



News, research, innovations, events and on-ground works to support managing for healthier soils in the Northern Rivers CMA region

## Summer 2011/12

**All the dirt** ISBN: 1838-8957 Volume 3, No. 2

Welcome to the summer edition of all the dirt of 2011 -12. In his edition we have a focus on monitoring the soil. And after toying with the idea of a layout that is friendlier for our subscribers who read on screen we have ditched the double column format. Here's hoping you enjoy reading.

[allthedirt.newsletter@industry.nsw.gov.au](mailto:allthedirt.newsletter@industry.nsw.gov.au)

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### SoilWatch

Sally McInnes-Clarke, Office of Environment and Heritage (OEH)

SoilWatch is a partnership program between OEH (Soil Science Division) and NSW CMAs designed to measure changes in soil condition by monitoring over time. SoilWatch is about working with landholders to facilitate land management change and improve soil health

#### What happens with the results?

Landholders who participate in the program will receive a copy of the soil test results, and an 18 page report which contains information to help decipher what the results really mean. A copy of the results will also go to the Northern Rivers CMA and to OEH where it is stored in the Soil And Land Information System database (SALIS). This information will not be publically available but you can view some state soils info through the spade site <http://www.environment.nsw.gov.au/soils/index.htm>

#### What do we test for?

The soil samples which are collected on your property will be tested at the OEH Natural Resources Laboratory in Yanco. The test suite includes:

- pH (CaCl)
- electrical conductivity (salinity)
- total carbon (leco)
- organic carbon
- gravel content
- field texture
- Emerson aggregate test (soil stability)
- soil colour
- bulk density
- estimate of porosity.



**Soil watch kit contents**

Image source: S Mcinnes-Clarke

## What other information do we collect?

We take soil samples (0-10cm), and take photos of the landscape and groundcover at two sites.



A SoilWatch program demonstration was held for landholders and NRCMA soil staff on the Comboyne Plateau on 21 November 2011. The day was very productive and generated a lot of interest in soil health monitoring. A pair of permanent monitoring sites was established on a local property and the landholders will get together again to discuss the results when they come in.

For more information contact:

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Soil Science Division | Scientific Services, OEH, Department of Premier and Cabinet

## What is the condition of NSW soil?

Marion Winkler (formerly OEH)

In 2008, the NSW monitoring, evaluation and reporting (MER) program was designed and implemented by the then NSW Department of Environment, Climate Change and Water (DECCW), now Office of Environment and Heritage (OEH), to generate soil condition information for the state, with contributions from catchment management authorities (CMAs) and the NSW Department of Primary Industries (DPI). Similar monitoring programs were also undertaken for 12 other natural resource themes such as native vegetation, ground water and wetlands.

The program aimed to determine whether NSW lands are being managed on a sustainable basis, i.e. within their inherent capability; and being the first study in a five-year ongoing rolling review, to provide a baseline with which to compare soil condition data in future years.

By May 2009, 850 sites had been established across all the 13 CMAs to measure soil condition, of which 730 had received laboratory testing, and 497 landholder surveys were returned. Key 'indicators' such as soil organic carbon, acidity, erosion, salinity, soil structure and acid sulphate soils (ASS) were measured and land management data was collected to inform land capability assessments.

The recently completed program found agricultural soils in NSW have declined noticeably in condition compared to soils in reference condition, but are on average in good condition, and land is on average being managed at a level just on par with its inherent physical capability. Many individual sites are in moderate to very poor condition due to previous degradation.

Low soil organic carbon is the dominant issue of concern. Soil structure, sheet erosion, salinity and soil acidity are also of significant concern, as are acid sulphate soils in some coastal areas.

Loss of soil function for ecosystem services and agricultural productivity was also detected.

Reports are now available online at

<http://www.environment.nsw.gov.au/soc/stateofthecatchmentsreport.htm>

and for the state as a whole at <http://www.environment.nsw.gov.au/soe/soe2009/>



**Monitoring in Murrumbidgee CMA,**

Image source: Lachlan James DECCW

### What about other states?

For an interesting update on the status of Victoria's soils achieved through resampling 50 sites in cropping soils that were first studied over 40 years ago see the article at <http://sl.farmonline.com.au/news/state/grains-and-cropping/grasses-and-feed/dpi-opens-soil-time-capsule-in-the-wimmera/2432657.aspx?storypage=0>

## National soil mapping facility for Australia

The soil and landscape grid of Australia is collaboration between CSIRO, state and territory agencies Geoscience Australia and the University of Sydney.

The plan is to provide a fine scale grid of functional soil attributes and key landscape features that is also consistent with established Australian soil information and the global soils map being currently developed by the digital soil mapping working group and the IUSS.

On the website the terrestrial ecosystems network (TERN) states; "With completion of the facility, Australian soils information will be consistent, readily available, comprehensive and relevant to current and developing modelling processes, and uncertainty estimates will make clear where there is need for more survey effort..... At a local scale, the new soil map will benefit farmers and their advisers, who are increasingly looking for new ways to increase their efficiency – getting more from the same inputs of water, nutrients or energy."

For more information see the TERN website:

[www.tern.org.au/Soils-and-Landscape-Grid-of-Australia-pg17731.html](http://www.tern.org.au/Soils-and-Landscape-Grid-of-Australia-pg17731.html)

## Update on SoilWeb in the USA

All the Dirt informed readers about SoilWeb in Spring 2010 reporting that the California Soil Resource Lab provided specific soil information via the web and/or through a free app for smartphones. This service is now available in the lower 49 conterminous states in the USA. The wider service is accessed through the United States Dept. Agriculture's Natural Resource Conservation Service at

<http://websoilsurvey.nrcs.usda.gov/app>

## What did you do on world soils day?

As you are all no doubt aware Dec 5th was world Soils day. First gazetted in 2002 By the International Union of Soil Sciences (IUSS) and sharing that date with the King of Thailand's birthday in recognition of his sanctioning of the day and his promotion of soil science and soil resources. It is a day that 'celebrates the importance of soils as a critical component of the natural system and as a vital contributor to the human commonwealth' says the IUSS website.

I am sure that there were many celebrations of all things soil. All the dirt would love to showcase some of these and the interesting ways in which the day was observed. Let us know what you did and maybe it can be featured in later editions of All the Dirt. For this edition there is a brief report on how World Soils day was celebrated by the staff at Wollongbar Agricultural institute.

Here at the Wollongbar Ag. Institute we had a bit of a soil bake off. There was an acid sulfate soil cake and rock cakes amongst others. Our little event was inspired by Nathan Heath who, two years ago when he was at Murray Catchment Management Authority, produced a fabulous looking chocolate cake to commemorate world soils day with his colleagues.

I challenge you all to think of some fitting activity to plan for 2012 to truly celebrate soils and our relationship with them. Let us all celebrate soils as they should be celebrated. Our efforts were also posted to the ASSSI facebook site for those of you who are into the e networking.



**ASS cake with iron stains, scald, drain and floodgate**

Image source: L Andersen and J Cox

If you would like any more info on soils and what others did this year checked out the links over:

IUSS

[http://www.iuss.org/images/stories/publications\\_pdf/SoilbrochureYPE.pdf](http://www.iuss.org/images/stories/publications_pdf/SoilbrochureYPE.pdf)

A soils blog from Canberra

<http://www.soilduck.com/2011/12/local-soil-celebrating-world-soil-day.html>

Terrestrial ecosystems network

<http://www.tern.org.au/Newsletter-November-2011-SoilsFeature-pg19621.html>

Ecological agriculture Australia association (EAAA) special world soils day newsletter

<http://www.ecoag.org.au/www/>



**Soils: A piece of cake with worms and soil pits of course**

Image source: L Andersen and J Cox

## Northern Rivers Catchment Management Authority wants your ideas

The eleven NSW CMAs are in the process of rewriting their Catchment Action Plans.

The Northern Rivers Catchment Action Plan (CAP) was first developed in 2006 to guide natural resource management (NRM) in the Northern Rivers region. It supports the whole community to improve natural resource condition by identifying key issues impacting on natural resources and priorities for investment and on-ground action.

The region's natural resources and community are constantly changing and it is important to constantly review and improve programs to best meet their needs. The Northern Rivers Catchment Management Authority (NRCMA) has commenced a 5 year CAP review. A new CAP for 2012 to 2022 will be developed with the community and finalised in 2013. Community input is essential to ensure the new CAP represents the aspirations of the whole Northern Rivers community for the future management of its precious natural resources.

Your input is essential! There will be many opportunities for input over the coming months, but as a first step, please have your say by completing the two surveys at <http://yoursay.northern.cma.nsw.gov.au/>.

If you are interested in keeping up to date with the CAP review process, please subscribe by emailing [CAPreview\\_northern@cma.nsw.gov.au](mailto:CAPreview_northern@cma.nsw.gov.au)

## World premiere: The soil solution

A new short film recently released through Youtube and premiered at the Santa Barbara International Film Festival discusses the importance of soil to our ecosystem and the important ecosystem services it provides.

The promo reads "What if a solution to climate change was just beneath your feet? Sustainable World Media visits with farmers, scientists, and educators who are exploring the connection of soil fertility to water quality, food security, and carbon sequestration"

Check it out at <http://www.youtube.com/watch?v=5h7rqIsOleU>

## New Publications

### State of the environment report

The fourth national assessment of the state of Australia's atmospheric, inland water, land, marine, coastal, Antarctic, biodiverse, heritage and built environments can be found at [www.environment.gov.au/soe](http://www.environment.gov.au/soe)

The publication now includes graded 'report-card' style assessments. It also includes discussions of the drivers of environmental change, resilience, risks, and future projections or 'outlooks'.

### Biochar: implications for agricultural productivity

Jessica Sparkes and Peter Stoutjesdijk



This report presents findings of a desktop review into biochar, covering potential applications, benefits, costs and risks, and future research required to realise the agricultural productivity improvement and environmental sustainability

potential of biochar.

Full text available at

[http://adl.brs.gov.au/data/warehouse/biochar9abc\\_m001/biochar9abc\\_m00101/TR.2011.06\\_Biochar\\_v1.0.0.pdf](http://adl.brs.gov.au/data/warehouse/biochar9abc_m001/biochar9abc_m00101/TR.2011.06_Biochar_v1.0.0.pdf)

### National soils capacity report

Soils Research, Development & Extension working group,



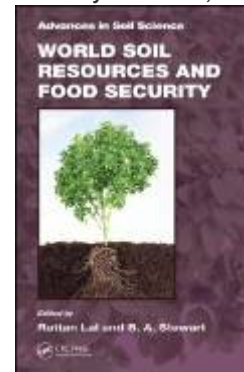
This report is a comprehensive snap shot of our national collective effort in soil research development and extension. A snapshot for 2010-11, the report has identified that Australia is spending around \$ 124 million annually on soils RD&E. There are about 40

organisations undertaking soils RD&E, and at least 13 Australian government or related organisations provide funds (\$42 million) for soils work. Research provider organisations, including universities, also contribute substantial funding. The stocktake also shows that Australia has around 850 people working in soils RD&E, plus several hundred consultants.

<http://www.daff.gov.au/natural-resources/soil-land-salinity/stocktake-of-australias-investment-in-soils-rde>

### World Soil Resources and Food Security

Edited by Rattan Lal, B.A. Stewart



This timely reference presents current information on soil resources, availability and status, in the context for food production for the worlds growing population. It discusses how to maintain or improve the world's soil resources in order to increase food production.

### Sustaining soil productivity in response to global climate change

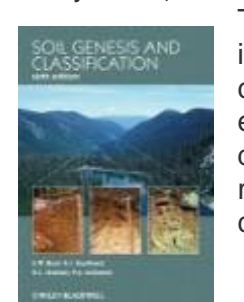
Thomas J. Sauer, John Norman, Mannava V. K. Sivakumar (Editors )



This two part publication is based on topics presented at the OECD conference and brings together the latest soil science and climatology research with the ethical, political and social issues surrounding soils and their stewardship.

### Soil genesis and classification

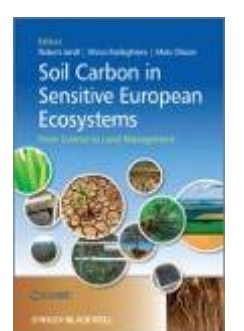
Stanley W. Buol, R.J Southard, R.C. Graham, P.A. McDaniel.



This new edition, the 6<sup>th</sup>, includes information on new classification systems and emerging technologies and databases with updated references. It also features a colour plate section

### Soil carbon in sensitive European ecosystems

Robert Jandl, Mirco Rodeghiero, Mats Olsson (Editors).



This book seeks to provide an up-to-date account on the state-of-the-art European research within this topical field. It focuses on ecosystems and their soil carbon stocks provides a comprehensive overview of the latest research in this field drawn together by a network of scientists, currently working for the European research programme.

## Web Resources

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### The story of soil

"In response to growing concerns about the condition of some of the worlds soils the soil science society of America has launched a campaign called the story of soil." says the website take a look at <http://www.iheartsoil.org/home>

### National soils grid information

ASRIS has released the first national standard soil data sets, 250m resolution, for clay content, bulk density and plant available water. For details see <http://www.asris.csiro.au/themes/NationalGrids.html>

### Understanding soil and farming systems

This project supports the organisation and delivery of data, information and knowledge for modelling and measuring the impacts of farming systems and climate on soil health in Victoria. For more info see [http://vro.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/lwm\\_usfs](http://vro.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/lwm_usfs)

### Visual soil assessment

Shepard, G, Ross C, Basher L, Sagger S, Janssen H and Bbird L

These guides were published in 2000 and have been out of print but they available online to download <http://www.landcareresearch.co.nz/research/soil/vsa/>

### IUSS bulletin

The latest issue of the IUSS bulletin is online at Facebook. Jock Churchman from the University of Adelaide appears in the 'five questions for a soils scientist' section. The newsletter can be viewed at <http://www.scribd.com/doc/75163716/IUSS-Bulletin-119-December-2011#source:facebook>

### Dirt on Ockham's razor

Jill, Duchess of Hamilton, wonders why dirt has such a bad name and the word is often used in a derogatory and negative way. In this talk she puts in the good word for dirt. For audio and transcripts see SBC website:

<http://www.abc.net.au/radionational/programs/ockhamsrazor/ockham27s-razor-8-january-2012/3732572>

### Biochar and native plant propagation

Information on a Greening Australia trial using biochar to help in the propagation of natives [http://www.biochar-international.org/profiles/Greening\\_Australia](http://www.biochar-international.org/profiles/Greening_Australia)

### Monitoring Soil Science Project for Schools.

The IUSS supported project to encourage soil science study at high school level has revised its website. Lyn Abbott writes "We have engaged with a second round of pilot schools in Western Australia and.....I encourage you to explore the possibility of being a soil science mentor to a science teacher at one of your local schools"

For further information

<http://soils.duit.uwa.edu.au/index.php>

### Soils on Youtube

**Soil texture** <http://www.youtube.com/watch?v=GWZwbVJCNec&feature=share>

**Soils for the future** [http://www.youtube.com/watch?v=rsbA4Z\\_v5JI](http://www.youtube.com/watch?v=rsbA4Z_v5JI)

Take a look at CSIROs you tube video promoting soil research and ASRIS

**Flight through the pore network**

<http://www.youtube.com/watch?v=7fhufJHzGsM&feature=related>

**Simulated fungi in a soil matrix** <http://www.youtube.com/watch?v=G0juMKx9LOM>

**Water distribution low carbon soil**

<http://www.youtube.com/user/tburykin#p/a/u/2/nBHJnwJk8y8>

**Soil Stories**

<http://www.youtube.com/watch?v=Ego6LI-ljBY>

## Research Papers

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### Effects of dairy cow treading pressures and food resources on invertebrates in two contrasting and co-occurring soils

N. L. Schon, A. D. Mackay and M. A. Minor A  
**Soil research vol 49(8)**

### Meeting bulk density sampling requirements efficiently to estimate soil carbon stocks

Karen W. Holmes, Andrew Wherrett, Adrian Keating and Daniel V. Murphy  
**Soil research vol 49(8)**

### Plant growth and soil responses to soil applied organic materials in Tasmania, Australia

S. W. Ives, W. E. Cotching, L. A. Sparrow, S. Lisson and R. B. Doyle  
**Soil research vol 49(7)**

### Relationships between soil organic matter and the soil microbial biomass (size, functional diversity, and community structure) in crop and pasture systems in a semi-arid environment

D. V. Murphy, W. R. Cookson, M. Braimbridge, P. Marschner, D. L. Jones, E. A. Stockdale and L. K. Abbott  
**Soil research vol 49(7)**

### Runoff losses from irrigated dairy pastures treated with phosphorus fertilisers of differing solubility in south-eastern Australia

A. J. Weatherley, B. F. Quin, K. B. Dassanayake and J. S. Rowarth  
**Soil research vol 49(7)**

### Rhizosphere effects on soil nutrient dynamics and microbial activity in an Australian tropical lowland rainforest

Hannah Toberman, Chengrong Chen and Zhihong Xu  
**Soil research vol 49(7)**

### Soils and nitrous oxide research

In a special free virtual issue of the journal Soil use and management compilers Bob Rees and Bruce Ball highlight some of the more important published papers on N<sub>2</sub>O.

**Soil Use and Management 26(2)**  
[Soils and nitrous oxide research](#)

### Tidally driven water column hydro-geochemistry in a remediating acidic wetland

Johnston, S Keene AF, bush RT, Sullivan LA, Wong VNL 2011  
**Journal of hydrology 409 (1-2)**

### Open Access Journals

There are several open access journals for soils for those that are interested Thanks go to Jess Drake (who runs the soils blog, soilduck ) for the posting links on the ASSSI facebook page

**Open Journal of soil science:** <http://www.scirp.org/journal/ojss/>

**Applied and environmental soil science** has special issue on biosolids and spectroscopy to name a few <http://www.hindawi.com/journals/aess/>

**Journal of Soil Science and plant nutrition** from Chilean Society of Soil Science  
[http://www.scielo.cl/scielo.php?script=sci\\_serial&pid=0718-9516&lng=es&nrm=iso](http://www.scielo.cl/scielo.php?script=sci_serial&pid=0718-9516&lng=es&nrm=iso)

**Journal of soil science and environmental management:**  
<http://www.academicjournals.org/jssem/index.htm>

**ISRN soil science journal:** <http://www.isrn.com/journals/ss/editors/>

### Soils hidden secrets

Whilst not a research paper per se this article refers to studies looking at the longevity of carbon in soils particularly as carbon levels in the atmosphere rise. An interesting read.

[http://www.sciencenews.org/view/feature/id/337548/title/Soil%E2%80%99s Hidden Secrets](http://www.sciencenews.org/view/feature/id/337548/title/Soil%E2%80%99s%20Hidden%20Secrets)

## Events

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### 3rd Sustainable Phosphorus Summit

February 29 - March 2, 2012  
Aerial function centre, Sydney  
<http://sustainablepsummit.net/>

### National acid sulfate soils conference

March, 6-7, 2012 3rd  
Melbourne  
[www.scu.edu.au/nationalassconference](http://www.scu.edu.au/nationalassconference)

### Soilfoodweb courses

March, 6-8, 2012 (10 places still available) or 8-10 May or 3-5 July  
Lismore NSW  
Admission: \$650.00 + GST

A three day comprehensive hands on course covering how to make quality compost, building a compost tea extract brewer, analysing tea and compost. The course is farm ready approved.

**Enquiries: Chris Ellery or Merline Olson (02) 6622 5150**

### Australian soil information symposium

April, 16-17, 2012  
Australian Technology Park, 2 Locomotive Street, Eveleigh, Sydney NSW  
For more information and registration see:  
<http://www.soilscienceaustralia.org/index.php/component/content/article/24-downloads/181-australian-soil-symposium>

### Fifth Global IUSS Workshop on Digital Soil Mapping

April, 10-13, 2012  
University of Sydney, Australia,

### Biochar in agriculture: Farmer update

June, 6, 2012  
Wollongabar Primary Industries institute NSW  
RSVPs for this free update are essential. Contact event organisers, Sefton and Associates, at [seftonpr.com.au](http://seftonpr.com.au)

### The 4th International Biochar Congress

September, 16 -19, 2012  
Beijing China  
[www.ibi2012.org](http://www.ibi2012.org)

### Soil solutions for diverse landscapes

December, 2 – 7, 2012  
Hobart  
<http://www.cdesign.com.au/soilscience2012/>

## Enquiries

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*All the dirt is produced by Department of Primary Industries, (NSW) and published by the NRCMA. Email to subscribe, unsubscribe, contribute or comment:*

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