australia.pdf

Catchment land use data

The 2014 catchment scale land use mapping dataset is now available. The dataset was compiled by ABARES from state and territory agencies data, through the Australian Collaborative Land Use and Management Program. This dataset can also be viewed in the NICTA national map. The land use data is listed under the 'Land' section under 'National Data Sets'.

http://www.data.gov.au/

Crown land management

This Parliamentary brief about Crown land provides a brief history and summary of the legislation governing Crown land, and it outlines reforms proposed by the NSW Government including reduction of red tape, decision making returned to local communities, and protection of community land uses such as surf clubs, scout halls and bowling clubs.

http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/key/Crownlandmanagement/$File/Crown%20land%20management.pdf

SUSTAINABILITY

Australia's biosecurity future

This new report from CSIRO identifies the major biosecurity trends and risks that Australia may need to respond to over the next 20-30 years, including lack of food diversity. Today, just 15 plant and 8 animal species account for 90 per cent of global food energy and protein and four crops (rice, wheat, maize and potato) account for over 60 per cent of global energy intake. In Australia, commercial egg layers primarily use one of three major genetic lines of brown egg layers, and approximately 65-70 per cent of all dairy cattle are the Holstein breed.

http://www.csiro.au/Organisation-Structure/Flagships/Biosecurity-Flagship/Biosecurity-Futures-Report.aspx

Cotton sustainability report

The Australian cotton industry's first sustainability report provides a snapshot of how the industry is performing against 45 indicators – from crop yield and quality, water use and riparian land management to education levels, employment, health and social capital.

http://cottonaustralia.com.au/uploads/resources/Sustainability_report_201114.PDF

Blueprint for a healthy environment

The Wentworth Group of Concerned Scientists has published its blueprint for a healthy environment and a productive economy. The blueprint describes the magnitude of the environmental challenges we face, establishes the case that it is possible to grow the economy and protect the environment, and describes long-term institutional and economic reforms that we believe are essential to achieve this.
http://wentworthgroup.org/2014/11/blueprint-for-a-healthy-environment-and-a-productive-economy/2014/

The Australia we love: survey of natural systems

This report on key issues affecting nature and society in Australia consolidates best available information about the state of nature in Australia, drawing on the latest science and economic data, and social and cultural analysis. This report is based on the idea that the material economy is embedded in society, which is embedded in nature, and that we cannot understand or manage society or the economy without understanding the whole interconnected system. It is produced by the Places You Love Alliance, a group of more than 40 environmental non-profit organizations in Australia.
http://www.placesyoulove.org/australiawelove/

Agroecology research papers

The UK Ecological Land Cooperative has compiled a list of research papers relevant to agroecology, looking at the environmental, social and economic benefits of diverse, labour intensive, smaller scale ecological farms.
http://www.ecologicalland.coop/research-papers-topic

EVENTS

March 3-4	Outlook conference, Canberra http://www.agriculture.gov.au/abares/outlook-2015
March 18-19	Water Innovation Forum 2015, Sydney http://www.awa.asn.au/EventDetail.aspx?id=4294979855
May 12-14	Ozwater'15, Adelaide http://www.ozwater.org/
July 15-17	Australian Meteorological and Oceanographic Society conference, Brisbane http://www.amos.org.au
April 12-16	Australian Rangeland Society conference, Alice Springs http://www.arsconference.com.au

SUBSCRIBE

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.

NSW GOVERNMENT Department of Primary Industries