

NRM on farms



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

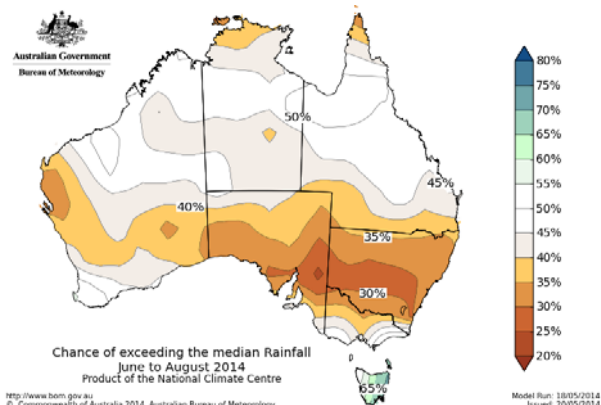
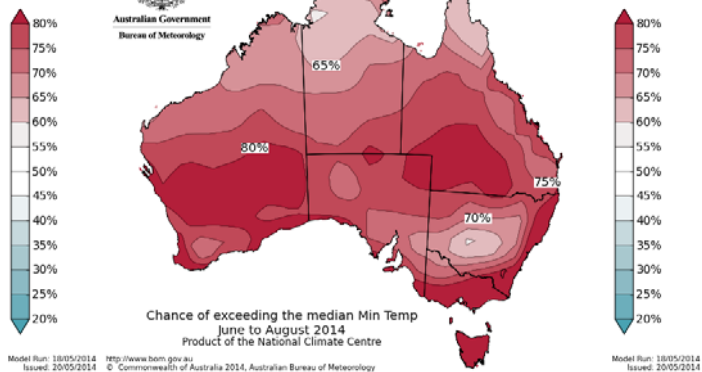
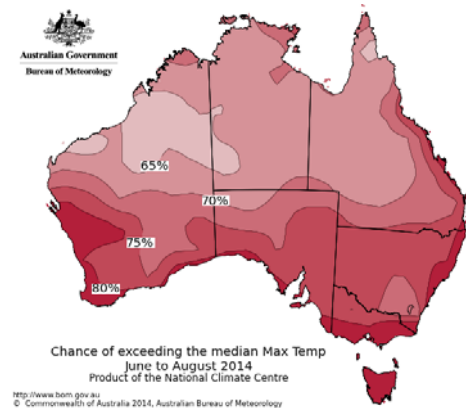
June 2014

CLIMATE

Seasonal outlook

A drier than normal winter is likely for NSW over the next three months (right), particularly in the south of the state. Warmer temperatures are also more likely, both day (below) and night (below right). Climate influences include a warming tropical Pacific, and an easing of the warm eastern Indian Ocean.

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



Ocean temperatures

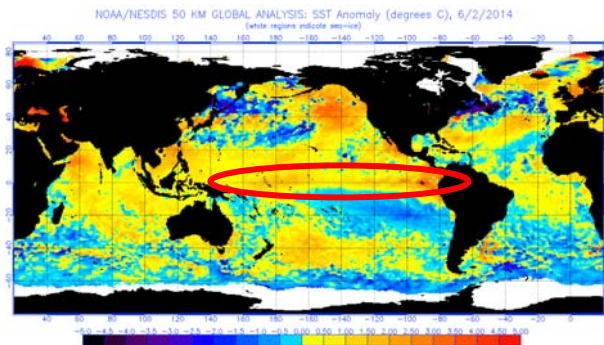
Sea surface temperatures along the equatorial Pacific Ocean (red outline) have warmed in the east, stayed fairly constant in the centre, and are warmer in the west.

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

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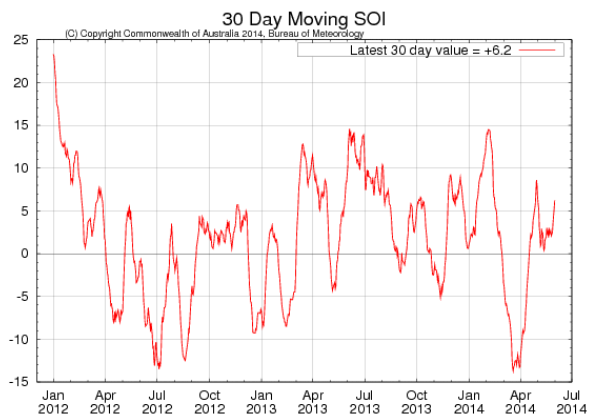
Department of
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SOI remains neutral

The Southern Oscillation Index rose to +6.2 on 1 June but remains within neutral values. Sustained positive values above +8 may indicate a La Niña event, while sustained negative values below -8 may indicate an El Niño event. Sea surface temperature anomalies in the tropical Pacific Ocean have increased steadily since February, and are now greater than +0.5°C in the key NINO regions. However, above-average temperatures in the western tropical Pacific meaning strong west to east temperature gradients have not yet established. As a result, atmospheric indicators—such as the Southern Oscillation Index and trade winds—have only shown a weak El Niño response.

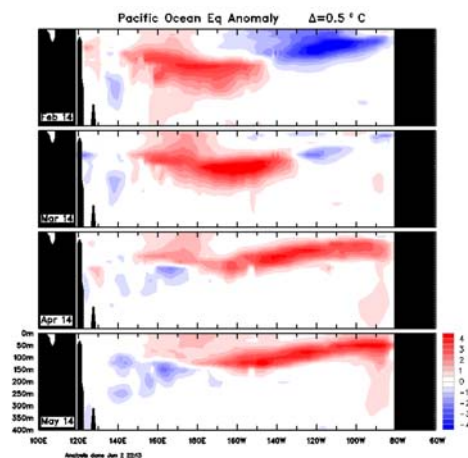
<http://www.bom.gov.au/climate/enso/#tabs=SOI>



Pacific Ocean sub-surface warming

The Pacific Ocean equatorial sub-surface temperature transformed into a pre-El Niño state during April and stayed relatively stable over May. Waters are warmer than average across most of the sub-surface of the equatorial Pacific east of 160°E to a depth of around 150m.

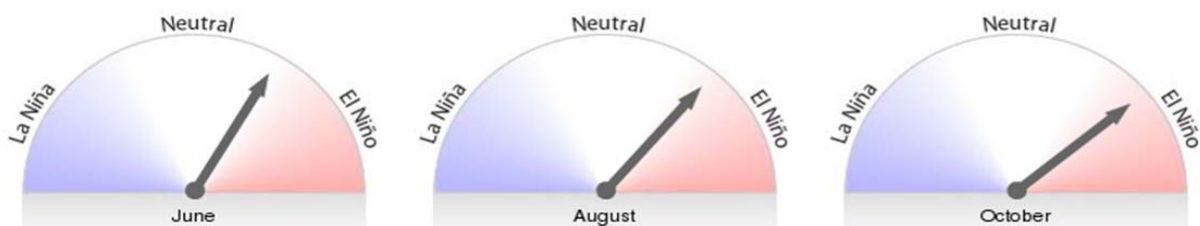
<http://www.bom.gov.au/climate/enso/#tabs=Sea-sub%E2%80%93surface>



El Niño likely by spring

While the El Niño-Southern Oscillation is currently neutral, patterns in the tropical Pacific Ocean and atmosphere are consistent with the early stages of a developing El Niño. All but one of the eight surveyed models indicate an El Niño is likely to develop by spring.

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



IOD remains neutral

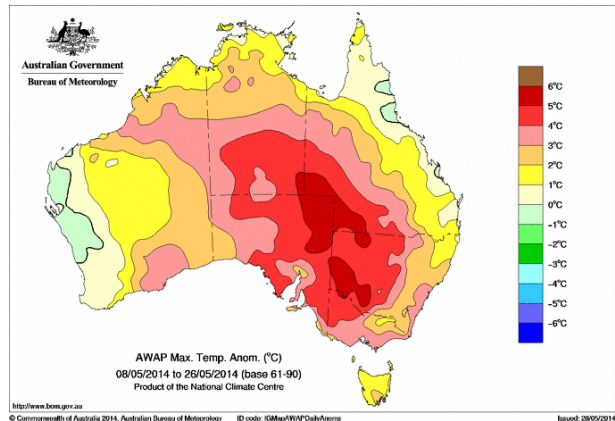
Models favour neutral IOD values over the coming months, with a slight trend towards a positive IOD developing in spring. The chance of a positive IOD event is elevated during an El Niño. Positive IOD events often coincide with El Niño and are typically associated with lower than average winter and spring rainfall over parts of southern and central Australia.

<http://www.bom.gov.au/climate/enso/#tabs=Sea-sub%E2%80%93surface>

NSW's May heatwave

May in NSW was exceptionally warm due to a stationary high pressure system in the Tasman Sea which brought warm northerly wind flows over south-eastern Australia and deflected cold fronts to the south. Mean maximum temperatures were 2°C above normal and mean minimum temperatures 1.1°C above normal. The autumn 'heatwave', lasting for more than two weeks, coupled with the unusual warmth both day and night, made it exceptional compared with other events in the historical record (see map at right). Stationary highs at this time are usually shorter, and result in clear skies, cooler nights and some frost. Record-breaking spells above 20°C were recorded at Newcastle, Moruya, Coonabarabran, Quirindi, Gunnedah, and Broken Hill. At some locations, temperatures on 26 May occurred at least two weeks later than previously.

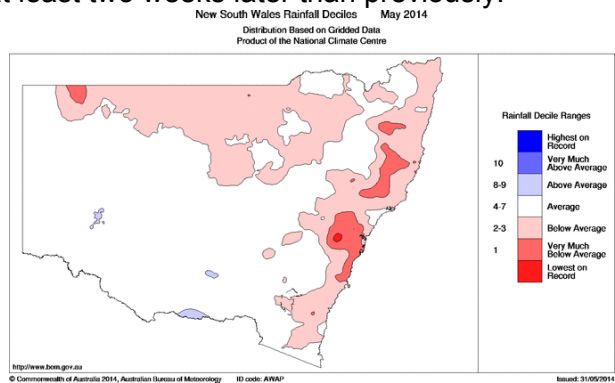
<http://www.bom.gov.au/climate/current/statements/scs49.pdf>



NSW May rainfall

The statewide average rainfall (right) was 20.6 mm, less than half the historical average of 47.1 mm and the driest since 2008.

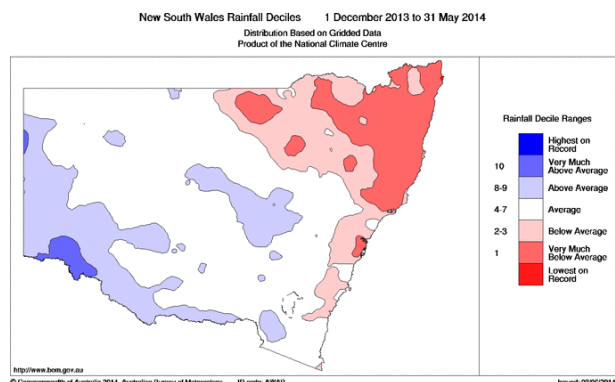
<http://www.bom.gov.au/climate/current/month/nsw/summary.shtml>



NSW north-east dries

NSW's north-east rainfall for the past six months is very much below normal (right) after the non-appearance of the summer wet season.

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



CLIMATE RESOURCES

Southern Ocean winds are drying southern Australia

Australian-led research has found that rising levels of carbon dioxide in the atmosphere are strengthening Southern Ocean winds and pushing them further south towards Antarctica, which means southern Australia is missing out on the rain-bearing winds and recording more droughts.

<http://news.anu.edu.au/2014/05/12/ocean-winds-keep-australia-dry-antarctica-cold/>

Cyclones are moving to the poles

Over the last 30 years, tropical cyclones, also known as hurricanes or typhoons, are moving poleward at a rate of about 50 kms per decade in the Northern Hemisphere and 60 kms per decade in the Southern Hemisphere. This has occurred in all oceans except the north Indian Ocean, and is thought to be linked to warming climate.

<http://www.sciencedaily.com/releases/2014/05/140514133432.htm>

El Ninos vary with their location in the Pacific

New research has found that not all El Ninos are the same. Global average surface temperatures are warmer than usual during and after traditional eastern Pacific El Niño events, but not central Pacific or mixed events. Grouping all El Niño events into one category, as is done with traditional El Niño classification, obscures potentially important differences.

<http://www.sciencedaily.com/releases/2014/05/140519134834.htm>

Australia was a carbon sink in 2011

Australia turned into a carbon sink in 2011 after La Nina record rains in 2010-11 promoted vegetation growth in semi-arid areas. Almost 60 per cent of global carbon uptake that year was attributed to Australian ecosystems. It is likely that the large carbon uptake during 2011 was short-lived, as suggested by a rapid decline of the sink strength in 2012.

<http://www.sciencedaily.com/releases/2014/05/140521142246.htm>

Poll finds increasing concern about climate

The latest Lowy Institute Poll found that 45% of respondents believe that 'global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs'. As well, 63% of respondents said the government should be taking a leadership role on reducing carbon emissions. Previous polls showed declining concern about climate change between 2006 and 2012.

<http://www.lowyinstitute.org/publications/lowy-institute-poll-2014>

Mobile BoM site

BoM now has a mobile-friendly weather website at m.bom.gov.au on your mobile. For more information go to the link below.

bom.is/mobile

CliMate App

The CliMate App, released in December 2012, offers a suite of climate analysis tools to interrogate climate records from the last 60 years about rainfall, temperature, radiation, as well as derived variables such as heat sums, soil water and soil nitrate. CliMate also provides information based on El Nino Southern Oscillation patterns..

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



Humans' contribution to climate sensitivity

In this Ecos article, two of Australia's leading meteorologists explain the relationship between CO2 and global warming, known as the climate's 'sensitivity' to CO2. There are two different measures of sensitivity. The transient climate response is a measure of how much warmer the climate will get when it is still being pushed by human activity. The equilibrium response shows what the end result is hundreds of years down the track. Determining climate sensitivity helps us understand our future risks and plan for future climate change.

<http://www.ecosmagazine.com/paper/EC14099.htm>

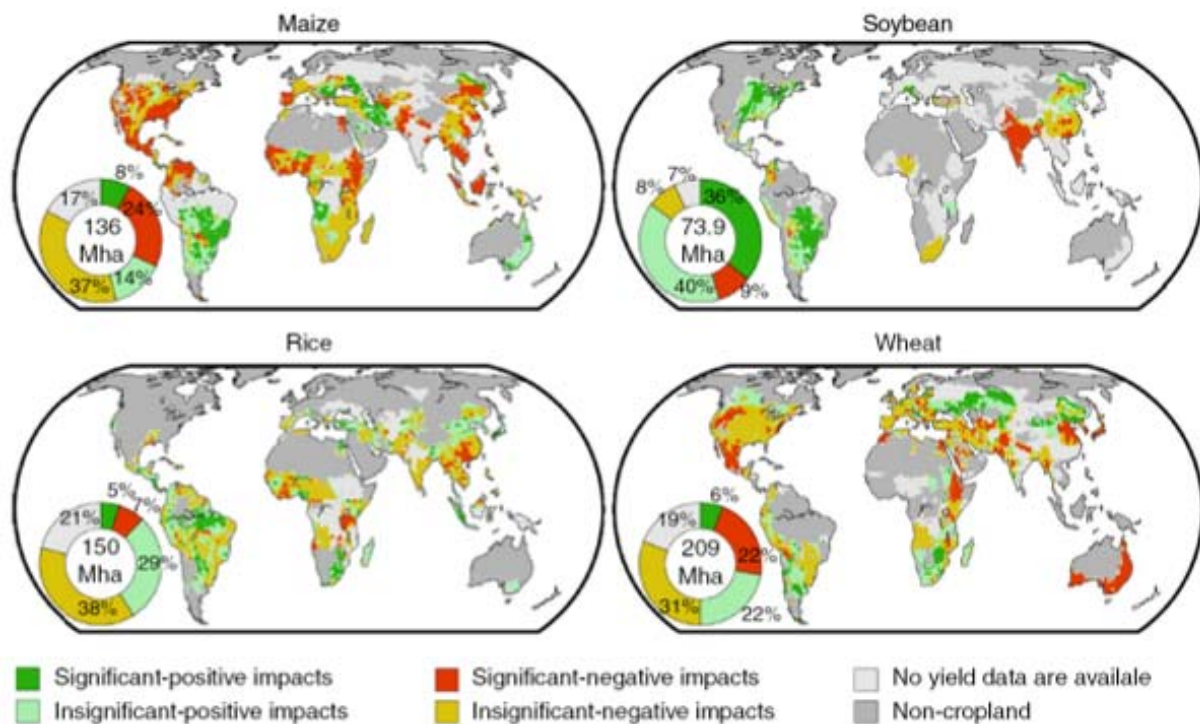
US National Climate Assessment

The US National Climate Assessment, released last month, states that few places in the US will be unaffected by climate change, and provides an in-depth look at impacts on regions and sectors, including agriculture, and a range of response strategies.

<http://nca2014.globalchange.gov/downloads>

ENSO impacts on global crop yields

Analysis of ENSO on global crop yields has found that El Nino is likely to improve global-mean soybean yield by 2-5% but appears to reduce yields of maize, rice and wheat due to warmer, drier conditions (see below). The global-mean yields of all four crops during La Nina years tend to be below normal. Overall, global crop yields are much more affected, positively and negatively, by El Nino than by La Nina. The researchers found that the high reliability of ENSO forecasts presented an opportunity to link it with global crop yields data which would be potentially beneficial for food monitoring and famine early warning systems.



<http://www.nature.com/ncomms/2014/140515/ncomms4712/full/ncomms4712.html>

EMISSIONS

Carbon footprint of dairying in Australia

The carbon footprint of average Australian milk from cradle to farm gate for 2009/2010 was calculated to be 1.11kg carbon dioxide equivalents per kg of fat and protein corrected milk. Differences in GHG emissions per kg of milk produced could be traced back to differences in production practices. The feed conversion efficiency was identified as the most important driver for the reduction of enteric methane emissions. Reduction potentials were also identified for manure management practices.

<http://www.dairyaustralia.com.au/Environment-and-resources/Carbon-tax/Dairy-carbon-footprint.aspx>

<http://www.sciencedirect.com/science/article/pii/S0958694614000533>

No substitute for reducing emissions

A US review of possible approaches to slowing down global warming has found no substitute for reducing emissions. The five strategies that appear to hold the most promise are reducing emissions, sequestering carbon through biological means on land and in the ocean, storing carbon dioxide in a liquefied form in underground geological formations and wells, increasing Earth's cloud cover, and solar reflection. Of these, sequestering carbon through biological means holds the most promise. Curbing destruction of forests and promoting growth of new forests, could tie up as much as 1.3 gigatonnes of carbon in plant material annually. Deforestation is currently responsible for adding 1 gigatonne of carbon each year to the atmosphere. Incorporating crop harvest residue into the soil could reintroduce between 0.4 and 1.1 gigatonnes of carbon annually to soil. Burial of biochar also holds promise by significantly increasing the time it takes for plant material to decompose.

<http://www.sciencedaily.com/releases/2014/06/140601114038.htm>

US Clean Power Plan

The US Government has announced regulations that would cut the amount of carbon dioxide the US energy sector may emit by 30 per cent on 2005 levels by 2030. The new limits are designed to spur states to phase out reliance on coal-fired power, and promote clean energy innovation.

<http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule>

WATER

Water Management Amendment Bill 2014

The Water Management Amendment Bill 2014 has been introduced into NSW Parliament to provide greater security for supplementary water licences and floodplain harvesting licences, streamline licensing and approval processes, and clarify the historical information basis for setting water allocations.

<http://www.parliament.nsw.gov.au/prod/parliament/nswbills.nsf/0/C1BF682C0CD5CE07CA257CE6001D9317>

Water sharing plans extended for 12 months

Thirty-one NSW water sharing plans due to expire at the end of June 2014 have been extended for 12 months to review the plans and issues raised by stakeholders and irrigators.

<http://www.water.nsw.gov.au/About-us/Ministerial-media-releases/Ministerial-releases/default.aspx>

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Cooperative management of environmental water in NSW

The Office of Environment and Heritage has produced guidelines that set out government agency responsibilities for the cooperative management of environmental water in NSW.

<http://www.environment.nsw.gov.au/resources/water/environmentalwater/14308envwat.pdf>

MDB water recovery strategy

The Australian Government's new MDB water recovery strategy outlines how the government will recover water in line with the Basin Plan requirement of 2750 gigalitres of surface water for the environment. Over two thirds of this water has already been contracted for recovery through investment in more efficient irrigation infrastructure and water buybacks. The strategy focuses on infrastructure investment over water buybacks, with a 1500 gigalitre cap on water buybacks over six years.

<http://www.environment.gov.au/system/files/resources/4ccb1c76-655b-4380-8e94-419185d5c777/files/water-recovery-strategy-mdb2.pdf>

National Water Act review

An independent panel has been appointed to review the 2007 Water Act to consider whether the Act is delivering on its objectives with the minimum necessary regulatory burden to the water industry, water managers and irrigators. The review will also address the Act's mandatory terms of reference which focus on the extent to which the objectives and outcomes of the Basin Plan and related reforms are being met. Deadline for submissions to the review is 4 July 2014.

<http://www.environment.gov.au/water/legislation/water-act-review>

Trees influence rainfall

Recent research suggests that current climate models may underestimate the full impact of forest vegetation on rainfall. A recent study showed that winds travelling through forests typically produce more than twice as much rain as those that blow over open land.

Transpiration from vegetation may contribute as much as 90 per cent of the moisture in the atmosphere derived from land surfaces. Trees produce flows of water vapour that are typically more than 10 times greater than from herbaceous vegetation per unit of land area, surpassing those produced by wet ground or open water.

<http://www.ecosmagazine.com/paper/EC14113.htm>

Water from manure

US researchers have developed technology to turn cow manure into clean water. It combines anaerobic digestion, ultra-filtration, air-stripping and reverse osmosis to extract energy and chemicals from manure to produce fertiliser and water clean enough for livestock to drink. So far the filtration system can turn 378 litres of manure into 189 litres of water, but the researchers believe the system can produce more.

<http://msutoday.msu.edu/news/2014/new-technology-turns-manure-into-clean-water/>

Run the River App

This App is designed for school students to deliver water from the river to wetlands, farms and communities, and keep the river mouth connected to the ocean. Difficulty increases with

each level as new challenges appear including flood, drought, evaporation, seasonal changes, salinity, watertable rise and increased water demand.

<http://mdba.gov.au/what-we-do/education/students/fun-and-games/run-the-river>

SOILS

WA report card on agricultural soils

WA has released a report card on the current condition and trends of natural resources that support agriculture in south-west WA. There is progress in some areas, such as managing wind and water erosion, but results in other areas are adverse. The card reports on soil acidity, water repellence, phosphorus status, wind erosion, water erosion, soil compaction, and dryland salinity. Themes with insufficient data to report condition or trends include soil organic carbon, phosphorus export and acidification of inland waterways.

<https://www.agric.wa.gov.au/soil-constraints/report-card-south-west-western-australia>

Soils for Life forum

The Soils For Life regenerative farming project held a two day forum in March, bringing together all their case study farmers, four of whom gave presentations to the public on the second day. You can access the presentations online.

<http://www.soilsforlife.org.au/announcements/forum-day-1>

Dung down under

World dung beetle expert Bernard Doube and organic agriculturalist Tim Marshall have co-authored a farmer-friendly book on the ecology and management of dung beetles in Australia, aimed at farmers, landcare groups environmental organisations concerned with sustainable land management.

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

Organic matter management and compost use

Proceedings from an international symposium on organic matter management and compost use in horticulture are now available online.

<http://www.actahort.org/books/1018/index.htm>

The smell of geosmin

The smell of rain on the earth is actually volatile compounds being released into the air from soil. The main compound is geosmin (earth odour). It is released into the soil by microbes when they die, and then released into the air when rain hits the soil. Humans and animals are highly sensitive to geosmin because it indicates the presence of water.

<http://www.rsc.org/chemistryworld/podcast/CIIEcompounds/transcripts/geosmin.asp>

<http://news.brown.edu/pressreleases/2007/09/origin-soil-scented-geosmin>

Soil, farming and science

This NZ website explores innovative science ideas that can help farmers and the environment.

<http://www.sciencelearn.org.nz/Contexts/Soil-Farming-and-Science>

Farm manure nutrient App

UK soils researchers have helped develop an App to help farmers visually assess manures and slurry application rates, calculate nutrient levels and estimate potential savings in artificial fertilisers. The App, based on the Defra fertiliser manual, allows farmers to select different seasons, types of manures and crops growing to see what the manure will provide in terms of fertiliser value.

<http://www.swarmhub.co.uk/about.php?id=3919>



Introduction to soil security

This UK film clip outlines why soil is the basis of our survival.

<http://www.youtube.com/watch?v=ApMqeK6qwYY&feature=share&list=UUHHciYt47RFZLqcO6QGkixg&index=1>

ENERGY

Chief Scientist recommends CSG insurance

NSW Chief Scientist & Engineer Mary O'Kane has recommended the State Government strengthen industry insurance requirements to guard against possible environmental damage from CSG activities. She has also recommended the NSW Government consider establishing an environmental rehabilitation fund to address unforeseen or long-term environmental impacts and remediation.

<http://www.chiefscientist.nsw.gov.au/latest-news/chief-scientist-and-engineer-calls-for-tougher-insurance-regime-for-csg-industry>

Hold on Victoria onshore gas exploration

The Victorian Government has imposed a hold on work plan approvals for onshore gas exploration in Victoria until more information is available, including evidence from a water study, community views, and industry impacts. This is in addition to the state's current moratorium on fracking.

<http://www.premier.vic.gov.au/media-centre/media-releases/10061-onshore-gas-exploration-on-hold-as-consultation-continues.html>

BIODIVERSITY

Native Vegetation Amendment Bill

The NSW Parliament has introduced the Native Vegetation Amendment Bill to modify current controls on clearing native vegetation. If passed the legislation will apply only to indigenous trees, provide for broadscale clearing of native vegetation if the clearing is in the social, economic and environmental interests of the region, and reduce penalties for unauthorised clearing.

<http://www.parliament.nsw.gov.au/prod/parlment/nswbills.nsf/0/9FE465B222A55C80CA257CA6001714E8?Open&shownotes>

Inquiry into beekeeping and pollination service industries

The Senate inquiry into the future of the beekeeping and pollination service industries in Australia has received 79 submissions. The Senate committee will report on their findings later this month.

http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Beekeeping

Bee diversity benefits blueberries

US researchers have found that blueberries produce more seeds and larger berries if they are visited by more than one bee species, possibly due to differences in behaviour between bee groups, in part depending on the weather.

<http://news.ncsu.edu/releases/burrack-bee-diversity-2014/>

FOOD

Australia's food security challenges

A recent paper on challenges to Australia's energy and food security argues that issues facing Australian agriculture may exceed adaptation capacity and have potential to be tipping points towards increased national fragility. These issues include natural disasters threatening food supply chains, long distance supply chains dependent on energy security, increasing seasonal variability, water shortages and an aging agricultural demographic.

<http://www.securitychallenges.org.au/ArticlePDFs/SC%2010-1%20ParkerandStewart.pdf>

Crop calories and the food system

A US analysis of food calories available from 41 crops grown around the world found that 55% directly feed humans, and 36% go to animal feed, of which 89% is lost such that only 4% of crop-produced calories are available to humans in animal products. Another 9% of crop calories are used for industrial uses and biofuels so are lost from the food system. The study suggests redefining yield from tonnes per hectare to 'people nourished per hectare'.

<http://iopscience.iop.org/1748-9326/8/3/034015>

Sustainability of food choices

A comparison of the nutritional and sustainability performance of six different diets found that dietary guidelines concerned with both a health focus and a low animal protein content represent the most viable option for health and sustainability.

<http://www.fcrn.org.uk/research-library/consumption/food/exploring-dietary-guidelines-based-ecological-and-nutritional-val>

New book: The future of food and agriculture

This book, titled 'Balancing on a planet' analyses the assumptions underlying different perspectives on problems related to food and agriculture around the world and a discussion of alternative solutions.

<http://www.ucpress.edu/book.php?isbn=9780520277427>

LAND USE

74 % of NSW land used for agriculture

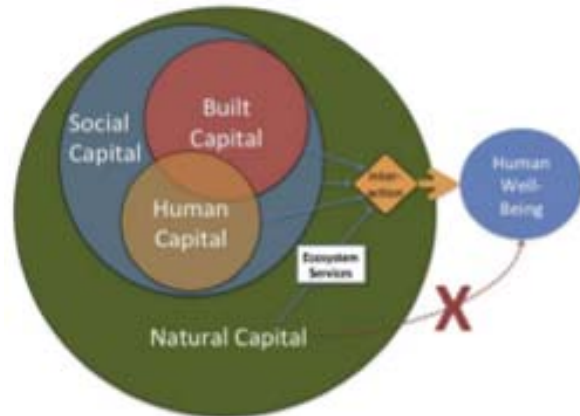
Approximately 52% of Australia's total land area was used for agriculture in 2012-13. Queensland and NSW had the highest proportion of agricultural land (75% and 74% respectively). Land used for agriculture fell by 2% from 2011-12, to 397 million hectares. The area planted to crops in Australia declined slightly in 2012-13 to 31.6 million hectares.

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/7121.0>

The value of ecosystem services

Recent research into the value of ecosystem services has valued the loss of eco-services from 1997 to 2011 due to land use change at \$4.3–20.2 trillion/yr, depending on the unit values are used. The paper argues that many eco-services are best considered public goods or common pool resources, so conventional markets are often not the best institutional frameworks to manage them. However, these services must be (and are being) valued, and we need new, common asset institutions to better take these values into account.

<http://phys.org/news/2014-05-environmental.html>



SUSTAINABILITY

Proposed biosecurity framework

NSW DPI has released a proposed framework for protecting NSW that outlines the legislative tools and powers required to manage pests, diseases, weeds and contaminants in NSW. The framework will be used to form the basis of the NSW Biosecurity Act, which will support the national agreed principle that biosecurity is a shared responsibility.

<http://www.dpi.nsw.gov.au/biosecurity/legislative-review>

UK SWARM knowledge hub

The SWARM knowledge hub provides farmers and growers with practical information to help manage natural resources efficiently and make the right business decisions.

<http://www.swarmhub.co.uk/about.php?id=2373>

The economic benefits of native shelter belts

This item from last month's NRM on Farms contained an incorrect link. The link below is correct.

<http://www.basalttobay.org.au/index.php/active-projects/81-the-economic-benefits-of-native-shelter-belts-report-01-14>

EVENTS

June 6	World Environment Day http://www.unep.org/wed/
July 8-10	Peri-urban 2014, Parramatta http://periurban14.org/
July 22-24	Grassland society of NSW conference http://grasslandnsw.com.au/news/conference/
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 1-3	Bioenergy Australia 2014 http://www.bioenergyaustralia.org/

MAILING LIST

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