

**DIVERSE  
SOILS -  
PRODUCTIVE  
LANDSCAPES**

# NZ SOCIETY OF SOIL SCIENCE CONFERENCE

**3 - 6 DECEMBER 2018**

**NAPIER**



[www.nzssconference.co.nz](http://www.nzssconference.co.nz)

## DRAFT PROGRAMME

### DAY ONE: MONDAY 3 DECEMBER

8:30	Registration Desk Opens (Napier Conference Centre Foyer)		
10:00	MORNING TEA BREAK		
10:30	Mihi/Powhiri Welcome – James Palmer HBRC Housekeeping (Main Plenary Room - Walker Room)		
11:00	Keynote Speaker: Annabel Langbein, Celebrity Chef Soil Matters		
11:45	Keynote Speaker: Andrew Waterhouse, UC Davis and Mark Shepherd, AgResearch The science behind 'Terroir'		
12:30	LUNCH		
Location	Walker Room	McCraw Room	Pollock Room
Session	<b>Our Land and Water National Science Challenge</b> Kindly sponsored by Our Land and Water - National Science Challenge AgResearch	<b>Soil Carbon</b>	<b>Soil contamination, degradation and remediation</b>
Chair			
1:30	Richard McDowell <i>Our Land and Water National Science Challenge</i> A strategy for optimising catchment management actions to improve water quality	Paul Mudge <i>Manaaki Whenua - Landcare Research</i> Impact of irrigation on soil carbon and nitrogen stocks	Mahdiyeh Salmanzadeh <i>Wintec and Waikato University</i> Source-tracking cadmium in New Zealand agricultural soils: a stable isotope approach
1:45	Ross Monaghan <i>AgResearch</i> Mitigating the impacts of pastoral livestock farming on water quality: what have we achieved?	Scott Graham <i>Manaaki Whenua - Landcare Research</i> Carbon and nitrogen balances for irrigated and non-irrigated lucerne: insights to minimise losses.	Jesus Adalberto Jimenez Torres <i>Massey University</i> Adsorption-desorption of glyphosate in New Zealand soils
2:00	Linda Lilburne <i>Manaaki Whenua - Landcare Research</i> The land use suitability concept: A Southland case study	Carmen Rosa Medina Carmona <i>Lincoln University and Plant &amp; Food Research</i> Irrigation of temperate pastures does not increase the net soil C inputs via photosynthesis	Col Gray <i>AgResearch</i> The potential for potassium chloride fertiliser applications to leach cadmium from a grazed pasture soil

2:15	Alan Renwick <i>Lincoln University</i> Land use transformation; can science de-risk barriers to land use change?	Jonathan Nuñez <i>Manaaki whenua - Landcare Research</i> Does reduced soil carbon accessibility to microbial decomposition decrease nitrogen losses?	Zicheng Yi <i>Lincoln University</i> The bioavailability of cadmium in New Zealand cropping soils
2:30	Neha Jha <i>Massey University</i> Molecular approaches to identify benign denitrification in shallow groundwaters	Roberto Calvelo Pereira <i>Massey University</i> Assessment of soil organic matter stratification in two pastoral soils following full inversion tillage-renewal	Jo Cavanagh <i>Manaaki-whenua Landcare Research</i> Influence of soil properties on the uptake of cadmium in selected agricultural crops
2:45	Marcela Gonzalez <i>Massey University</i> Dissolved gasses as indicator of denitrification process in shallow groundwater in agricultural landscape	Denis Curtin <i>Plant &amp; Food Research</i> Empirical evidence for the existence of labile and passive soil organic matter pools	Dharshika Welikala <i>Lincoln University</i> Cadmium sorption and mobilization by organic soil amendments
3:00	AFTERNOON TEA BREAK		
<b>Location</b>	<b>Walker Room</b>	<b>McCraw Room</b>	<b>Pollock Room</b>
Session	<b>Our Land and Water National Science Challenge <i>Continued</i></b>	<b>Soil Carbon <i>Continued</i></b>	<b>Soil contamination, degradation and remediation <i>Continued</i></b>
Chair			
3:30	Gina Lucci <i>AgResearch</i> The impacts of delivering credence attributes of livestock products	Carolyn Hedley <i>Manaaki Whenua - Landcare Research</i> Development of a soil carbon monitoring framework and its implementation in hill country	Thangavelautham Geretharan <i>Massey University</i> Effect of Fluorine on Rhizobia growth and morphology
3:45	Lisa Pearson <i>Land and Water Science</i> Physiographic Environments of New Zealand: An integrated landscape classification for understanding variation in water quality	Alec Mackay <i>AgResearch</i> Factors influencing soil carbon in hill country under contrasting phosphorus fertiliser and sheep stocking rate	<b>Soils in the landscape (Pedology) – Past, Present and Future</b> Sunita Lata <i>CQ University</i> Hydropedology and salinity in Hedlow Creek Catchment
4:00	Stewart Ledgard <i>AgResearch</i> Adaptation of water eutrophication indicators for European Product Environmental Footprinting of New Zealand products	Miko Kirschbaum <i>Landcare Research - Manaaki Whenua</i> Are soil carbon stocks controlled by a soil's capacity to protect carbon from decomposition?	Nathan Odgers <i>Manaaki Whenua - Landcare Research</i> Soilscapes for understanding regional soil distributions
4:15	Our Land and Water discussion on research requirements on the future use of versatile soils	Roberta Gentile <i>Plant &amp; Food Research</i> Comparing deep soil carbon stocks under kiwifruit and pasture land use	Alan Palmer <i>Massey University</i> The role of tephra cover in slope stabilisation following the Last Glacial in Waipaoa Catchment.
4:30		Sam McNally <i>New Zealand Institute for Plant and Food Research</i> Vertical distribution of soil carbon following full inversion tillage: implications for C sequestration	Carol Smith <i>Lincoln University</i> Project-based learning and soil judging: approaches to teaching the "hidden skills" in Soil Science.
4:45pm	NZSSS AGM (Walker Room)		
5:30 - 7.30	<b>BBQ Function at the Napier Conference Centre</b> kindly sponsored by Ravensdown		

**DAY TWO: TUESDAY 4 DECEMBER**

**Field Trips**

7:30	Registration Desk Open (Napier Conference Centre)		
Field Trip	<b>Productive landscapes on the plains, kindly sponsored by FAR</b>	<b>Spectacular Soils</b>	<b>Regenerative farming-what is it? And the influence soils on wine making (Terroir) Kindly sponsored by Hill Laboratories</b>
Departure	8.00am Napier Conference Centre	8.00am Napier Conference Centre	8.00am Napier Conference Centre
	<p><b>First stop:</b> A mixed cropping/grazing enterprise in Otane owned and operated by Hugh and Sharon Ritchie.</p> <p><b>Lunch stop:</b> The Pekapeka wetlands for lunch and a walk.</p> <p><b>Final Stops:</b> True Earth Organics which is situated near Bridge Pa and several renowned wineries on the Gimblett Gravels.</p>	<p><b>First stop:</b> Te Mata Peak summit. We will travel across the alluvial plains and the low rainfall loess covered downlands through the huge ash-covered, tilted slabs of Neogene sandstone, limestone and conglomerate, up to the pumice and greywacke of the Kaweka Range.</p>	<p><b>First stop:</b> Mangarara station owned and run by Greg and Rachael Hart.</p> <p><b>Second stop:</b> Te Awa winery located on the famous wine growing area of the Gimblett Gravels where Jonathan Hamlet, Chief Viticulturist for Villa Maria in Hawke's Bay will meet us.</p>
Return	5.00pm at Napier Conference Centre	5.30pm at Napier Conference Centre Following the field trip, attendees are invited to an optional informal dinner at the Emporium.	5.00pm at Napier Conference Centre
	<p><b>Student Function</b> kindly sponsored by Plant &amp; Food Research <b>Par2 MiniGolf 6:00 – 7:00pm</b> <b>From 7:00pm Drinks and Nibbles</b></p>		

## DAY THREE: WEDNESDAY 5 DECEMBER

8:30	Keynote Speaker: Brent Clothier, <i>Plant &amp; Food Research</i> Soil, Carbon, and Water: Natural Capital Delivering Valuable Ecosystem Services		
9:10	Plenary Speaker: Greg & Rachel Hart, <i>Mangarara Station</i> Mangarara - The Family Farm, Regenerative Agriculture and why every bite counts		
9:50	Plenary Speaker: Estelle Dominati, <i>AgResearch</i> Using land information and the Ecosystem Approach for farm planning and system design		
10:10	MORNING TEA BREAK		
Location	Walker Room	McCraw Room	Pollock Room
Session	<b>Quantifying and mitigating nutrient losses to water</b>	<b>Greenhouse Gases</b>	<b>Soil fertility, nutrient management and plant nutrition</b>
Chair			
10.45	Grace Chibuike <i>Massey University</i> Assessment of the nitrate attenuation capacity of a seepage wetland in a hill country landscape	Kamal P. Adhikari <i>Massey University</i> Effectiveness and longevity of 2-NPT and nBTPT in reducing NH <sub>3</sub> emissions from cattle urine-patches	Moira Dexter <i>AgResearch</i> Using laboratory soil incubations to study the nitrogen cycle
11:00	Juergen Esperschuetz <i>University of Canterbury</i> Effect of different wood chip material on nitrogen leaching from stand-off pads	Jiafa Luo <i>AgResearch</i> Nitrous oxide emissions from beef and dairy cattle excreta deposited on grazed pastoral hill lands	Peter Beets <i>Scion</i> Soil productivity drivers in New Zealand planted forests
11:15	Selva SELVARAJAH <i>Enviroknowledge</i> Can organic farming reduce nitrate leaching in polluted and sensitive catchments? A critical review	Sergio Morales <i>University of Otago</i> Urine patches: unique ecosystems that reshape soil microbiomes and N cycling rules	Belinda Hackney <i>NSW Department of Primary Industries</i> Soil conditions and botanical composition influence pasture growth in variable landscapes
11.30	Wei Hu <i>Plant &amp; Food Research</i> No-tillage to reduce compaction effect on soil physical quality, nitrogen loss and barley productivity	Anne Wecking <i>University of Waikato</i> Bottom-up or top-down? Paddock-scale nitrous oxide budgets using static chamber and eddy covariance data	Rohit Lal <i>Massey University</i> Sustainable nutrient management system for taro growers in Taveuni, Fiji
11.45	Brian Levine <i>Massey University</i> Quantifying nutrient attenuation performance of Detainment Bunds in the Lake Rotorua Catchment: Preliminary data	Liyin Liang <i>Manaaki Whenua - Landcare Research</i> Nitrous oxide fluxes determined by eddy covariance measurements from intensively grazed pastures: patterns and controls	Niklas Lehto <i>Lincoln University</i> White lupin roots forage and mobilize phosphorus in a nutrient-poor soil
12:00	LUNCH		

Location	Walker Room	McCraw Room	Pollock Room
Session	<b>Quantifying and mitigating contaminant losses to water</b>	<b>Greenhouse Gases - <i>Continued</i></b>	<b>Soil fertility, nutrient management and plant nutrition - <i>Continued</i></b>
Chair			
1:00	Maria Jesus Gutierrez Gines <i>The Institute of Environmental Science and Research Ltd.</i> 30 years of effluent land-application	Amanda Matson <i>Scion</i> Soil and tree-stem N <sub>2</sub> O fluxes of a large-scale oil palm plantation in Sumatra, Indonesia	Tom Meaclem <i>University of Canterbury</i> Effect of temperature variations on Controlled Release Fertiliser applications and modelling
1:15	Dave Houlbrooke <i>AgResearch</i> Contaminant losses from contrasting peat soil types and farm dairy effluent regimes: a lysimeter study	Sally Price <i>Lincoln University</i> Optimising soil conditions for methane oxidation - using land use change as an example	Jeff Reid <i>Plant &amp; Food Research</i> Nutrient Management for Vegetable Crops in NZ – a major update for the industry
1:30	Jianming Xue <i>Scion</i> Beneficial use of biosolids to forestland: What are the environmental impacts?	Jimena Rodriguez <i>Massey University</i> Does plantain sward affect N <sub>2</sub> O emissions during different seasons?	Joanna Sharp <i>Plant &amp; Food Research</i> Soil sampling strategy on system outcomes in maize: A case study
1:45	Brendon Malcolm <i>Plant &amp; Food Research</i> Using catch crops to mitigate nitrate leaching following autumn grazed fodder beet in Waikato.	Camille Rousset <i>Lincoln University</i> Relative Gas Diffusivity; an integrative tool for estimating N <sub>2</sub> O emissions from soils?	Simeon Smail <i>Scion</i> Optimising forest productivity, soil nutrient pools and environmental outcomes with NuBaIM
2:00	Matthew Norris <i>Plant and Food Research</i> Measuring losses of N and P from cropping systems using a network of drainage fluxmeters	<b>Soil Physics and Water Management</b> Benye Xi <i>Beijing Forestry University, China</i> Effects of different irrigation regimes on growth and water use efficiency in <i>Populus tomentosa</i> plantations	Akinson Tumbure <i>Massey University</i> Using recycled glass to increase P availability of insoluble Dorowa phosphate rock
2:15	Diana Selbie <i>AgResearch</i> Progress towards quantifying some environmental implications of New Zealand dairy sheep systems	Jun Yi <i>Central China Normal University</i> Characterising of macropores and preferential flow of mountainous forest soils with difference human disturbance intensities	Adrian Hunt <i>Plant &amp; Food Research</i> Considering the value proposition of variable rate N
2:30	Minakshi Mishra <i>Lincoln University</i> Effect of interactions between antimicrobial plants and <i>Escherichia coli</i>	Devraj Chalise <i>University of New England, Australia</i> Spatial assessment of soil erosion in a hilly watershed of Western Nepal	Bert Quin <i>Quin Environmentals (NZ) Ltd</i> RPR Revisited 5: A wider perspective on potential reductions in all forms of P loss
2:45	<b>AFTERNOON TEA BREAK &amp; POSTER SESSION</b> kindly sponsored by ASPAC		
Location	Walker Room		
3:30	Plenary Speaker: Sam Robinson, Farmer Resource management challenges in today's era		
3:50	Plenary Speaker: Jonno Rau, Landcare / Manaaki Whenua		
4:10 - 4:30	Plenary Speaker: Blair Waipara, Te Tumu Paeroa		
	<b>CONFERENCE DINNER</b> kindly sponsored by <b>Ballance Agri-Nutrients</b> Venue: Mission Estate Winery		
6:00	Buses Depart Napier Conference Centre		
6:30	Pre-Dinner Drinks		
7:00	Dinner starts		
From 10:30	1 <sup>st</sup> Bus Returns and last bus at midnight		

**DAY FOUR: THURSDAY 6 DECEMBER**

Location	Walker Room	McCraw Room	Pollock Room
<b>Session</b>	<b>Soil physics and water management</b>	<b>Soil Carbon 2</b>	<b>Soil quality and function</b>
Chair			
9:00	Michael Blaschek <i>Manaaki Whenua - Landcare Research</i> Prediction of soil available water-holding capacity from visible near-infrared reflectance spectra	Yuan Li <i>Lincoln University</i> Root exudates enhance soil respiration rates and the ratios of N <sub>2</sub> /N <sub>2</sub> O emissions	Tihana Vujinović <i>Lincoln University, Plant &amp; Food Research</i> Quantitative and qualitative properties of dissolved organic matter and their relationship with biodegradability
9:15	Sam Carrick <i>Manaaki Whenua</i> SWAMP3: The S-map soil water characterisation initiative	Matteo Poggio <i>Manaaki Whenua - Landcare Research</i> Estimation of soil carbon stocks using a newly developed automated sensing platform	Yunying Fang <i>NSW Department of Primary Industries, Australia</i> Using stable-carbon isotope to understand the role of organic amendments in ameliorating poorly structured sodic-subsoil
9:30	Steven Dellow <i>Plant &amp; Food Research</i> Is the ridge and furrow bed architecture limiting potato production?	Jasmine Robinson <i>The University of Waikato</i> Partitioning the temperature dependence of microbial respiration from root inputs and soil organic matter.	Erin Lawrence-Smith <i>Plant &amp; Food Research</i> Application of soil C stabilisation capacity methodology for soil quality monitoring
9:45	John Drewry <i>Manaaki Whenua - Landcare Research</i> Temporal changes in soil physical properties under irrigated cropping	Aaron Wall <i>University of Waikato</i> Does imported supplemental feed to a dairy farm result in an increase in soil carbon?	Karin Mueller <i>Plant &amp; Food Research</i> X-ray CT and gas transport-derived pore-network characteristics of a silt loam soil
10:00	MORNING TEA BREAK		
10:30	Keynote Speaker: Simon Upton, Parliamentary Commissioner for the Environment		
Location	Walker Room	McCraw Room	Pollock Room
<b>Session</b>	<b>Soil physics and water management</b> <i>Continued</i>	<b>Soil biology and ecosystems</b>	<b>Soil Quality and Function -</b> <i>Continued</i>
Chair			
11:15	Mr Ahmed El-Naggar <i>Massey University</i> Soil and crop sensing technologies informing best application of irrigation water	Sarah Addison <i>Scion</i> Decade effects of forest ecosystem management on soil biodiversity and function	Robyn Simcock <i>Manaaki Whenua Landcare Research NZ</i> Soil quality from an ecosystem restoration perspective
11:30	Steve Green <i>Plant &amp; Food Research</i> Measuring runoff from a kiwifruit orchard in the Bay of Plenty	Sofie De Meyer <i>Maldiid Pty Ltd</i> RHIZO-ID as a novel technology for direct rhizobia identification	Gabriel Moinet <i>Manaaki Whenua Landcare Research</i> Out with chemical recalcitrance: field evidence that soil organic matter persistence is an ecosystem property
11:45	Seth Laurenson <i>AgResearch</i> Understanding the spatial distribution of treading damage risk across farmlands	Stanislav Garbuz <i>Massey University, School of Agriculture &amp; Environment</i> Effect of biochar on plant growth, soil biology and biochemistry in a 6-month mesocosm experiment	<b>Macro Influences</b> Annette Carshalton <i>University of Waikato</i> Soil climate and active layer depth monitoring, Ross Sea Region, Antarctica

12:00	Priscilla Lad <i>Scion</i> Quantifying soil microsite effect in forest soils with electromagnetic induction	Michelle Peterson <i>Plant &amp; Food Research</i> Soil microbial community structure and function is influenced by plant secondary metabolites excreted in urine	Haydon Jones <i>Waikato Regional Council</i> Loss of versatile land available for production
12:15	Alexandre Michel <i>Plant &amp; Food Research</i> Accurate scheduling of irrigation using plant-based measurements	Robert Simpson <i>Plant &amp; Food Research</i> The Tea Bag Index and Soil Carbon Cycling	Reece Hill <i>Waikato Regional Council</i> Local scale land fragmentation on high class soils in the Waikato region
12:30	LUNCH		
<b>Location</b>	<b>Walker Room</b>	<b>McCraw Room</b>	<b>Pollock Room</b>
Session	<b>Soil physics and water management <i>Continued</i></b>	<b>Soils in the landscape (Pedology) – Past, Present and Future</b>	<b>Macro Influences - <i>Continued</i></b>
Chair			
1:15	Veronica Penny <i>Manaaki Whenua Landcare Research</i> Changes in soil under irrigation: a summary of research findings	Peter Almond <i>Lincoln University</i> Retaining soils as a landscape phenomenon in the digital era	Carlo van den Dijssel <i>Plant &amp; Food Research</i> Plant-based protein: A sustainable protein source meeting future opportunities?
1:30	Jack Pronger <i>Manaaki Whenua - Landcare Research</i> A simple tool for estimating water use efficiency in irrigated and non-irrigated fodder crops	Thomas Caspari <i>Manaaki Whenua - Landcare Research</i> Revitalising the National Soils Database	Mark Shepherd <i>AgResearch</i> Reflections on the implications of the 'Digital Age' on delivery of solutions for NZ farming
1:45	Aldrin Rivas <i>Lincoln Agritech Ltd.</i> Can we defensibly estimate catchment-scale flowpaths contributions based on widely available geospatial data?	Scott Fraser <i>Manaaki Whenua Landcare Research</i> Developing tools that build understanding of soils in the landscape	Pierre Roudier <i>Manaaki Whenua Landcare Research</i> How can soil science benefit from the data revolution?
2:00	Balin Robertson <i>Lincoln University</i> Water retention properties of stony soils	Sharn Hainsworth <i>Manaaki Whenua - Landcare Research</i> Bringing the geomorphology back to modern NZ soil survey: the old "soil unit"	Edmar Teixeira <i>Plant and Food Research</i> A new landscape-scale framework to analyse crop responses to climates and soils across New Zealand
2:15	Dirk Wallace <i>Plant &amp; Food Research</i> Amendment incorporation to increase soil water retention of shallow stony soils	Gerard Grealish <i>Manaaki Whenua - Landcare Research</i> Farm-scale soil mapping protocols for New Zealand	Barry Lynch <i>Hawke's Bay Regional Council</i> Using the SedNetNZ model as a policy planning tool in Hawke's Bay
2:30	AFTERNOON TEA BREAK		
2:45	Norman Taylor Memorial Lecture – Ants Roberts, Ravensdown Is Disruption the New Black? A Luddite's View		
3:30-3:50	Conference Closing		