



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

Spring 2012

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Spring is well and truly sprung so welcome to the spring edition of All the Dirt. This quarter there is interesting information from further afield of the Northern rivers with results from an alternative fertiliser trail near Yass and soil schools running in the Pacific.

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Alternative fertiliser trial

Fiona Leech, District agronomist Yass, NSW DPI

For the last three years on the southern tablelands of NSW, Binalong Landcare and NSW DPI have been running a replicated field trial looking at the effect of alternative fertilisers on native pasture production, soil fertility and soil microbial status. The study has generated extensive interest from a wide range of people across south-eastern Australia. As a result Binalong Landcare and NSW DPI, Yass have committed to continue the trial for a further 2 years.

The trial consists of 3 native pasture sites where 9 products were trialled at rates determined by the companies who contributed them. Recommended spreading rates were based on trial plots previous year's soil test results. A control or nil treatment was included for all pasture production comparisons. Some products are applied annually while others are applied as 'capital' dressings.

The products that delivered substantial amounts of phosphorus and sulphur (such as single superphosphate, Agri-ash, SEP pig manure and YLAD Compost Mineral Blend, BioAg Blend and Dical 64) produced the most kilograms of dry matter/ha in some or most springs across the 3 trial sites. When looking at cost effectiveness single superphosphate, Agri-ash and SEP pig manure had similar costs. However, YLAD Compost Mineral Blend was 2 to 7 times more for the additional pasture it grew. BioAg Blend and Ecology Fluid Fertiliser/Dical 64 were as cost effective as the single superphosphate, SEP pig manure and Agri-ash however have been less consistent in growing significantly more pasture than the control to date.

Alternative products included in trial

- Single Superphosphate,
- Agri-ash,
- Trio-min/Eco-min Balance,
- SEP Pig Manure,
- Groundswell Compost,
- YLAD Compost Mineral Blend,
- YLAD Compost Tea,
- BioAg Blend and
- Ecology Fluid Fertiliser/Dical 64.

The pasture and soil data collected has been statistically analysed and the economic assessment carried out was based on the spring pasture growth measurements taken over the 2009 to 2011 period.

Each of the products that grew significantly more pasture than the control treatment had a relative cost effectiveness figure calculated. A product yielding less than the control was regarded as being not cost effective.

To date the trial has been funded by DPI, NSW Office of Environment and Heritage, Murrumbidgee Catchment Management Authority, Federal Department of Agriculture, Fisheries and Forestry (Caring for our Country Community Action Grants), Woolworths and Landcare Australia.

A copy of the full 3 year report will be available in November 2012 by contacting Fiona Leech NSW DPI, Yass. Ph 6118 7701 or email fiona.leech@dpi.nsw.gov.au.

Soil schools for the pacific

Michele Smith, Organic matters

The Pacific islands might be known as a holiday destination but it's also common to find farmers struggling to grow cash crops such as taro and kava and food to feed their families on plots of only a few acres. There's a pressing need for Pacific island farmers to find alternatives to expensive imported fertilisers and a desire to improve crop productivity so that they can move beyond subsistence farming and have funds for education, health care and more.

This is where Soil School steps in – on the ground. Teaching the basics, and beyond, of soil health to farmers in the Pacific is a life's passion for Mike Smith. Soil School is teaching hundreds of people how to understand the soil and then how to improve it using cheaper, locally available and low chemical options. Education levels vary across the Pacific but some farmers have very little understanding of the chemistry of fertilisers and herbicides, how biological processes such as photosynthesis work or how agricultural practices such as crop rotation and growing nitrogen-fixing crops, can be used to naturally improve their soil. Soil School lessons take place in small towns close to where the farmers live in conjunction with local farmer collectives.



Soil school Samoa



Soil school Taveuni, Fiji

The lessons taught at Soil School begin with the basics but continue up to an advanced level over a number of intensive days that include field work, soil testing, observations and classroom discussions. Students learn how to use simple tools and how to read soil test results to ensure they are well-informed about what their soil actually needs (as opposed to what a chemical company may want to sell them). The Soil Schools are modules of the Diploma in Organic and Sustainable Production (TAFE Australia) for any students wishing to extend their study.

Since Soil School began in 2009 over 300 participants have learnt practical skills to improve their farm's fertility, productivity and profitability in places such as Fiji, Samoa and Tonga. The solutions are sustainable, affordable and tailored to local climatic and soil conditions.

If you'd like to know more about the hands-on work of Soil School and the Organic Matters Foundation, take a look at the website (www.organicmatters.org.au), follow them on Facebook Organic Matters Foundation or sign up to receive e-newsletters.

Dung Beetles and Buffalo Fly – The good the bad and the ugly.

Simon Proust, NRCMA

Clarence Landcare attracted about 60 graziers, Landcarers and agency staff to hear about Dung Beetles and Buffalo fly at Tracey's Lawson's Beef cattle property at Alummy Creek just north of Grafton.

Dr Bernard Doube, the key speaker, has been speaking at a range of Landcare field days on the North Coast and Northern Tablelands supported by Landcare and the Australian governments Community Action Grant. Bernard from Dung beetle Solutions is a former CSIRO research scientist.

Dung Beetles are friends of the farm and the environment. Australia has 436 Dung beetle species though most are only active in the summer months. According to Dr Doube there are three types of Dung beetles – the ball rollers, inside pads and tunnelers – the latter can tunnel up to 0.5m in depth carrying dung which improves soil structure through aeration and improve water holding capacity and increasing soil carbon. Additionally they reduce N₂O emissions by burying the dung.

Dr Doube presented data showing the increased pasture yield where there is a higher incidence of Dung Beetles. He also discussed how they can improve soil health and water quality through improved infiltration. Dr Doube provided advice on worm treatments which are non toxic to Dung Beetles and had a range of species on hand.



There is an important relationship between the dung beetle and the control of buffalo fly. Buffalo Fly is a blood sucking external parasite which has only arrived in NSW recently – though obviously with vengeance if a show of hands of workshop participants is any guide. The principal habitat for Buffalo Fly is dung - if as a farmer you can have a range of Dung Beetle species which work across the seasons then the incidence of Buffalo fly should be greatly decreased.

Aaron Lewis a Veterinarian in training gave an energetic and humorous talk, ably supported by his mentor with the LHPA the experienced Phil Kemsley. They stressed the huge impact buffalo fly can have on cattle health and the need to control the fly early to prevent its dispersal.

For more information <http://www.dungbeetlesolutions.com.au/>

Six easy steps for soil nutrient management in the cane industry

Rick Beattie, NSW Sugar Milling Co-op

Modification of the traditional nutrient-management guidelines for sugarcane production in Australia has been in progress for some time. The result was the development by the Bureau of Sugar Experimental Stations (BSES) of the SIX EASY STEPS nutrient management package aimed at optimised, productive and profitable sugarcane production in combination with environmental awareness.

The SIX EASY STEPS program is an integrated nutrient-management tool that enables the adoption of best-practice nutrient management on-farm. It consists of:

- Knowing and understanding your soils.
- Understanding and managing nutrient process and losses.
- Regular soil testing.

- Adopting soil-specific nutrient management guidelines.
- Checking on the adequacy of nutrient inputs.
- Keeping good records to modify nutrient inputs when and where necessary.

More recently we have adapted the system to suit the local conditions and the cane-growing soils of New South Wales (NSW). Soil pits were excavated for the major soil types in the Harwood, Broadwater and Condong districts and soil samples collected for chemical and physical analyses. Communicating with growers and extension providers was an important part of the process of understanding and integrating local knowledge into the overall package. This enabled existing SIX EASY STEPS knowledge to be combined with the unique aspects of growing cane in NSW. The result was the development of nutrient management guidelines specific to the soils of the three NSW cane-growing districts.

In collaboration with BSES agronomists the "SIX EASY STEPS for NSW" has been delivered to industry through a grower-orientated short-course program. The overall objective of the program is to increase growers' understanding of nutrient processes and losses, and how to adopt the new guidelines within their fertiliser programs. To date seven workshops have been held involving more than 90 growers, their advisors and agri-business staff. Feedback received has been exceptionally positive. More courses will be conducted when required through arrangements with the NSW Sugar Milling Co-op.

For further information on the SIX EASY STEPS program please contact Rick Beattie, rbeattie@nswsugar.com.au, Peter McGuire pmcquire@nswsugar.com.au or Anthony Young ayoung@nswsugar.com.au.

Northern Rivers Action on Ground soil carbon project update

Lindy Brown NRCMA

Recently, 30 farmers, Landcare Community Support Officers, DPI, industry and CMA staff came together as part of a three year Action On The Ground Project being managed by the NRCMA. The project involves ten partners and 27 landholders covering beef cattle, dairy, sheep, vegetable, potato, herb and chicken producers. Twenty seven trial sites with a combination of, compost, chicken and cow manure applications, coupled with biological and rotational grazing practices will be set up, with the aim of increasing soil organic carbon. Two of the farms have also been selected to measure Nitrogenous emissions from the trial sites over the three year project

The two day workshop commenced at DPI's Grafton Agricultural Research Station, home to one of the 27 trial sites. Dr Lukas van Zwieten, (DPI), gave a great overview of the complexity of nitrogen fertiliser, N₂O emissions and discussed some of the relationships between emissions, soil moisture content and soil carbon levels, particularly the labile carbon fraction. Many of the trials the landholders are conducting in this project include the addition of compost and manures with a reduction of N fertiliser application. Darren Fahey from Australian Organics Recycling Association (AORA) progressed this discussion by enlightening us all about using "mature" compost and composted poultry manures. Darren outlined the compost industry and biological process during compost making and a range of trials with compost use, he has been involved with.

The highlight of the Workshop was a field trip to Stuart Larsson's family farm business Mara Seeds at Mallanganee. Mara Seeds produces some 6000t of Organic compost and also grows wheat and soybeans. The Soybeans supply a market in Korea together with the largest organic Soy Milk product in Australia. We had a fantastic tour of the facility and the Sustainable Organic Farming Techniques (SOFT TM) products.



Mara seeds compost windrows. (photo NRCMA)

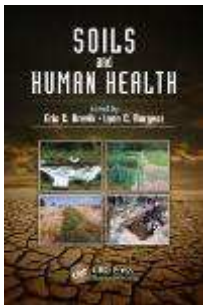
Project landholders were full of enthusiasm after the two days and keen to start their trials now that the soils baseline sampling has been completed on all properties by Dr Peter Bacon, (Woodlots and Wetlands). The trials will run for the next two years and soil testing will be repeated.

This project is funded through the Australian Government's Clean Energy Future Program. For more info contact Simon Proust, simon.proust@cma.nsw.gov.au

New Publications

Soils and Human Health.

Eric Charles Brevik, Lynn C. Burgess (Eds.)



This text focuses on human health from a soils perspective, discussing how soils influence human health including the supply of nutrients; presence of toxic materials and pathogens. It also covers the topics of soil-based public health recommendations; heavy

metals in soil; food security and climate change.
<http://www.crcpress.com/product/isbn/9781439844540>

Digital Soil Assessments and Beyond: Proceedings of the 5th Global Workshop on Digital Soil Mapping 2012.

Budiman Minasny, Brendan P. Malone, Alex B. McBratney (Eds.).



Papers presented at the 5th Global Workshop on Digital Soil Mapping, held in Australia are published in this publication. The contributions demonstrate the latest developments in digital soil mapping as a discipline with a special focus on the use of

map products to drive policy decisions particularly on climate change and food, water and soil security.

<http://www.crcpress.com/product/isbn/9780415621557>

Soil-Subsurface Change: Chemical Pollutant Impacts.

Bruno Yaron, Ishai Dror and Brian Berkowitz.



Combining soil science, earth science, and environmental geochemistry, this book provides comprehensive background information for specialists interested in chemical-induced changes in the soil-subsurface system. The major focus is on changes to the soil-subsurface matrix

and properties caused by chemical pollution which has been largely neglected.

http://www.springer.com/?SGWID=0-102-24-0-0&searchType=EASY_CDA&queryText=Soil-Subsurface+Change%3A+Chemical+Pollutant+Impacts.

Heavy Metals in Soils. Trace Metals and Metalloids in Soils and their Bioavailability series, Volume 22

Brian J Alloway (Ed.)



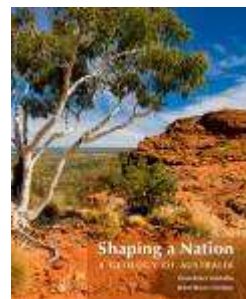
In its third edition, but completely rewritten third book covers the general principles of the occurrence, analysis, soil chemical behaviour and soil-plant-animal aspects of heavy metals and metalloids, with a more detailed coverage of 21 elements.

The scope has been widened with four new chapters dealing with toxicity in soil organisms, soil-plant relationships, heavy metals and metalloids as micronutrients for plants and/or animals, and the modelling of critical loads of heavy metals for use in risk assessment and environmental legislation.

<http://www.springer.com/environment/soil+science/book/978-94-007-4469-1>

Shaping a Nation: Geology of Australia

This new e-book from Geoscience Australia

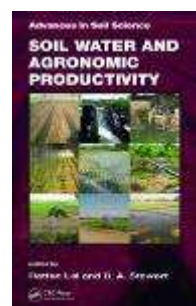


explores the geology, resources and landscapes of Australia, covering its geological history, fossil record, evolution of life across the continent, mineral and energy reserves, and coastal and groundwater systems.

<http://epress.anu.edu.au/titles/shaping-a-nation/pdf-download>

Soil water and agronomic productivity

Rattan Lal and B A Stewart



This book focuses on technologies for improving soil water availability, enhancing water use efficiency, and using productive irrigation systems. It also presents techniques to conserve water in the root zone as well as remote sensing techniques to assess soil water regime and predict

drought on a regional scale.

<http://www.crcpress.com/product/isbn/9781439850794>

Web Resources

New federal advocate for soil health

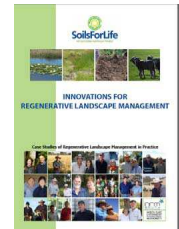
Did you know that the prime minister has appointed former Governor-General, Michael Jeffrey as an advocate for soil health? Look at this link to see what she said about soils and the new role to the National Farmers' Federation

<http://resources.news.com.au/files/2012/10/23/1226501/277361-aus-na-file-gillard-speech.pdf>

Soils for life

An outcome Australia project that is looking at new and innovative things farmers do in managing their soils

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



Soil moisture

Monthly soil moisture maps for Australia can be found at

<http://www.eoc.csiro.au/awap/>

Australian soil information symposium April 2012

Proceedings from the symposium can be found on the Soil Science Australia website. Of particular interest may be; Building soil carbon on farms by Jeff Baldock and Raphael Viscarra Rossel

http://www.soilscienceaustralia.com.au/index.php?option=com_content&view=article&catid=1%3Aaboutsoils&id=181%3Aaust-soil-info-symposium&Itemid=68

Soil carbon videos

West Gippsland Catchment Management Authority (WGCMA) and Dairy Australia have put together nine YouTube clips from the region's 2011 soil forum featuring keynote speaker Dr. Jeff Baldock.

<http://www.wgcma.vic.gov.au/the-news/announcements/315-soil-carbon-video-presentation-now-available.html>

Enough soil carbon to mitigate climate change is a 'big ask'

Hear the 2012 Harald Jensen lecture given by Dr. Mark Conyers at

https://amp.redbackconferencing.com.au/recordings/Webinar/SOIL_SOCIETY_28_SEP_1930.wmv

Soil to sky

Poster outlining the difference between industrial agriculture and agroecology.

<http://www.care2.com/greenliving/agroecology-vs-industrial-farming-infographic.html>

Global Soil Partnership (GSP)

A recent initiative of the Food and Agriculture Organisation (FAO) check the website for news, events and information resources such as articles, working papers, reports and a press release.

<http://www.fao.org/globalsoilpartnership/home/en/>

New carbon cycling model

This new model accounts for the carbon dioxide-releasing activity of microbes in the soil. It simulates the carbon cycle after a decaying plant or animal releases carbon-rich materials into the soil. Read a report on the new model at

<http://www.sciencedaily.com/releases/2012/08/120816170307.htm>

Market research into carbon farming in Australia

Find out what farmers and their advisors think of the carbon farming initiative in this DAFF report

http://www.daff.gov.au/data/assets/pdf_file/0009/2171088/Market_Research_Report.pdf

Relationship between land management practices and soil condition

This DAFF report looks at the relationships between land management practices and soil condition and the quality of ecosystem services delivered from agricultural land in Australia.

<http://daff.gov.au/natural-resources/ecosystem-services/relationships-between-land-management-practices-soil-condition>

Subsoil testing may save nitrogen applications

New research reveals growers could make savings on nitrogen fertiliser by conducting sub-soil testing to obtain a more accurate picture of nutrients available to their crops.

<http://theland.farmonline.com.au/news/state/grains-and-cropping/general/subsoil-testing-could-lead-to-nitrogensavings/2617210.aspx>

Research Papers

Afternoon rain more likely over drier soils

Christopher M. Taylor, Richard A. M. de Jeu, Françoise Guichard, Phil P. Harris & Wouter A. Dorigo
Nature, 489 423–426 September 2012
<http://www.nature.com/nature/journal/v489/n7416/full/nature11377.html>

Arbuscular Mycorrhizal Fungi Increase Organic Carbon Decomposition under Elevated CO₂

Lei Cheng, Cg Tu, L Zhou, H. David Shew, T W. Rufty, S Hu, F Booker and K Burkey.
Science (online) Aug. 30, 2012

Nitrogen dynamics in grain crop and legume pasture systems under elevated atmospheric carbon dioxide concentration: A meta-analysis

Deli Chen, Rob Norton, Roger Armstrong and Arvin Mosier,
Global Change Biology 18(9) 2853–2859
<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2012.02758.x/abstract>

Phosphorus loss and speciation in overland flow from a plantation horticulture catchment and in an adjoining waterway in coastal Queensland, Australia

Peter R. Stork A C and David J. Lyons B
Soil Research 50(6) 515-525
<http://www.publish.csiro.au/nid/84/paper/SR12042.htm>

Rapid responses of soil microorganisms improve plant fitness in novel environments.

J. A. Lau, J. T. Lennon.
Proceedings of the National Academy of Sciences, 109(35) 14058-14062
 Indicates that microbes prompt plants to respond to environmental changes

Roots and fungi accelerate carbon and nitrogen cycling in forests exposed to elevated CO₂.

Richard P. Phillips, Ina C. Meier, Emily S. Bernhardt, A. Stuart Grandy, Kyle Wickings, Adrien C. Finzi.
Ecology Letters, 15(9) 2012;
<http://onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2012.01827.x/abstract;jsessionid=93344BAD0B85B4B96F951578FD5D22D2.d01t03>

Short-term effects of a prolonged blackwater event on aquatic fauna in the Murray River, Australia: considerations for future events.

King A, Tonkin Z, Lieshcke J (2012)
Marine and Freshwater Research 63: 576-586.

Soil information in support of policy making and awareness raising

Johan Bouma, Gabriele Broll, Todd A Crane, Olivier Dewitte, a, Ciro Gardi, Rogier PO Schulte, Willie Towers
Current opinion in environmental sustainability
<http://www.sciencedirect.com/science/article/pii/S1877343512000887>

Spatial patterns of, and environmental controls on, soil properties at a riparian-paddock interface.

M, Smith P Conte, AE Berns, J Thomson, TR Cavagnaro (2012).
Soil Biology and Biochemistry. 49: 38-45.

The future of grain legumes in cropping systems

Thomas R. Sinclair A C and Vincent Vadez
Crop and Pasture Science 63(6) 501-512
<http://www.publish.csiro.au/nid/40/paper/CP12128.htm>
 This review looks at what is needed to increase symbiotic nitrogen fixation capacity and soil phosphorus recovery, overcome yield limitations, and encourage cropping systems to take advantage of legume benefits.

Events

The First Global Soil Week

18-22 November 2012

Berlin, Germany

The website says this event “offers a forum of interactive exchange and dialogue”

<http://www.globalsoilweek.org/>

Bioenergy Australia 2012

November 26-27

Melbourne

<http://www.bioenergyaustralia.org/>

21st Professor G W Leeper Memorial Lecture

November 23 at 5pm. Field Excursion will be held on 24th November.

Lower Lecture Theatre, University of Melbourne

Professor John Crawford of the University of Sydney is the 2012 Leeper Lecturer.

World Reference Base for Soil Resources (WRB) Field Excursion in Australia

25-28 November Victorian tour and 28 November to 2 December 2012 Tasmanian tour

http://www.soilscienceaustralia.com.au/index.php?option=com_content&view=article&id=197:wr_b-field-excursion-in-australia&catid=24:downloads

The field excursion is to examine the international framework for soil correlation, with the Tasmanian tour also acting as the official pre-conference tour for soil solutions for a diverse landscape conference.

Climate change in primary industries conference

November 27-29

Melbourne

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

Quadrennial Kirkham Conference of the Soil Science Society of America ‘Exploring Frontiers in Soil Physics’

28-30 November 2012

Massey University

<https://www.soils.org/membership/divisions/s01/kirkham-conference-2012>

Soil solutions for diverse landscapes

2012 SOIL SCIENCE AUSTRALIA NZSS joint soils science conference

December 2-7 2012

Hobart Tasmania Australia

<http://www.soilscience2012.com/>

First International Controlled Traffic Farming Conference

25 – 27 February 2013

Empire Theatre, Toowoomba.

to express interest www.actfa.net

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Soil Science and Management on the North Coast of NSW



Industry & Investment

