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New Zealand Soil News

Newsletter of the New Zealand Society of Soil Science

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Your contributions are required - New Zealand Soil News is your newsletter

News, views, letters, articles (serious or otherwise)—send to:

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Deadline..... for the December issue of Soil News is **Monday 15th December 2014**

Visit our website:

<http://nzsss.science.org.nz/>

New Zealand Soil News

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NZSSS subscriptions

NZSSS subscriptions become due on **1 July** each year. Individual members who do not pay their subscription before 31 October in a given year will be asked to pay an additional \$NZ10.00 as a penalty for late payment.

	<i>If paid by 31st October:</i>	<i>After 31st October:</i>
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I hear mutterings and murmurings from time to time emanating from Wellington by the high priests of science policy and administration, intimating that the scientific community needs to ‘up its game’, so to speak, in terms of how it interacts and relates to society. This message is strongest in the recent report “A Nation of Curious Minds: A National Strategic Plan for Science and Society” (MBIE 2014). There is even the recent suggestion that we need a “Code of Practice for Public Engagement.”

Unlike most soil scientists in New Zealand I spend most of my professional days in the space between science and the farmer. It is perhaps a unique place from which to observe the interactions between society and science. What do I see, restricting myself to my field of interest; agriculture, soil science and fertilisers? Very little I’m sad to say. Where is the voice of soil science? Agricultural journalist, wanting input into stories, frequently ask me – why are there so few soil scientist are prepared to engage with society?

Recently, the NZ Royal Society held a forum on “Future Food for the Planet.” Four scientists were on the billboard, but no one from New Zealand. The promotional blurb commenced “The soil literally feeds the world, but is itself being depleted.” Despite such an obvious prompting I heard not a word from our soil science society or its members, most of whom would agree with the first proposition but are likely, or at least should, have much to say about the second statement.

This sentiment – we are destroying our soils with our modern farming techniques - is prevalent in the farming news and especially in advertorial comment and product advertising. Why do I not hear NZ soil scientists commenting and contributing to this discussion, which must surely be at the heart of our profession?

Self-styled Gurus come into New Zealand telling society, and in particular farmers, to go organic or to use the Albrecht soil ratio theory as a basis for fertiliser advice. Both practices have been shown by science to be flawed. Soil scientists should be enraged by their intrusions. Not a whisper. We have companies in New Zealand promoting a concept called the soil-food-web: feed the bugs and they will feed the plant. Really? Not a whisper from science. We have soil labs pumping out soil tests that are not calibrated for use in NZ resulting in bad fertiliser practices and no one cares.

Historically science is in a vulnerable place today. The Age of Enlightenment, which gave birth to science has been superseded in the last generation by post-modern philosophy which demands that every opinion must be given equal weight irrespective of where the evidence lies. Out of that melting pot comes post-normal science or better referred to as noble-cause science; science must now serve the modern narrative even if it means bending the scientific to fit.

Science must be asserted and scientists must demonstrate yet again to society that what they have to offer is vital for the long-term survival of humanity. That means the science must engage with society and importantly that engagement needs to take place at the level of society so they can see clearly and understand the value of science to society.

Dr D C Edmeades



A collection of soil-related oddities from Godzone and around the world

An ode to soil

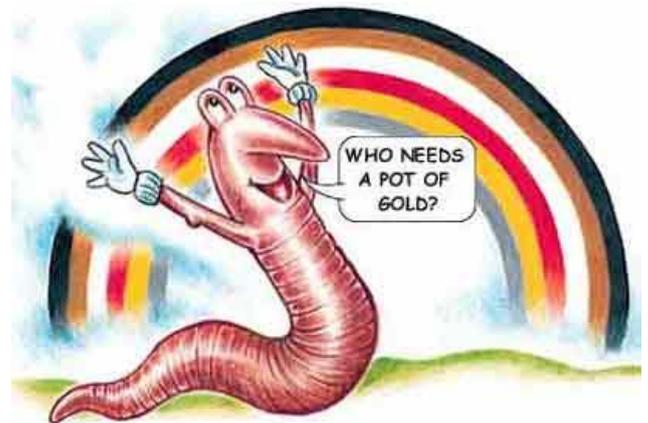
As the international year of soils is fast approaching, it seems like the right time to pause and think about how we can share our love of soil with those that are less enlightened than ourselves. Dr. Francis Hole (!) was a Wisconsin professor of soil science who liked to share his love of soil and enthusiasm for nature with song. Here are a couple of my favourites:

You Are My Soil, My Only Soil

You are my soil ... my only soil;
you keep me vital night and day.
This much I know, friend you do support me
please don't erode my life's soil away.

A Rainbow of Soil

A rainbow of soil is under our feet:
Red as a barn & black as a peat.
It's yellow as lemon and white as the snow;
Bluish gray ... so many colors below.
Hidden in darkness as thick as the night:
The only rainbow that can form without light.
Dig you a pit, or bore you a hole,
You'll find enough colors to well rest your soul.



I imagine this song was written after a tough day of digging:

Rock, Rock Song

Rock, rock, rock, rock, rock, rock, rock, rock!
No leaf, no green! No plant is seen!

(source: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/kthru6/?cid=nrcs142p2_054313)

Do you like to get creative with soil? Don't forget to enter something to the Soils and Art Exhibition at the next NZSSS conference (www.nzsssconference.co.nz).

Waikato/Bay of Plenty

University of Waikato

Everyone is very busy. But we did hold our annual graduate/postgraduate conference on 21 October and some terrific papers on soils amidst a wide mix of Earth sciences topics were well rewarded with prizes. **Jasmine Robinson** won the Geoscience Society of New Zealand (Waikato Branch) prize for her 1-minute talk on her forthcoming MSc-thesis research entitled “Finding the temperature optimum of soil respiration”. **Phillipa Mills** was a runner-up for the Tonkin and Taylor prize with her poster on her forthcoming MSc-thesis research entitled “Initiation of landslides in sensitive soils in the Tauranga region”. **Camillia Garae** won the NIWA inaugural “Vern Pickett Memorial Award” for best oral paper (on coastal or environmental processes) entitled “*Estimating rates and patterns of shoreline erosion from cliffed regions around the margins of Tauranga Harbour*”. **Melissa Kleyburg** won the Waikato Regional Council (Coasts, Land and Wetlands group) prize for best MSc or BSc(Hons) oral paper “Paleoliquefaction in Late Pleistocene alluvial sediments in Hauraki and Hamilton basins, and implications for paleoseismicity”.

Jack Pronger won the Mark T. Mitchel prize for best PhD oral paper: “Are mixed sward pasture systems a solution to improve water use efficiency and dry season production?” Finally, **Yu-Tuan (Doreen) Huang** won the Michael J. Selby prize for best overall paper for the conference entitled “Buried secrets in allophanic paleosols on tephras: the search for palaeoenvironmental DNA from past terrestrial environments”. Doreen’s research is funded by the Marsden Fund (project “New views from old soils”, UOW1006).

Prize winners at the annual graduate/postgraduate conference for Earth sciences, 21 October, 2014.



Back row from left: Phillippa Mills, Billy Bodger, Melssia Kleyburg, Camillia Garae, Suzanne Branford, Melissa Kellett, Talissa Squire.

Front row from left: Kevin Mullane, Jasmine Robinson, Yu-Tuan (Doreen) Huang, Yu-Shen Liu, and conference convenor Professor David Lowe.

AgResearch Ruakura

Fresh faces

Marike Cappon from Wageningen University, MSc study Animal Science, the Netherlands, has started her internship within the NM&EF team. She will work within the Life Cycle Analysis team, supervised by **Marlies Zonderland**, on water footprinting analyses of NZ dairy farms until the Christmas Holidays.

Diana Selbie, Sheree Balvert and **Debbie Clark** hosted 53 students (9-10 years old) from Southwell School in an interactive session on the connection between food and the land. Diana explained: “We took a ‘soil to supermarket’ approach by identifying four different foods and created a chain of production right back to the land. Using milk, meat, bread and potatoes as examples, we created an eight step product cycle beginning with soil and ending with the final product you would see in the supermarket”. The visit was a great success; the teachers and kids were rapt and sent 53 thank you letters, some are pictured below.



New places

Stewart Ledgard recently returned from San Francisco where he attended a LCA Food Conference and gave two presentations. He was on the organising committee and chaired three sessions, which meant limited time for moving between different workshop groups. Prior to the conference he spent several days climbing the granite outcrops in the Yosemite National Park, with its fire-stricken pine trees. He also found a couple of days to check out the soils of volcanic and marine origin in the Napa and Sonoma valleys, and also to check out their great wines.

Gina Lucci spent most of September on a Kathleen Spragg Agricultural Trust- funded visit to Sweden, Scotland and England. There she met with researchers to learn more about their approach in putting together catchment management plans and to look at their natural flood management approaches and runoff attenuation features to reduce sediment and nutrient losses. One site visited was part of the River Eden Demonstration Test Catchment (EdenDTC); a Defra funded research project. They work closely with farmers in the catchment to test a range of mitigation measures in real catchment situations.



Dairy farm in the Eden catchment. Left to right: Jennine Jonczyk (Newcastle Uni), Chris Turner (Catchment Sensitive Farming officer), Gina Lucci (desperately trying to scribble down all the key information discussed), Nick Barber (Newcastle Uni), and farmer.

Bread and butter

A new chapter in the Overseer Technical Manual was published in August on the “Characteristics of fertilisers” authored by **David Wheeler & Natalie Watkins**.

And finally, **Mark Shepherd, Bob Longhurst** and **Gina Lucci** participated in a workshop focused on nitrogen losses from a winter forage cropping cycle on pumice soils. This workshop summarised the results of a three-year Sustainable Farming Fund project on the Central Plateau and was a bitter-sweet end to the project.

Manawatu/Hawke’s Bay

Plant and Food Research, Palmerston North

Plant & Food Research, Ruakura has commissioned developing a fully automated solute transport apparatus (SOLO), which allows to measure hydrodynamic soil properties with accuracy. **Karin Müller** (PFR), **David Hunter** and **Phillipa Rhodes** from Landcare have been busy measuring sorptivity of irrigated arable soils with SOLO. Based on sorptivity measurements with ethanol and water, subcritical water repellency was quantified. This is potentially significant for water and nutrient use efficiency under irrigation, particularly on sloping land susceptible to runoff, or soils prone to preferential flow with an enhanced risk of contaminant leaching.



The design team Karin Müller, Paul Gaastra, Richard Oliver and Lynn Cate, and the three SOLO units.

The new Root Zone Reality project has been keeping Plant & Food Research teams across the country busy. Regional authorities around New Zealand are developing plans to improve freshwater quality while enabling sustainable intensification of agriculture. A common theme is the requirement that farmers should, as a minimum, be applying agricultural good management practice (GMP). There is however relatively little information available regarding the measured nitrogen (N) losses from the root zone of cropped paddocks under GMP.

In July this year a new three-year Sustainable Farming Fund project began to help address this gap. The project is creating a network of tension fluxmeters installed across a range of commercial cropping farms in Hawke's Bay, Manawatu and Canterbury, and will use these to measure drainage and nutrient concentrations in leachate.

Installation has now been completed at 7 of 9 sites, and the sites will become operational in the months ahead. For more detail on the project contact **Paul Johnstone** (Plant & Food Research) or **Di Mathers** (Foundation for Arable Research).



The team installing fluxmeters in Canterbury. Each site consists of a central post with four fluxmeters placed at right angles a distance of 3 m from the post.



In August, some of the team attended the International Horticultural Congress in Brisbane. **Brent Clothier** gave an invited presentation on the ecosystem services from orchard natural capital. **Steve Green** presented research results on the effects of artificial spur extinction on apple water use efficiency and the water use of date palms in the UAE. **Karin Müller** talked about eco-efficiency of New Zealand kiwifruit production, and **Roberta Gentile** gave presentations on soil carbon and nutrient services in Australian apple orchards and the potential contribution of soil carbon orchard carbon footprints. Brent Clothier, Roberta Gentile and Ian Goodwin (DEPI, Victoria) also chaired a symposium on Eco-Efficiency in the Lifecycle of Horticultural Production. Interesting talks in the symposium included keynote presentations by **Sarah McLaren** (Massey University) on life cycle management and Richard Stirzaker (CSIRO) on social learning to negotiate the problems of irrigation. We farewelled **Evangelos Xylogiannis** at the congress as he returned to Italy to submit his PhD after spending the past year working with our team on the fluxes of water and carbon in orchards.

We welcome two new visitors, Paolo and Antonio, from Spain to Palmerston North. **Paolo Zuccarini** is a postdoc fellow at IRTA of Torre Marimon, Barcelona, Spain, who is on a five month OECD fellowship. Paolo is working with Brent Clothier and Steve Green to study hydrological balances in different crops and soil types, and for the moment he has been busy with the installation of drainage fluxmeters in the Manawatu and Hawke's Bay regions. Paolo got his MSc in Agriculture and PhD in Horticulture at the University of Pisa, his hometown. He then founded his own consultancy company in the field of Pharmacovigilance and left research for a few years, during which he took a second MSc in Natural Sciences. Two years ago he finally went back to research in the ecophysiology group of IRTA, in Barcelona.

Antonio Molina is a final year PhD student also from IRTA. He has mainly worked on forest hydrology in Mediterranean mountainous areas of Spain, trying to understand the effects of

forest management on the water cycle components and how we can modify them in order to get higher “blue water”. For his dissertation, he has focused on studying the water cycle components in a cherry tree plantation oriented to timber production, and how they may be modified by the typical practices of pruning, irrigation and soil tillage. During his two month stay at Plant & Food Research, he will be working with **Ian McIvor** and **Steve Green** to integrate his data in SPASMO and, based on a simple water balance, to estimate the water footprint of the cherry wood.



Paolo Zuccarini installing drainage fluxmeters in Hawke's Bay.



Antonio Molina working in a forest.

We also both farewell and welcome **Edouard Périé**, who has been completing his PhD assessing the variability of soil carbon stocks in apple orchards and accounting for soil carbon in life cycle assessment. Edouard is imminently submitting his dissertation and will be moving with his family from Palmerston North to Te Puke to begin work with Plant & Food Research as a member of the Fruit Crops Physiology team.

Canterbury

Lincoln University

The Department of Soil and Physical Sciences at Lincoln University would like to welcome Dr. María Jesús Gutiérrez Ginés, from Madrid, who will be working on using biosolids to establish native ecosystems on degraded soils with Juergen Esperschuetz and Brett Robinson. Minakshi Mishra has started her PhD investigating the role of manuka and kanuka to accelerate pathogen die-off in biosolids. Minakshi will be supervised by Brett Robinson, Jacqui Horswell (ESR) and Jennifer Prosser (ESR).

Congratulations to Dr Fiona Shanhun, who has been awarded a science Fellowship from the Scientific Committee for Antarctic Research (SCAR). Fiona is working on partitioning the sources (biotic and abiotic) of CO₂ flux in Antarctic Dry Valley soils, in order to isolate a biotic component that can be used as a reliable metric to quantify ecosystem response to environmental change. As part of this work, Fiona will travel to Canada next year to work with Assoc. Prof. Dave Risk at St. Francis Xavier University, in Antigonish, Nova Scotia.



Fiona has also been busy setting up a display at IceFest, a public exhibition in Christchurch which aims to bring Antarctica to the world. She has put together a photographic display depicting “an expedition in the shoes of a Lincoln researcher”, as well as a display comparing spectacular soil monoliths from around the South Island with an Antarctic soil sample from the Dry Valleys.



Otago/Southland

AgResearch Invermay

Ross Monaghan, Rich McDowell and Chris Smith met with colleagues from Otago Regional Council and Sam Carrick from Landcare Research to evaluate potential sites for measuring N and P leaching from freely-draining soils in the Matukituki Valley, near Lake Wanaka. This proposed experimentation aims to quantify losses from pasture, winter forage cropping and native bush sites under the prevailing high (> 2m pa) rainfall conditions of this locality. Results will be used to inform community discussions about farming within limits under ORC's Plan 6a policy change. **Seth Laurenson and Tony van der Weerden** ran a series of farmer/industry workshops in Otago and Manawatu this month as part of a Global Research Alliance Project that investigates the potential benefit of restricted grazing for the reduction of N₂O emissions. The workshops were interactive and were a good 'ground-truthing' of scientific principles.

NZSSS – Soils as Art

Soils as Art: Call for expressions of interest from the soil science community



Art is potential a means of engaging an audience with the importance, variety, and beauty of soils, that may not be much interested in soil science. We are planning to hold an exhibition of soil-related art works, *created by YOU the soil science community*, in conjunction with the NZ Society of Soil Science conference in Hamilton in December 2014. We want to share our love of soils and show the wider world that scientists are multi-talented people who are about a lot more than white coats and "incomprehensible" conversations. To make this a success we need you to contribute.

We are interpreting art-works in the widest possible sense. The artwork may be any media and any size (within reason). Media may include photography, drawing, painting, printmaking, sculpture, textiles or artwork made from soil itself. The artwork should relate to, or feature, soil in some way. You may have a great photo or two, paintings that feature or have some connection with the soil/earth, sculptures made from clay or other soil materials..., soil peels, poems, posters – we are open to your suggestions.

The exhibition will be on display-panels and tables in the NZSSS conference venue for the duration of the Conference from 1st-5th December 2014.

If you are interested in further information or have some art/sculpture work that you would like to exhibit please can you email either Megan Balks (m.balks@waikato.ac.nz) or Peter Singleton (peter.singleton@waikatoregion.govt.nz) so we can plan in more detail. We will be looking for final confirmation of contributions in October. So get your thinking caps on and your pencils sharpened – the more contributions we have the better it will be!

Without soil, we lose the capacity not only to feed and clothe people, but also the largest natural filter in the world, the largest sponge for fresh water in the world and by far most of the world's natural biodiversity.

Professor Iain Young

Wind Erosion Data

Wind erosion is a widespread phenomenon causing serious soil degradation. It is estimated that about 28% of the global land area experiencing land degradation suffers from this wind-driven soil erosion process. In agricultural lands, soil erosion by wind mainly results from the removal of the finest and most biological active part of the soil richest in organic matter and nutrients. Repeated exposure to wind erosion can have permanent effects on agricultural soil degradation, making it difficult to maintain favourable soil conditions in the long run.

Wind erosion is also a European phenomenon. According to the European Environment Agency, about 42 million ha of European agricultural land may be affected by wind erosion. Local studies reported that wind erosion can affect both the semi-arid areas of the Mediterranean region and the temperate climate areas of the northern European countries. However, little is known about the extent and magnitude of wind erosion throughout Europe.

Understanding spatial and temporal patterns in land susceptibility to wind erosion is essential to design effective management strategies to control land degradation. The lack of researches, particularly at the landscape to regional scales, prevents national and European institutions from taking actions aimed at an effective mitigating of land degradation. With respect to this significant research gaps, the EC-JRC Soil started a new series of studies at Pan-European scale to assess:

Land susceptibility to wind erosion: An Index of Land Susceptibility to Wind Erosion (ILSWE) was created by combining spatiotemporal variations of the most influential wind erosion factors (i.e. climatic erosivity, soil erodibility, vegetation cover and landscape roughness).

Wind erosion susceptibility of soils: The wind-erodible fraction of soil (EF) is one of the key parameters for estimating the susceptibility of soil to wind erosion.

Quantitative assessment of soil loss potential in agricultural lands [work in progress].

Former studies: Agriculture Field Parameters on NUTS-3 regions

Data

To get access to the data, please compile the [online form](#); instructions will then follow how to download the data. The data download page will provide you access the page containing three available datasets: 1. ILSWE 1981-2010; 2. Wind-erodible fraction of soil (EF), and 3. Agriculture Field Parameters on NUTS-3 regions for Wind erosion research.

References

- Borrelli, P., Panagos, P., Ballabio, C., Lugato, E., Weynants, M. Montanarella, L (2014). [Towards a pan-European assessment of land susceptibility to wind erosion](#). Land Degradation & Development, In Press. DOI: 10.1002/ldr.2318
- Borrelli, P., Ballabio, C., Panagos, P., Montanarella, L. (2014). [Wind erosion susceptibility of European soils](#). Geoderma, 232, 471-478.

More Information

[Pasquale Borrelli](#), Panos Panagos. European Commission, Institute of Environment and Sustainability, Land Resource Management Unit, Ispra, Italy.

<http://eusoils.jrc.ec.europa.eu/library/themes/erosion/winderosion/>

**Minutes of a meeting of the NZSSS Council held at 9.30am on
Thursday 7th August 2014 via teleconference.**

PRESENT: **At Lincoln:** P. Fraser (Chair and Minutes); Roger McLenaghan; Tony van der Weerden
In Palmerston North : H. Lowe; I. Vanderkolk.
In Hamilton: D. Houlbrooke; R. Hill; M. Balks

APOLOGIES: Allan Hewitt, Iris Vogeler and Tim Clough.

SECRETARIAT:

Minutes of May meeting:

It was moved "that the minutes of our meeting held on 14 May be accepted."

Trish/ Megan - carried

Matters arising from minutes: None.

Matters for general business

- 2015 International year of soils – to be discussed under promoting soil science
- Video clips for training purposes

Approval of Agenda

It was moved "that the agenda be approved"

Chair – carried

TREASURY

The Treasurer tabled sets of reports on cash summary, profit and loss and balance sheet.
The cash summary that was tabled is appended.

It was moved "that the payments since the last meeting be accepted".

Tony/ Trish - carried

Action: Reece and Trish (and Hamish volunteered too if he ends up available) to set up a display at the conference to encourage a membership recruitment drive.

The annual accounts are being sent to auditor shortly.

SECRETARIAT

A summary of our current members is as follows:

NZ Member	227
Overseas Member	29
NZ Student	46
Overseas Student	3
NZ Retired	24
Overseas Retired	3
Life Member	10
Honorary	1
Libraries	13
TOTAL MEMBERSHIP	356

NEW MEMBERS

It was moved that the following people be accepted for full membership:

- Gregory Snook CMW Geosciences (NZ) Limited
- Juergen Esperschuetz Lincoln University

Trish/ Roger - carried

It was moved that the following people be accepted for student membership:

- Khadija Malik Massey University
- Nicole Mesman Lincoln University

Trish/ Roger - carried

Member Resignations

It was moved that resignations be accepted from the following people:

- Noel Trustrum
- Joshua Scarrow
- Laurie G Greenfield
- Djuro Paripovich
- Holly Bredin-Grey

Trish/ Tony - carried

A list of members with overdue subscriptions was circulated. It was agreed that a friendly reminder email should be sent to these members.

Action: Tony to contact Groundworks to arrange for a reminder email to be sent out.

SOIL NEWS

Coming out a little earlier as Isabelle going on leave. Reece is doing this month's editorial.

Mike Hedley and Megan also supplying some info to go in.

Hard copy – still about 12 people – 9 libraries.

Art exhibition needs advertising.

NZSSS WEBSITE

Conference material can go up on there later.

Action: Trish to prepare report on Facebook usage for next meeting / Soil News...

SITNZL

Need to find a good online location – e.g. "Issue" – was not seen as such an appropriate site for our material.

Action: Megan to talk to Alan and investigate putting the pdf's of individual chapters of SITNZL on our website.

AWARDS

Bert Quin Award is now established to replace the Altum Award. He has also generously increased the amount to \$5000.

Nominations have come in for Bert Quin; Leamy; Blakemore; Grange; Fellowships.

Rigg and Fieldes theses awards judging are also under way. Thanks to the judges.

PROMOTING SOIL SCIENCE

Soils poster to be finalised shortly.

Publication of "Soils of NZ" book still under negotiation.

It is to be the International Year of Soil in 2015 and it will be World Soils Day 2014 same week as our conference.

Megan provided some suggestions for us to consider for celebrating International Year of Soils.

Hamish – commented that through the issue of need to change land application options, he has a need to inform the populous about the constraints e.g. on water quality. We have a unrealistic populous and it would be good to use the opportunity to educate them more.

Action: Trish and Reece to arrange a press release by our Society at start of 2015 about International year of soil.

Megan put forward some suggestions for Council to consider as options to follow up for celebrating International Year of Soils:

- Soils related theme at Mystery Creek? Reece and Megan have approached the organisers of Mystery Creek Field Days (met with Nick Droomgal) to suggest that they have a soil theme next year to mark the international year of soils... and they were positively received (He has to discuss themes with his key sponsors and marketing people so we haven't yet heard any outcome for that, but he was supportive.
- Next year the Norman Taylor lecture will be a travelling lecture – could potentially be promoted as widely as possible as a high-profile public event for IYsoils. Also possible to hold Regional meetings (maybe in conjunction with NHT) such as the WaiBOP one that we promote to as wide an audience as possible
- “I ‘love’ soil” stickers in Maori and English to give away to as wide an audience as possible – students, farm conferences.... Mystery Creek and other farm field day events. Stickers are cheap and cheerful – Megan collected them in a range of languages from IUSS, courtesy of SSSA.
- A visiting lecture tour from a high profile international speaker?... e.g. someone like Rattan Lal, incoming president of IUSS who would talk about global food and soil related issues?
- Series of soil-related articles in widely read magazines – eg.... farmer ones, QEII open space, NZ Gardener – although previous experience has found this to be difficult to drum up support for.
- New Soil material on our website
- 2015 soils of NZ calendar or posters
- Students soil-related art competition
- Special extra focus for School Science Fairs to mark IYSoils
- Further suggestions welcome.... we will need to decide on those to follow up on at next meeting.

SCIENCE FAIRS

12 out of the 14 Science fairs around the country took up the offer for book prize sponsorship.

CONFERENCES

NZSSS Conference 2014

Only 4 abstracts in so far! But apparently this is a pretty typical pattern of events.

Extensions will not be accepted.

Registrations – early bird to 24th October...

Very good sponsorship received.

Student billets are a possible option for those from Massey and Lincoln to offset costs.

Keen to encourage students to come along.

Support from NZSSS for students to attend was agreed upon:

That “students from Lincoln – be allowed to claim for up to \$6000 capped at \$600/ student

Students from Massey – to be allowed to claim for up to \$4000 – capped at \$400/ student.

Waikato students will be sponsored from elsewhere so did not request any support at this time.

Note provisos – students need to be members and where they are not giving a presentation at the conference the support is capped at \$100 per student.”

Tony/ Trish - carried

NZSSS Conference 2016

Queenstown is to be the location for the 2016 Joint Conference. It will be held on 28 Nov – 1 Dec 2016.

Megan commented that at the recent World Soil Congress, the soil judging event was very popular; the teams get lessons on the local soils and then get tested in a competition.

Stephen Cattle/ Richard Doyle organised it for Australia; teams from each University. Likely to be keen on doing it in Queenstown too. It will need significant organising...

World Congress

The World Congress of Soil Science will be held in Rio de Janeiro in Brazil in 2018 and in Glasgow, Scotland, in 2022.

Soil classification – IUSS formally recognises the WRB soil classification system. After much discussion, in response to a request from USDA they also agreed to formally recognise Soil Taxonomy as well, provided work continues to develop a simpler Universal Soil Classification System.

SCIENCE FUNDING ISSUES

Progress on National Science Challenges -

Land and Water decision has been deferred and more information is being sought.

Funding statement on funding by MBIE has been circulated.

GENERAL BUSINESS

Norman Taylor Lecturer 2014 – Dr Stewart Ledgard

This year's lecturer will be Stewart Ledgard and he will give his presentation at our conference in December.

Video clips

Hamish conducts training programmes for onsite waste water and there is a component to understanding receiving environment of which the soils is an important part. Several video clips were made, but better quality is needed. He wondered what resources might already be available to assist with such training e.g. basics showing clips to understand bulk density, infiltration etc etc

Would Councils be interested in supporting development?

Action: Canvas our membership to see if they know of any NZ soil video clip resources available or alternatively if any of those who set up the sorts of demonstrations that we would want to video, whether or not they would consider getting involved with making video clips.....

Can advertise via Soil News, Facebook, Council members etc.

SECRETARIAT

Correspondence

None other than address changes etc.

NEXT MEETING

Tentatively 4th November 2014

Meeting closed at 11.50am.

Call for Abstracts

Prof. Tim Fletcher and Dr Bryant Scharenbroch are guest editing a special issue in Plant and Soil, planned for publication in late 2015. The Special is titled: '*Modified soils and designed substrates for improved urban green infrastructure and ecosystem service*'. Anyone interested in submitted abstracts can go to <http://wp.me/P3Q9Tk-cK>

	<p>Modified soils and designed substrates for improved urban green infrastructure and ecosystem service</p> <p>Plant and Soil - Special Issue (<i>late 2015</i>)</p>	
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Guest Editors: Dr Stephen Livesley¹, Prof. Tim Fletcher² and Dr Bryant Scharenbroch³

¹Green Infrastructure Research Group, The University of Melbourne, Australia. sjlive@unimelb.edu.au

²Waterway Ecosystem Research Group, The University of Melbourne, Australia. timf@unimelb.edu.au

³The Morton Arboretum, 4100 Illinois Route 53 Lisle, Illinois, USA. bscharenbroch@mortonarb.org

SI scope and rationale

This proposed PLSO Special Issue will cover an emerging and international topic in the modification and improvement of urban ecosystem functioning through amendment and modification of existing urban soils as well the introduction of novel substrates for specific green infrastructure function and ecosystem services. This Special Issue seeks to enhance our mechanistic understanding of plant-soil interactions in a modified and designed urban ecosystem context.

Urban regions, and the built and landscaped environment within them, play an increasingly significant role in global sustainability as over half of the global population lives in cities and this is set to increase. Urban landscapes and the human activities within them are responsible for a large fraction of global resource consumption and in turn regional and global environmental impacts. At the same time, growing cities face increasing social, ecological and sustainability challenges. Increasing the quantity and improving the vigour of vegetation within cities is one way of addressing many of these challenges, such as heat, mental health and wellbeing, pollution, biodiversity and stormwater. Inherent to the performance of vegetation systems in cities is the quality and properties of the soil or substrate that they grow in. Furthermore, the soil and substrates themselves can perform valuable ecosystem services beyond that provided by the vegetation. Improving and modifying the properties of urban soils or damaged soils can optimise and extend the ecosystem service function of these green spaces and brown field spaces. Similarly, the specific design and development of substrates for novel green infrastructure systems can further extend the ecosystem service possibilities into, and onto, previously underutilised urban built form and space. Making use of local urban resources and waste streams to modify these soils and to develop these substrates can provide additional sustainability benefits, providing a closed loop of urban waste utilisation for improved urban ecosystem function which reduces urban environmental impact – akin to a sustainable ‘urban metabolism’.

In this PLSO Special Issue we aim to dig deeper into this fascinating and emerging field of urban ecosystem research. We will encourage manuscripts with a focus evidence-based research with quantitative data. Of particular interest are papers that demonstrate significant impact on urban green space performance and ecosystem service at a site, precinct or city scale. The specific objectives of the SI are to present international scientific studies from a range of climatic conditions to demonstrate the opportunities, advances and benefits delivered from:

- *urban soil modification and amendment for improved plant growth, nutrient cycling and hydrological performance.*
- *urban substrate development, use and performance in green infrastructure systems, e.g. green roofs, biofilters, structural soils.*
- *the use of urban waste streams as a resource for soil modification or substrate development.*

We invite author(s) to provide abstracts (300 words) by **31 January 2015**, to be emailed to the Guest Editors. Criteria for evaluating submitted abstracts are presented in the scope above.

Approved abstracts will be invited to submit full manuscripts **between 20 February and 31 April 2015**.

Full manuscripts should consider the scope of Plant and Soil and will be subject to the standard PLSO peer review process: <http://www.springer.com/life+sciences/plant+sciences/journal/11104>

Assessing drivers of plantation forest productivity on eroded and non-eroded soils in hilly land, eastern North Island, New Zealand

Marie J Heaphy¹, David J Lowe², David J Palmer³, Haydon S Jones⁴, Gerty JHP Gielen¹, Graeme R Oliver¹ and Stephen H Pearce¹

¹Scion, Private Bag 3020, Rotorua, New Zealand

²School of Science, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

³Landcare Research, Private Bag 3127, Hamilton 3240, New Zealand

⁴Waikato Regional Council, Private Bag 3038, Hamilton 3240, New Zealand

Background:

The effect of soil erosion on New Zealand production forestry is not well known and there has been no research prior to our study into the relationship between soil nutrient status and planted forests growing in eroded soils in steeplands.

Methods:

The impact of soil erosion by mass movement on forest productivity was investigated in a paired plot trial in a planted forest in a mainly hilly to steep-land catchment (Pakuratahi) near Napier, eastern North Island, New Zealand. Tree growth and form were measured and soil properties analysed to compare productivity and productivity drivers in adjacent non-eroded and eroded plots.

Results:

Regression analysis showed that the decreased soil total nitrogen, total carbon, total phosphorus, and soil organic matter content in eroded plots had a negative impact on tree volume, resulting in a 10% decrease in measured tree volume. Based on an assessment of log quality, trees in the eroded plots were forecast to produce 16% less volume from high quality pruned logs, with associated reduction in revenue of around \$4000 per hectare, than trees in non-eroded plots. The total recoverable volume (TRV), estimated (for a 25-year rotation) from the measured *Pinus radiata* D. Don trees growing on the eroded sites, was valued at \$68,500, about 9% less than the estimated TRV from trees measured on non-eroded plots (\$76,000). Tree form and mean tree height in eroded and non-eroded plots were not significantly different.

Conclusions:

Soil erosion impacts production in planted forests. Afforestation of erodible land provides a valuable ecosystem service through land and soil stabilisation but this service is currently not reflected in the market prices for timber in New Zealand. Maintaining the productive capacity of erodible soils through practices such as fertilisation or continuous-cover forestry can add further costs to production forestry. To ensure that sustainable forest practices are carried out to protect the productivity of soils, financial incentives may be justified.

New Zealand Journal of Forestry Science (2014) 44: 24 (pp.1-10) [[open access](#)]

Tephrochronology

David J. Lowe^a and Brent V. Alloway^b

^aSchool of Science, Faculty of Science and Engineering, University of Waikato, Hamilton, New Zealand 3240

^bSchool of Geography, Environment and Earth Sciences, Victoria University of Wellington, Wellington, New Zealand 6140

Extract

Tephrochronology is the use of primary, characterized tephras or cryptotephras as chronostratigraphic marker beds to connect and synchronize geological, paleoenvironmental, or archaeological sequences or events, or soils/paleosols, and, uniquely, to transfer relative or numerical ages or dates to them using stratigraphic and age information together with mineralogical and geochemical compositional data, especially from individual glass-shard analyses, obtained for the tephra/cryptotephra deposits. To

function as an age-equivalent correlation and chronostratigraphic dating tool, tephrochronology may be undertaken in three steps: (i) mapping and describing tephras and determining their stratigraphic relationships, (ii) characterizing tephras or cryptotephras in the laboratory, and (iii) dating them using a wide range of geochronological methods. Tephrochronology is also an important tool in volcanology, informing studies on volcanic petrology, volcano eruption histories and hazards, and volcano-climate forcing. Although limitations and challenges remain, multidisciplinary applications of tephrochronology continue to grow markedly.

In Rink, W.J., Thompson, J.W. (editors) (2014), “Encyclopaedia of Scientific Dating Methods”. Springer, Dordrecht, pp. 1-26 (DOI: 10.1007/978-94-007-6326-5_19-1)

Using palaeoenvironmental DNA to reconstruct past environments: progress and prospects

**Nicolas J. Rawlence,^{1,2} David J. Lowe,¹ Jamie R. Wood,³ Jennifer M. Young,⁴
G. Jock Churchman,⁵ Yu-Tuan Huang¹ and Alan Cooper⁴**

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²Allan Wilson Centre for Molecular Ecology and Evolution, Department of Zoology, University of Otago, PO Box 56, Dunedin 9054, New Zealand

³Landcare Research, PO Box 40, Lincoln, Canterbury 7640, New Zealand

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⁵School of Agriculture, Food and Wine, University of Adelaide, SA 5005, Australia

Palaeoenvironmental DNA (PalEnDNA) is defined as ancient DNA (aDNA) originating from disseminated genetic material within palaeoenvironmental samples. Sources of PalEnDNA include marine and lake sediments, peat, loess, till, ice, permafrost, palaeosols, coprolites, preserved gut contents, dental calculus, tephras, and soils as well as deposits in caves/rockshelters and at archaeological sites. PalEnDNA analysis provides a relatively new tool for Quaternary and archaeological sciences and its applications have included palaeoenvironmental and palaeodietary reconstructions, testing hypotheses regarding megafaunal extinctions, human-environment interactions, taxonomic studies and studies of DNA damage. Because PalEnDNA samples comprise markedly different materials, and represent wide-ranging depositional and taphonomic contexts, various issues must be addressed to achieve robust, reproducible findings. Such issues include climatic and temporal limitations, the biological origin and state (free versus bound) of PalEnDNA, stratigraphic reliability, sterile sampling, ability to distinguish modern from aDNA signals, DNA damage and PCR amplification, DNA extraction methods, and taxonomic resolution. In this review, we provide a non-specialist introduction to the use of PalEnDNA for Quaternary and archaeological researchers, assess attributes and limitations of this palaeoenvironmental tool, and discuss future prospects of using PalEnDNA to reconstruct past environments.

Journal of Quaternary Science (2014) 29, 610-626. [[open access](#)]

Assessing the agronomic benefit of noninversion tillage for improving soil structure following winter grazing of cattle and sheep

S. Laurenson & D.J. Houlbrooke

Invermay Agriculture Centre, AgResearch, Private Bag 50034, Mosgiel, New Zealand, and AgResearch, Private Bag 3123, Ruakura, Hamilton, New Zealand

Abstract

Severe treading damage to soils often occurs when cattle and sheep graze standing forage crops during winter. Soil recovery is a long process that may take several months if not years. Noninversion tillage

can speed up the recovery process by improving drainage and air diffusion. This research assessed the ongoing benefit of noninversion tillage for improving soil structure relative to non-tillage.

This assessment was made following a land-use transition from winter forage cropping to re-establishment of seasonal pasture that was rotationally grazed by cattle or sheep. Prior to commencement of this study, the research site had poor soil structure due to four consecutive years of cattle and sheep grazing of winter forage crops [macroporosity (0–100 mm) <0.075 and 0.113 m³/m³ under cattle and sheep, respectively]. Tillage was effective in increasing soil macroporosity to ca. 0.175 m³/m³ under both grazing classes, which was significantly higher than nontilled soils (ca.0.140 m³/m³, 0–100 mm depth). Improvements gained from tillage generally did not persist longer than 18 months. Average annual pasture production in tilled plots was 22.1 and 20.9 tons of dry matter per hectare (t DM/ha) for respective cattle- and sheep-grazed plots, while in the nontilled plots, it was 19.1 and 18.6 t DM/ha, respectively. Results indicate noninversion tillage can provide an immediate increase in the porosity of compacted soils and improve pasture growth. However, processes involved in the formation of resilient soil aggregates are curtailed if subsequent grazing events coincide with high moisture content that causes recompaction.

doi: 10.1111/sum.12144

Soil Use and Management

Characterizing soil quality clusters in relation to land use and soil order in New Zealand: an application of the phenoform concept

Stevenson BA, McNeill S., Hewitt AH.

The multivariate character of seven dynamic soil properties from a national soil quality data set was explored to determine if generalizations can be made about the status of the properties from land use and soil order. The genoform–phenoform concept (where soil phenoforms arise from a genoform due to modification of dynamic soil properties through specific land use history) was used to frame three hypotheses. Hypothesis one proposed that managed sites were distinct from native sites. This was supported by discriminant analysis and permutational multivariate analysis of variance. Hypothesis two proposed that managed sites were clustered into statistically significant distinct classes. This was supported by fuzzy-c means clustering, with recognition of five to seven statistically significant clusters. Hypothesis three proposed that the clusters had functional meaning. This was supported by inspecting the clusters for rational relationships between land use, soil order and soil quality status as estimated by indicator mean values for each cluster. While organic status (e.g., soil C and N) appeared to be the primary driver of clustering, other soil quality indicators (such as macroporosity) were also important in differentiating the effects of land use and soil type on cluster patterns. The results indicate that a taxonomy of phenoforms is possible, but would require input of both inherent and dynamic soil properties.

Such a phenoform clustering approach would provide a more quantitative framework for defining intergrades and uncertainty in mapping. Used in conjunction with spatial inherent-property-based databases, the phenoform clustering approach could also be beneficial to assess soil natural capital and to predict susceptibility of specific soils to land-use intensification.

Geoderma, v239-240, 135-142.

Effects of Fertiliser Nitrogen Management on Nitrate Leaching Risk From Grazed Dairy Pasture

Iris Vogeler¹, Mark Shepherd², Gina Lucci²

¹AgResearch, Palmerston North

²AgResearch, Ruakura

Abstract

Dairy farms are under pressure to increase productivity while reducing environmental impacts. Effective fertiliser management practices are critical to achieve this. We investigated the effects of N fertiliser management on pasture production and modelled N losses, either via direct leaching of fertiliser N, or indirectly through N uptake and subsequent excretion via dairy cow grazing. The Agricultural Production Systems Simulator (APSIM) was first tested with experimental data from fertiliser response experiments conducted on a well-drained soil in the Waikato region of New Zealand. The model was then used in a 20-year simulation to investigate the effect of fertiliser management on pasture response and the impacts on potential leaching losses. The risk of direct leaching from applied fertiliser was generally low, but at an annual rate of 220 kg N/ha exceeded that from urine patches in one out of 10 years. The main effect of N fertiliser on leaching risk was indirect via the urine patch by providing higher pasture yields and N concentrations.

Best management practices could include identification of high risk periods based on environmental conditions (e.g. soil moisture, plant growth), avoidance of fertiliser applications in these periods and the use of duration controlled grazing (DCG) to prevent excreta deposition onto the grazing area during critical times.

NZGA 2014 Proceedings

Deriving pasture growth patterns for Land Use Capability (LUC) Classes in different regions of New Zealand

R. Cichota, I. Vogeler, F.Y. Li, J. Beutrais

AgResearch Grasslands, Private Bag 11008, Palmerston North 4442

ABSTRACT

Farm system models are increasingly being used to assess the implications of land use and practice changes on profitability and environmental impacts. Exploring implications beyond individual farms requires the linkage of such models to land resource information, which for pastoral systems includes forage supply. The New Zealand Land Resource Inventory (LRI) and associated Land Use Capability (LUC) database includes estimates of the potential stock carrying capacity across the country, which can be used to derive annual, but not seasonal patterns of pasture growth. The Agricultural Production Systems Simulator (APSIM) was used, with generic soil profiles based on descriptions of LUC classes, to generate pasture growth curves (PGCs) in three regions of the country. The simulated pasture yields were similar to the estimates in the LRI spatial database, and varied with LUC Class within and across regions. The simulated PGCs also agreed well with measured data. The approach can be used to obtain spatially discrete estimates of seasonal pasture growth patterns across New Zealand, enabling investigation of land use and management changes at regional scales.

NZGA 2014 Proceedings

Conferences and upcoming events:

<http://www.nzsssconference.co.nz>



The banner for the NZSSS Annual Conference 2014 features a logo on the left with a stylized landscape and the text: "New Zealand Society of Soil Science", "Soil Science For Future Generations", "2014 Conference", "The University of Waikato, Hamilton", and "1-4 December 2014". On the right, it lists "IMPORTANT DATES" and "CONTACT DETAILS".

IMPORTANT DATES		CONTACT DETAILS	
Abstract submissions open:	1 Feb 14	onCue Conferences	
Abstract submissions close:	1 Sep 14	PO Box 1193, Nelson	
Registrations open:	1 Mar 14	Tel: 03 546 6330	
Early-bird registrations close:	24 Oct 14	Fax: 03 929 5512	
Conference:	1-4 Dec 14	Email: lea@on-cue.co.nz	

www.nzsssconference.co.nz

Norman Taylor Lecture (to be delivered on Thursday 4th Dec from 1-3 pm S Block lecture theatre University of Waikato.)



“Nitrogen Efficiency: From Plant to Planet”

This year’s lecture will be given by Dr Stewart Ledgard. Dr Ledgard has over 30 year’s research experience working for AgResearch, where he is a Principal Scientist. A major focus of his research has been on understanding nitrogen cycling in grazed pasture systems, with initial research on the role of legumes and biological nitrogen fixation. More recently his nitrogen research has been on mitigation practices and farm system options to reduce nitrogen losses. During the last 8 years he has also been active in research on environmental emissions through the life cycle of agricultural products to overseas markets. He is Adjunct Professor of the Life Cycle Management Centre at Massey University. He has a range of international collaborative projects with Denmark, France and Ireland and leads an FAO project on environmental benchmarking methods. He has published over 190 peer reviewed publications and over 100 research reports on nutrient and life cycle management in agriculture.

Post Conference Workshops

Professor Oene Oenema from Wageningen University will be the opening plenary speaker at the NZSSS 2014 conference with his talk entitled "Intensification of agricultural production in the European Union and the response by policy and public". AgResearch would like to take the opportunity to make use of Oenes presence in New Zealand by holding two open workshops where we can further discuss the merits and potential downfalls comparing land use policy approaches (particularly with regards to nutrient management and losses) between the EU and New Zealand. AgResearch intends to hold these events at their Ruakura campus at Hamilton on Friday the 5th of December (one day post the NZSSS conference) and on Monday the 8th of December at its Invermay campus near Dunedin. It is anticipated that these events will run for approx. two hours and will be held in the morning and afternoon for Ruakura and Invermay respectively. More detailed information regarding these workshops will be distributed through the NZSSS conference email distribution list. If you would like to be actively involved in these workshops or have some specific ideas then please contact one of the following people:

Diana Selbie Diana.Selbie@agresearch.co.nz (Hamilton)
or Cecile De Klein cecile.deklein@agresearch.co.nz (Dunedin).

Regards Dave Houlbrooke (Soil News editor)

NEW ZEALAND SOCIETY OF SOIL SCIENCE 2014 CONFERENCE

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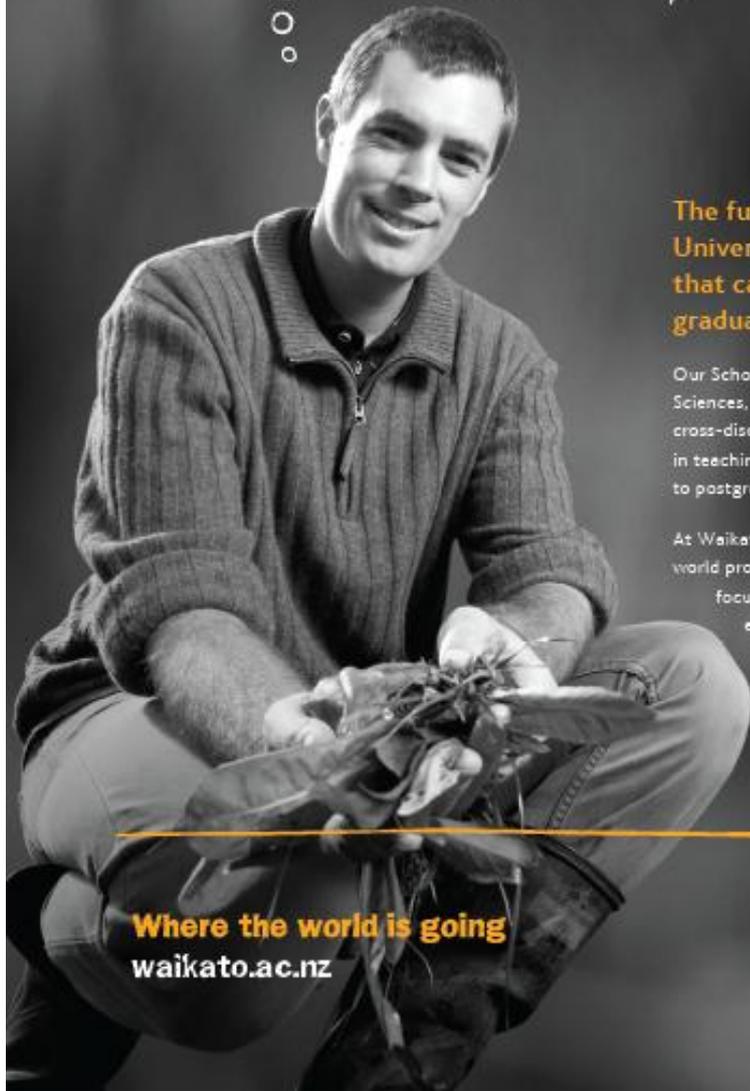
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December 2014

- ◆ International Conference on Agriculture, Biology and Environmental Sciences (ICABES'14) Dec. 8-9, 2014 Bali (Indonesia) www.iicbe.org
8th December 2014

May 2015

18th International Soil Conservation Organization Conference **May 31 –June 5, 2015** El Paso, Texas
<http://tucson.ars.ag.gov/isco/index.php>

July 2015



The banner features the title "Water and Society 2015" in a large blue font at the top. Below it, the text "Call for Papers" is centered, flanked by two small blue crest icons. On the left side, there is a square image of a fountain with water spraying upwards, overlaid with the text "WATER AND SOCIETY 2015" in white. At the bottom of this image, a green bar contains the text "15 - 17 July 2015" and "A Coruña, Spain". To the right of the image, the text "3rd International Conference on Water and Society" is displayed in blue, followed by "15 - 17 July, 2015" and "A Coruña, Spain" in the same color. At the bottom of the banner, a blue bar contains the URL <http://www.wessex.ac.uk/15-conferences/water-and-society-2015.html> in white text.

September 2015

LuWQ2015 - 2nd International Interdisciplinary Conference on LAND USE AND WATER QUALITY: *Agricultural Production and the Environment*, Vienna, Austria, 21-24 September 2015

More information is on <http://web.natur.cuni.cz/luwq2015/>

Abstracts are due by 1 February 2015. Abstract submission will be possible by end September 2014.

20th International Soil Tillage Research Organization Conference in Nanjing China **14-18 September 2015**. <http://istro2015.csp.escience.cn/dct/page/1>