SOIL CONNECTS

SOIL CONNECTS is the biannual newsletter of Division 4 in the International Union of Soil Sciences

Issue 2 - July 2015

2015 International Year of Soils

this edition

Welcome to SOIL CONNECTS - 2

It is a pleasure to release the second edition of the newsletter covering the stories, issues, events from the members of Division 4. This newsletter will contribute to a suite of newsletters already produced within the IUSS and will give its members the opportunity to share their knowledge of soil with other members and the broader community.

Now the International Year of Soil (IYS) 2015 is well underway there have been a myriad of activities happening to celebrate and share peoples involvement with soil. Some of these are shared in this edition with more to come later in the year.

It continues to be my pleasure to edit this newsletter and I call on all of you who are reading it to make a contribution to future issues.

Damien Field
Editor, Soil Connects

Cover Photo - The scout group from Gars am Kamp, from Lower Austria investigating soil, Tea4Science program. Photo provided by Dr. Taru Lehtinen

Soil Connects logo designed by;
David van der Linden

Newsletter design inspired by Profile, a newsletter produced for Soil Science Australia

IUSS Division 4 & Newsletter Information

DIVISION 4

The Role of Soils in Sustaining Society and the Environment

This Division focuses on transfer and outreach of good soil knowledge to society, as well as, taking responsibility for lifting the profile of soil among the general community. It takes the scientific knowledge and information developed in the other three divisions of the IUSS and shares this through education, international conventions and informing public policy and debate. Sharing of this knowledge between scientists, economists, policy makers and the broader community means this division interacts well beyond the traditional bounds of the soil science disciplines.

Commission 4.1 - Soils and the Environment

This Commisison looks at soil as part of the ecosystem and how human activites impact on the soil and environmental interactions.

Commission 4.2 - Soils, Food Security and Human Security

This Commission looks at the challenge of maintaining agricultural lands, providing enough safe and nutritious food, and the role of soils in a changing world affecting human health.

Commission 4.3 - Soils and Land Use Change

In the context of global sustainability, this Commission investigates how soil functions can be managed and controlled to mitigate the impact of climate change. It also considers the impact of landuse change with increased urbanisation, and loss of productive and forested lands.

Commission 4.4 - Soil Education & Public Awareness

A well informed public is needed so that the importance of soil is understood. This Commission shares the developments in learning and teaching of soil science that support this aspiration, as well as, developing strategies that increase the connectedness of the public with soil.

Commission 4.5 - History, Philosophy, and Sociology of Soil Science

This Commission deals with the past; it links the study of what has happened in history and how soil can be used to help explain the past changes. This Commission investigates the relationship between human development and soil.

Newsletter Contributions

Soil Connects is published in December and July each year. Contributions are to be received the first day of the month preceding the publication and can be emailed to the current editor Damien Field - email: damien.field@sydney.edu.au

Division Chair's Report

Christian Feller
Chair Division 4,

Soil Connects Nature and Culture

It is a typical feature of western and scientific thinking that nature and culture are being distinguished. This conceptual split had become clearly visible during 17th Century. As a consequence, 'primary' and 'secondary' qualities of natural bodies had been differentiated. Measurable physical, chemical and biological properties, have become the 'primary' qualities of the 'object'. Other qualities, which were perceivable by human senses only, be that perception ephemeral or generic, have been treated as being 'secondary'. This is characterised by the, sometimes difficult, distinction between; 'matter' and 'spirit', 'objective' and 'subjective', 'natural' and 'cultural', 'science' and 'art', and similar.

French anthropologist Philippe Descola is one of the great contemporary theoreticians of the nature-culture split, showing it being neither natural nor universal. He argues in his works, *Par-delà nature et culture* published in 2005 (translated by Janet Lloyd, *Beyond Nature and Culture*, 2013), that our tendency to highlight the separateness of culture from nature facilitates a treatment of nature which is not respectful, and causes the well-known environmental consequences.

This separation between nature and culture affects the soil, too. For one of the founders of pedology (soil science), Vasilii Dokuchaev (1883) soil is defined as a "natural object", and not so much as a vital or even spiritual 'subject'. Thus, soil is studied for the causal chains of its formation (genesis), its physical, biological, and chemical properties as well as concerning its functional use and services for humanity. The International Union of Soil Science Societies (IUSS) has dedicated three of its four divisions to that approach.

Beyond being framed as a 'natural body' there are cultural dimensions of soil that are reflected in traditions, such as, pigments for drawing, ceramic material, and colours and clays for customary or ritual body painting. Deeper than this there is a cultural layer of soil that is traceable by the polysemy (multiple meaning) of words like 'soil' or 'earth'. In French, 'soil' often hints to an 'origin', as can be seen by expressions like "Le sol de nos ancêtres" ("soil of our ancestors", for human societies referring to past specific cultures and traditions). In German, the term 'Grund' can be used for 'soil' and for 'cause'/'reason', both. Nikola Patzel in a chapter on *European religious cultivation of the soil*[1] writes that in many cultures of the world people know a "Mother Earth" or a Goddess inspiring all living matter. In Judaism, the memory is alive that the name 'Adam' comes from 'Adamah', that is 'soil' in Hebrew. These few examples show that soil can be meaningful in a dimension which is definitely outside materialistic concepts of 'nature', but being in the heart of culture.

[1] Chapter 16, In: **Soil and Culture**. Landa E.R., Feller C. (eds), 2010 , Dordrecht, Heidelberg, London, New York: Springer Press

I and my co-authors[2] recognise that this cultural dimension, occurring in different forms in all civilisations, may be important (and is often ignored in development projects) for alternative approaches in order to change our behavioural patterns towards soils, soil materials, and soil life.

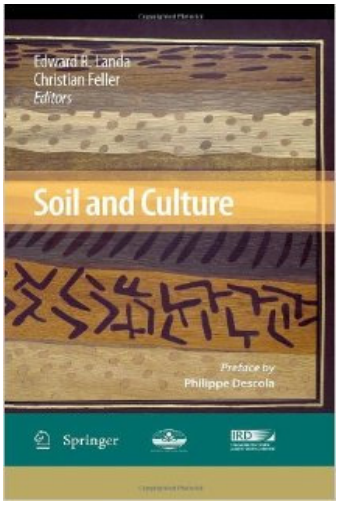
When writting of *The soils scientist's hidden beloved: archetypal images and emotions in the scientists relationship with soil*[3] Nikola Patzel describes the inner reality of the cultural dimension of soil which can be called the "inner soil", including all kinds of symbolic meaning of, and even spiritual relations to the soil. From a psychological standpoint, the investigation of the "inner soil" leads to the questions: What are our unconscious or subconscious drivers and guiding images in our perceptions and conceptualisations of soil, leading us to love or disgust it, and to like or dislike certain soil management practices? What are our concepts of soil fertility and of soil health? Which mental and cultural patterns lead us for example to prefer in our soil relation a computer-technical approach, an economic product value approach, an eco-functional approach, a relation formed by manual labour with soil, or guided by intuitions and symbolic thinking? So, there are many alternatives and complementarities how to deal with soil.

It is one of IUSS division four's original topics to integrate viewpoints and results from social science and humanities. For the division 4 "The Role of Soils in Sustaining Society and the Environment", history, education, health, justice, and economy for example all imply cultural dimensions. These perspectives open up the spectrum from physical and cultural soil services for human societies to the soil being a "cultural entity".

To further develop this dimension in the heart of division 4 is one of our concerns.

[2] Feller C., Compagnone C., Goulet F., Sigwalt A., 2015. Historical and socio-cultural aspects of soil organic matter and soil organic carbon benefits, chap. 14, pp. 169-178. In S.A. Banwart, E. Noellemeyer and E. Milne (eds), Soil Carbon: Science, Management and Policy for Multiple Benefits. Wallingford, UK: SCOPE, vol. 71, CAB International.

[3] Chapter 13, In: Landa E.R., Feller C. (eds), 2010. Soil and Culture. Dordrecht, Heidelberg, London, New York: Springer Press



This book explores the link between soil science and culture on an earth and environmental science level.

The content, scope and diversity of this volume's contributors are unique, including poets, studio artists, gallery owners, farmers, philosophers, historians, geographers, geologists and soil scientists.

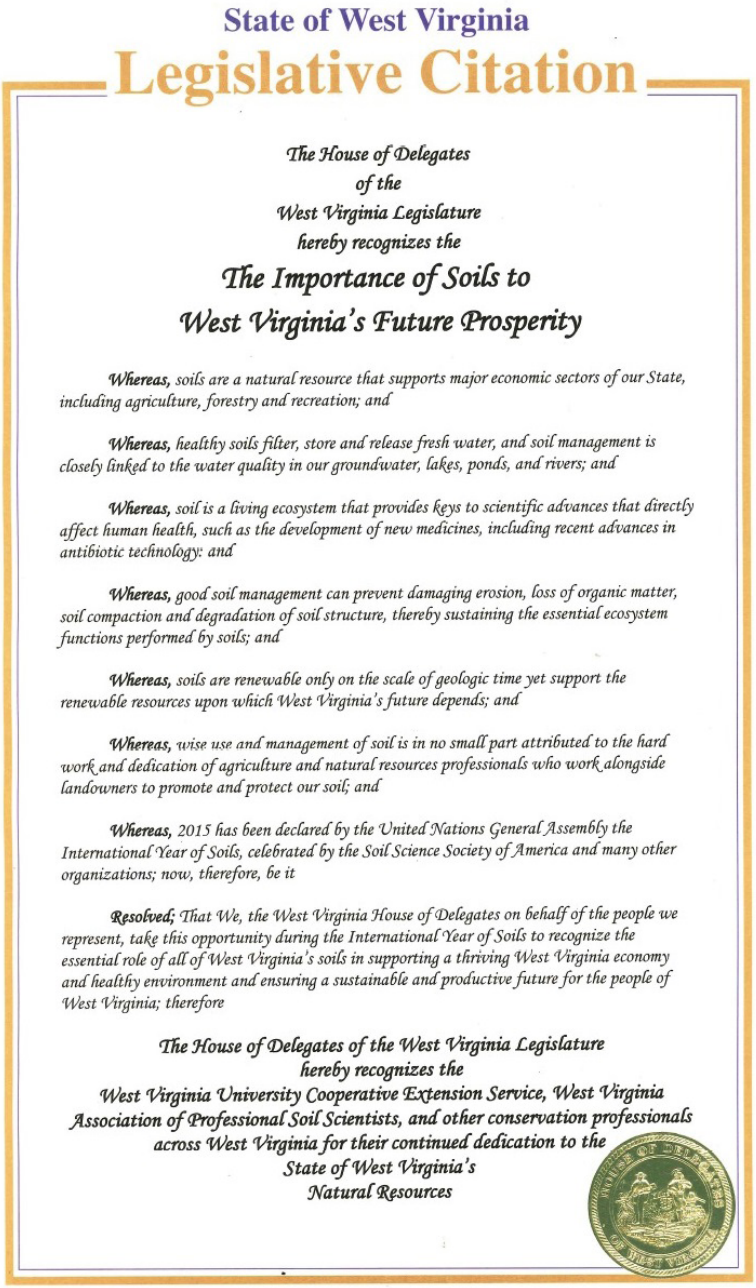
This is a comprehensive volume with content understandable to both scientists and non-scientists alike without diluting the interest-level for

Details can be found at: http://www.springer.com/us/book/9789048129591

One group's efforts to recognise soil in IYS.....

Michael Harman
Extension Agent, Agriculture & Natural Resources, West Virginia

I believe the international year of soils is a once in a lifetime opportunity to raise the profile of soil science at the ground level. Outside of our little world of soil scientists, so many people never give soil a second thought. In West Virginia, the West Virginia Association of Professional Soil Scientists has always struggled trying to do more to educate the public about the virtue and importance of soil. We have enacted a three stage approach for this year to remedy the problem. Our goals were to secure some form of legislative recognition at the state level, work with each conservation district to name a district soil, issue press releases in media outlets across the state announcing these actions. Our plan, while reaching out to a broad audience at many levels, is to share each success via newsletters, social media, and word of mouth while sneaking



State of West Virginia

Legislative Citation

The House of Delegates
of the
West Virginia Legislature
hereby recognizes the

The Importance of Soils to
West Virginia's Future Prosperity

Whereas, *soils are a natural resource that supports major economic sectors of our State, including agriculture, forestry and recreation; and*

Whereas, *healthy soils filter, store and release fresh water, and soil management is closely linked to the water quality in our groundwater, lakes, ponds, and rivers; and*

Whereas, *soil is a living ecosystem that provides keys to scientific advances that directly affect human health, such as the development of new medicines, including recent advances in antibiotic technology: and*

Whereas, *good soil management can prevent damaging erosion, loss of organic matter, soil compaction and degradation of soil structure, thereby sustaining the essential ecosystem functions performed by soils; and*

Whereas, *soils are renewable only on the scale of geologic time yet support the renewable resources upon which West Virginia's future depends; and*

Whereas, *wise use and management of soil is in no small part attributed to the hard work and dedication of agriculture and natural resources professionals who work alongside landowners to promote and protect our soil; and*

Whereas, *2015 has been declared by the United Nations General Assembly the International Year of Soils, celebrated by the Soil Science Society of America and many other organizations; now, therefore, be it*

Resolved; *That We, the West Virginia House of Delegates on behalf of the people we represent, take this opportunity during the International Year of Soils to recognize the essential role of all of West Virginia's soils in supporting a thriving West Virginia economy and healthy environment and ensuring a sustainable and productive future for the people of West Virginia; therefore*

The House of Delegates of the West Virginia Legislature
hereby recognizes the
West Virginia University Cooperative Extension Service, West Virginia Association of Professional Soil Scientists, and other conservation professionals across West Virginia for their continued dedication to the
State of West Virginia's
Natural Resources

in a little basic soils knowledge and some critical facts about conservation, all the while making sure everyone know it is the international year of soils.

I would like to recognize the soil scientists who have contributed to this process: Thank you Natalie Lounsbury Katey Yoast, Amir Hass, Skip Bell, Stephanie Connolly, Susan Demas, Nick Beaver, John Sencindiver, Jeff Skousen, Jim Thompson, Tim Dilliplane, Mary Beth Adams, and Jared Beard. I also want to than the West Virginia House of Delegates and specifically The Honorable Isaac Sponaugle and the Honorable Allen Evans. This has been and continues to be a team effort.

Soil Renaissance movement reawakens discussion on safegarding Earth's most valuable assest

Adam Calaway
The Noble Foundation

To see the most precious resource on the planet, walk outside and look down.

Soil is the foundation of life. The top 6 to 8 inches of rich organic matter that covers a small fraction of Earth's surface serves as the genesis of food, which drives the world's economy and, in turn, gives rise to modern society.

Yet so often, soil is treated like dirt.

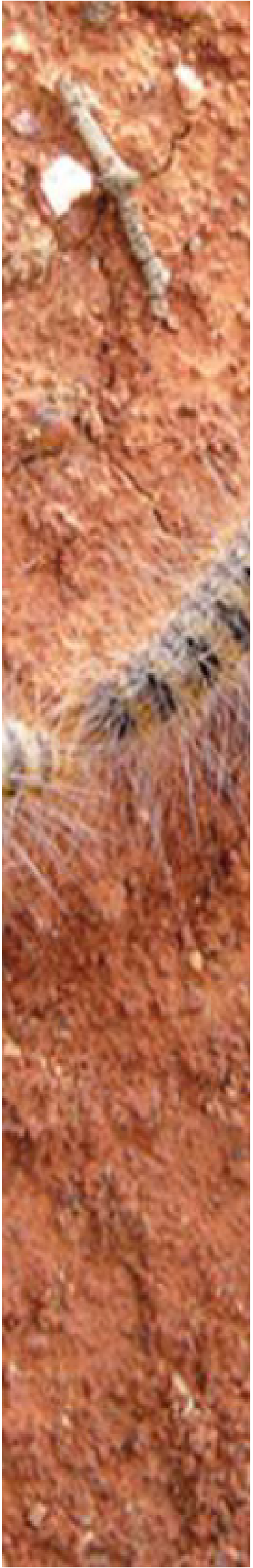
As vital to the life cycle as sunshine and water, soil remains undervalued and overlooked.

Most people never contemplate that healthy soil could disappear, but this exhaustible resource requires active management to remain productive. This isn't the first time in history that soil health has required immediate attention.

The Southern Great Plains witnessed firsthand the life-altering impact of soil health. In the early 1900s, generations of farmers unknowingly taxed the soil with poor land stewardship. These practices combined with 10 years of drought to produce the Dust Bowl of the 1930s.

If soil equated life, then Oklahoma was dead.

Oilman and philanthropist Lloyd Noble had a unique perspective on the Dust Bowl's devastation. Noble pioneered the use of personal aviation as a means to travel between his drilling rigs across North America. From the air, he saw his home state lying in ruin. He became an advocate for protecting the soil and safeguarding the land for future generations. "No civilization has outlived the usefulness of its soils," Noble said. "When the soil is destroyed, the nation is gone."



Noble endowed The Samuel Roberts Noble Foundation, in part, as a tool to prevent another Dust Bowl by raising awareness about proper soil management and providing agricultural producers with land stewardship education.

Seven decades later, significant concerns surrounding soil health have become evident but on a global scale. The organization Noble established is once again reaching out to fulfill its mission. This time, though, it will take a renaissance.

James Locke, Soils and Crops Consultant for the Noble Foundation, takes a soil sample from a pasture in the Southern Great Plains. The Noble Foundation and the Farm Foundation launched the Soil Renaissance as a means to reawaken the conversation regarding the necessity for healthy soils.

This national movement began with an unlikely conversation between Bill Buckner, Noble Foundation's president and CEO, and Klaas Martens, an organic farmer from New York.

The two men met at the Dialogue on Food and Agriculture in the 21st Century, an initiative led by Farm Foundation, NFP to create opportunities for people to discuss the critical issues of feeding a growing world population.

Seated next to each other, the two men with radically different backgrounds found common ground on the importance of soil health issues. "Soil health is a key factor in any agricultural production system, whether conventional or organic, yet soil is too often ignored or overshadowed by other factors," Buckner said. "It is critical that farmers and ranchers – the people working directly with the land – be in close communication with researchers and policymakers to ensure that their challenges are recognized and our soils are protected and sustained for future generations."

By fall, the conversation had advanced into action through the leadership of the Noble Foundation and Farm Foundation. Twenty-five leaders representing conventional and organic agriculture, science and research, land managers, government agencies, and policymakers convened at the Noble Foundation's campus in Ardmore, Oklahoma, to develop a road map.

A mere 72 hours later, the Soil Renaissance was born to strengthen awareness of soil's central role in productive agricultural and natural resource systems.

"In many cases, the people in that room had little in common," said Farm Foundation President Neil Conklin. "While they had different backgrounds and perspectives, the unifying factor was the common belief that action must be taken to conserve and build up our soil profile."

To conduct research, educate diverse audiences and understand the economics of soil, researchers must first agree on how to measure soil health. It's the baseline from which everything else will spring. In November 2014, Soil Renaissance leaders continued the process of hammering out the guidelines that can be adopted as the soil measurement test. With the measurement piece soon in place, a baseline will exist for that research.

Through the Soil Renaissance's research work group, scientists then will identify research priorities to help the USDA and congressional policymakers better understand the value and importance of soil research from a national perspective.

Individual researchers and institutions will be able to provide support through collaborative projects, but funding on the national and international levels will be pivotal for success.

In 2015, the Noble Foundation will continue the momentum from Soil Renaissance by launching a new program within the organization that will help provide additional resources to the soil health research effort.
Running parallel to the research efforts will be an educational program for consumers and policymakers about the critical role of soil, as well as the underlying economics of soil health.

Soil health advocates know adoption of soil health standards hinges on showing the underlying financial impact and the economic benefit of investing in soil health, as well as how it mitigates long-term risk.

"There are layers upon layers of issues surrounding soil health to address," Buckner said. "Soil Renaissance addresses them all with an interconnected strategy. Unlike other soil efforts, we will have no financial gain. We are doing this because this is our responsibility. This is our moment in history to make a change before we can no longer salvage the vitality of soil. We must act now."

With this strategic plan the Noble Foundation invites you to join us in this important work, bringing attention to soil health and expanding the knowledge that will help sustain earth's most valuable resource.

Visit: http://soilrenaissance.org/ and find a downloadable copy of the stretagic plan located under 'About Us'

Global Soil Partnership
Pillar 2

Encourage Investment, Technical Cooperation, Policy, Education, Awareness and Extension

Over the last two decades, investment and technical cooperation for soils have been lacking, but greater attention is being paid now to this invaluable resource.

Soil knowledge and soil implications on water, climate, biodiversity, energy, food and poverty issues are not properly addressed in the general education system, so a wide effort is needed to create public awareness and strengthen curricula and training on the importance of sustaining soils and their functions.

Pillar Two of the GSP underpins many of the actions under the other Pillars by addressing the general lack of societal awareness of the importance of soil in people's lives and the well-being of the planet. In many cases, deficiency in education is the specific underlying cause of unsustainable land management practices, of the general lack of investment (both in education and physical measures to protect soil) and, as importantly, of the widespread political reluctance to adopt short- and long-term measures to preserve and enhance soil conditions. The PoA for Pillar 2 consists of six interlinked and interdependent components: policy, investment, education, extension, public awareness and technical cooperation. Related action-related recommendations are included.

There are 17 recommendations affecting areas of policy (3), education (5), awareness (4), extension (3), and investment (2). The details of the recommendations can be found at: http://www.fao.org/3/a-ml035e.pdf.

At the Third Plenary Assembly of the Global Soil Partnership held June 2015 at the FAO headquarters with the approval of the plan of action, the Secretariat has been supporting the development of comprehensive and realistic Regional Implementation Plans

2015
International
Year of Soils

The International year of soil (IYS) aims to be a platform for raising awareness of the importance of soils for food security and essential eco-system functions.

The objectives of the IYS are:

1) to create full awareness of civil society and decision makers about the fundamental roles of soils for human's life;
2) to achieve full recognition of the prominent contributions of soils to food security, climate change adaptation and mitigation, essential ecosystem services, poverty alleviation and sustainable development;
3) to promote effective policies and actions for the sustainable management and protection of soil resources;
4)to sensitize decision-makers about the need for robust investment in sustainable soil management activities aiming at healthy soils for different land users and population groups;
5)to catalyze initiatives in connection with the SDG process and Post-2015 agenda;
6) to advocate rapid enhancement of capacities and systems for soil information collection and monitoring at all levels (global, regional and national).

To keep up-to-date with what is happening globally visit:
http://www.fao.org/soils-2015/en/

New World Soil Charter endorsed by FAO members

Coinciding with 2015 the International Year of Soils, member countries during the 39th FAO Conference unanimously endorsed the new World Soil Charter as a vehicle to promote and institutionalize sustainable soil management at all levels. When doing so, members also welcomed and appreciated the work done by the Global Soil Partnership and requested to move into its full implementation including that of the World Soil Charter.

See, http://www.fao.org/globalsoilpartnership/highlights/detail/en/c/293415/
and http://www.fao.org/3/a-mn442e.pdf

A little soil knowledge

Tony Koppi
Consultant, Australia

The Challenge

Is it possible to know too much about the soil that's growing wheat? It might be possible to know too little; and what is it they say about a little knowledge?

In Australia there is a growing concern that the change in responsibilities of government agencies has resulted in a loss of soil skills and capacity in recent years and these have not been replaced from other organisations. It seems that retiring experienced soil scientists are not being replaced yet at least twice the number of existing soil scientists will be needed in the years ahead.

A particular quality of soil scientists is that they are able to integrate a range of sub-disciples when investigating a problem. The mixed bag of knowledge may include soil physics, chemistry, biology and pedology, not to mention relating these to other disciplines such as agronomy and environmental science. Collecting the relevant bag of evidence to make informed decisions and solve problems can take years of practice.

How can we address the decline in soil knowledge and loss of expertise?

The Sydney and GRDC's approach

A team based at The University of Sydney has been charged with identifying just what soil knowledge is required for grains production and how students and in-service advisors can best access this knowledge. Rather than telling advisors what they should know about soil, the teams' approach is essentially to find out what soil science knowledge advisors need, and how in their busy lives they would realistically acquire it. This consultative approach is seen as the way to provide the kind of education that the industry wants and will use.

The team started with the outcomes from a previous project that asked soil scientists what essential or core soil knowledge should be taught in all university soil science courses in Australia. This core body of soil science knowledge was examined at a forum of stakeholders for its relevance to grain production, and modified to become 'soil for grains knowledge'. Further direct consultation with advisors, growers, academics and certified practicing soil scientists is continuing to refine this soil for grains knowledge.

Knowing what should be known about soil for grains across the diverse Australian soil spectrum is one thing, and quite another thing is identifying the best way for this knowledge to be learned and applied to make productivity gains.

What learning works best?

Agronomy advisors are busy people and squeezing in more study or any kind of professional development is not easy. Taking time off to study for a higher degree, albeit in a relevant and necessary discipline, is not an option for many people. So how do busy people up-skill their knowledge, especially if they live in the country a long way from any university? There are plenty of soil science textbooks or DVDs available but can they alone provide the answer? Online might be an obvious solution but the medium itself does not say how the learning would best occur, for how long and in what form. Or even how it would engage busy people who have specific and local soil science issues affecting production.

Having pretty well identified the soil knowledge for grains production, the teams' perhaps bigger challenge lies in designing the most effective and desirable formats and media to suit a range of study and learning approaches and opportunities. To help refine this thinking, and find an optimal solution that meets industry needs, the team organised a forum at The University of Sydney on 8 April 2015 to which a range of stakeholders particpiated.

A few key messages that came out of the workshop were support for the continued development of a soil 'book' where cereal production was the central focus and is used to arrange the soil knowledge. This resource will be housed in the GRDC Knowledge Library which is under development with Federal University Australia (FUA) and be used to support in-service training. There is also a need to develop a suite of scenarios built around real-world situations with the ability for advisors to upload their own, including photos and videos to add to this learning resource. These scenarios will not just focus on problem areas but include high-yield sites.

One thing seems to be clear: unless people can get the soil knowledge they need to address their particular soil problem, when they need it, in the way they need it, the problem may not be solved in the best way possible.

For more details contact Derek Yates: derek.yates@sydney.edu.au

Supported by

GRDC Grains Research & Development Corporation
Your GRDC working with you

Particpants at forum disecting opportunities for developing resources of soil knolwedge for grains. Photo provided by Derek Yates

Making securing the worlds soil a global imperative.

Damien Field & Alex McBratney
Faculty of Agrciulture and Environment, The Univeristy of Sydney, Australia

Securing our soil to sustain our supply of food, water and energy were just four of the catena of seven global challenges discussed at the first Global Soil Security Symposium hosted by Texas A&M University at the end of May 2015. Early in the program a call to arms to secure our soil was made by General Michael Jeffery, Australia's National Advocate for Soil Health, when he said, "If you eat you should be involved". Involved people were, with some 85 participants from 14 countries and 40 institutions representing soil scientists, government agencies, foundations, policy makers, and the general public converged on College Station to voice their ideas on this emerging concept of Global Soil Security.

Growth in the global population which is driving the demand for more food and clean drinking water are just two of the themes discussed as being central to securing soil. The continued loss of arable land to erosion and the potential for prime cropping land being lost to urban sprawl, combined with the shifts in climate resulting in more volatile weather with climate change were also at the fore-front of people's minds. Yet, those at the symposium believe that they can tackle this with a combination of good science, the right social frameworks, and policy. This inspired participants to discuss the meaning of the concept of Global Soil Security and how the dimensions that frame it can be used to monitor, evaluate and manage these challenges.

Early in the symposium a simple question was asked, "What can this soil do?", which more formally is asking what is the *Capabiity* of this soil. It was decided that the capability of a soil is not only to function in the provision of food, water and biodiversity but also has a role in preserving cultural heritage, a store for carbon, and can be used to support recreation. Managing the *Condition* of the soil to maximize the potential benefits for any given function and how this can be evaluated and monitored was also discussed.

Participants at the Global Soil Security Symposium, photo provided by Jae Yang

For agriculture, discussions focused on advocating for no-till strategies combined with leguminous cover crops to secure the soil's ability to produce food and energy crops. As stated by Cristine Morgan, 'the fact that we know about soil' and combining this with the notion of managing soil to its capability we have the ability to maintain soil in good condition now and into the future. But, to realize this, Bill Buckner CEO of the Samuel Roberts Noble Foundation noted that supporting farmers to see the economic opportunities of changing their management to secure soil is a key to driving change at the grass roots level.

Such economic opportunities need to be extended to include how soil contributes to ecosystem services and developing approaches that enable the accounting for the soil's Capital contribution is the third dimension of soil security that was discussed. Estelle Dominati from Land Care Research New Zealand talked the symposium through real-world examples of linking soil natural capital to drive investment for resource management, and the fact that financial institutions are starting to investigate how this capital can be incorporated into future financial considerations.

Complementing this was a session looking at the role of policy, identified as a dimension of Codification, and the development of incentives that support better decision making to maintain the soil's condition. The ideas of 'carrots and sticks' were discussed and it was recognised that the adoption of either of these approaches to secure soil will depend on the where your are in the world, Having society connect with soil and providing accessible soil capability and condition monitoring will improve the opportunity for policy development.

To complete the dimensions that frame soil security will be serviced by understanding people's Connectivity. To support farmers connectivity with soil means having access to good soil knowledge and this requires a new way to think about extension, and initiatives, such as the NRCS Soil Health and the Noble Foundation Soil Renaissance programs , are spearheading efforts to improve stewardship of soil. It is an imperative that society has a means to reconnect with soil and this will need the developmnet of a few clear and easily accesible messages about the affect soil has.

At the symposium is was agreed that these can only effectively be achieved when soil science, economists, social science, and policy makers discuss and all contribute to the decision making about soil and this is what soil security is striving to happen. To work toward achieving soil security in the next two decades, goals are being drafted to secure soil so that it can contribute to solving of other global issues, including;

- 50% of soils is used according to its capability by 2030
- Increase annual capital value of soil ecosystem services by 5% per annum by 2030
- 90% awareness and understanding amongst the general public of soil security, by 2030

and many more.

See https://dl.sciencesocieties.org/publications/meetings/browse/sssa/2015GS for presentations

Key Processes and factors to mitigate land degradation

Hatano Ryusuke, Suwardi, Bellingrath-Kimura Sonoko Dorothea
Division of Environmental Resources, Hokkaido Univeristy, Japan
Department of Soil Science, Bogor Agrcilutral University, Indonesia
Leibniz Centre for Agricultural Landscape, Germany

At the 20th world Congress of Soil Science (WCSS) held in Jeju, Korea an inter-divisional symposium was held on the above with the purpose of specifying the key processes and the controlling factors that lead to soil and land degradation in landuse and land management in every region. The base of the symposium was the Division 4.3 Soils and land Use Change (IUSS) focusing on its mission to integrate the knowledge of soil science and to inform stakeholders about the utility of the soil. This inter-divisional symposium was highly inter-disciplinary with active discussion at the oral and poster sessions.

From the symposium a ***Special Issue in Catena*** is being published which includes eight papers by presenters at the symposium, as well as, researchers in areas of soil carbon sequestration, methane and nitrous oxide emissions, eutrophication and soil acidification.

Two papers focus on changes in carbon stocks which have been achieved by converting secondary forest to Chinese fir and Moso bamboo, while research in Russia and Kazakhatsn demonstrates an increase in soil carbon of abandoned crop fields being converted over to natural vegetation. Both acknowledge there is a trade-off between agricultural production and soil carbon sequestration. A third paper showed that the proper management of manure applicaiton in balance with plant nutrient demand maintained crop production without decreases in soil carbon. Research presented on tea plantation management showed that a combined application of chicken manure and chemical fertiliser reduced N_2O emissions. Research in Lake Hachiro Japan, demonstrated that lowering the ration of dissolved inorganic nitrogen to soluble phophorus is a key factor for the growth of algal or cyanobacterial blooms. Also in Japan, on Ogasawara Island, soil acidification resulted from subsoil exposure by erosion by feral goats, while parts of the bare soil with high acidity received phophorus and nitrogen derived from seabird activities.

These papers in this special addition add to the work over the last 30 years since the development of the Global Assessment of Human-induced Soil Degradation (GLASOD) housed at ISRIC (http://www.isric.org/projects/global-assessment-human-induced-soil-degradation-glasod) and are key to developing good practices for reducing soil and land degradation.

SO, KEEP YOUR EYES PEELED FOR THIS PUBLICATION.....

Growing from the ground up interviews

Ian Hollingsworth
Principal Horizon Environmental, Soil Survey & Evaluation, NT. Australia

This activity is being promoted to enhance public appreciation of the value of soil to urban society and beyond and support cultural change for the better.

Soil scientists are asked to conduct interviews around soil profile description in community gardens with people who grow food and post the interviews on social media.

To participate, record interviews (and images if you like) with a smart phone and post these to social media using #IYSCommunityGarden and #IYS2015.

It's a low key, distributed broadcast, extension activity designed to value soils for agriculture and environment in urban areas where most people live, and radio may pick it up. Contact Ian for more details; ian.hollingsworth@horizonesse.com

Tea4Science

An international Lesson Plan for teachers - Tea4Science – has recently been developed were students will use a simple method to measure decay of organic matter (plants) by making use of commercially available tea bags.

The method consists of burying Lipton tea bags with Green tea and Rooibos tea, and digging them up after three months. The retrieved bags are dried, cleaned on the outside, and weighed on a balance. Thereafter, weight loss, decomposition rate, and stabilization index will be calculated using the collected data by the teacher or the students (if their age allows) using an Excel sheet.

The students can take part in a global citizen science experiment by sending their data to the Tea Bag Index Project (in the period mid-2015 to 2018, http://www.decolab.org/tbi/). The students will learn that (1) there is biological activity in the soils, (2) the intensity of this biological activity depends on environmental conditions, and (3) this biological activity has feedbacks that influence climate change.

Please contact:
Lehtinen, Taru - taru.lehtinen@ages.at
Institute of Sustainable Plant Production, Deapartment for Soil Health and Plant Nutrition University of Iceland,

Materials can be found at:
http://www.soils4teachers.org/files/s4t/lessons/lesson-plan--tea4science.pdf

Photo provided by Bas van de Riet

Strip tillage can affect crop water use and crop water productivity.

Jay Jabro
NPARL-ARS-USDA- Sidney, Mt 59270 USA

Recently ARS researchers in Sidney, Montana, USA published a refereed article on crop water use and crop water productivity under strip tillage and conventional tillage practices in sugarbeet fields in the MonDak region (north-eastern Montana and north-western North Dakota). That research has already demonstrated significant fuel and labor cost savings for producers opting for strip tillage due to significantly reduced trips across the field under strip tillage (one pass versus six passes for fall seedbed preparation), but questions remained on how strip tillage affected crop water use and productivity.

The results were published in "Agronomy Journal 2014, 106:2280–2286." In this article, we noted interest in strip tillage has been increasing among MonDak sugarbeet producers because of its ability to reduce soil erosion, reduce tillage costs and conserve soil water by maintaining crop residues on the surface.

The study itself was conducted in Sidney, MT from 2006 to 2008 using an overhead linear irrigation system, with sugarbeet planted following malt barley under both tillage practices in each of the three study years.

One of the added benefits of strip tillage, which leaves alternating strips of tilled and untilled soils, was immediately evident in the first year when a strong wind storm passed through in early May 2006 shearing off several of the young beet seedlings in the conventionally tilled plots. In contrast, the rows of standing crop residue left in the strip tilled plots protected the young seedlings there from significant damage (see images).

"Sugarbeet seedlings are pretty delicate so when spring wind events occur in the MonDak region, which happens frequently, there can be significant damage to young plants," we noted. "That's what happened in 2006 in our conventionally tilled plots."

Sugarbeets plants under strip and conventional tillage practices.

That damage led to a 17% reduction in root yield in those plots compared to the strip tilled acreage. In the remaining two years of the study, the strip tilled plots also produced higher root yields (4% and 8% respectively) but those differences were not statistically significant.

Similar results were reported for both crop water use and sucrose yield, with larger differences in 2006 attributable to the wind damage in conventional plots, while water use and sucrose yield were not significantly different in the remaining two years of the study.

When considering overall crop water productivity, strip tilled plots once again came out ahead. Altogether, strip tilled plots used 2.5 gallons less irrigation water to produce one kilogram, or 2.2 pounds, of sugarbeet root yield as compared to conventionally tilled plots, and 16.12 gallons less irrigation water to produce I kilogram of sucrose.

"That means strip tillage is a practice which provides conservation benefits over conventional tillage that can be used to produce comparable sugarbeet yield at a lower cost and with greater crop water productivity," we concluded. "Sugarbeet producers can also reduce their fuel and labor requirements, use less water and increase their profitability by using strip tillage practices."

And that profitability can have a big impact on the MonDak region, where total direct economic impacts from sugarbeet production, processing and marketing were estimated at $73.9 million in 2011 by Sidney Sugars, Inc.

For more information go to the original article: Jabro, J.D., W.B. Stevens, W.M. Iversen, R.G. Evans, and R.G Allen. 2014. Crop water productivity of sugarbeet as affected by tillage. Agronomy J.106:2280–2286.

Gardening in a polluted paradise.

Kaine Korzekwa
This story is reprinted from materials provided by the Soil Science Society of America.

Greens thumbs, do not fret. Pockets of soil in urban areas are still avialable for the increasingly popular practice of urban gardening.

Some scietists have found that while soils close to pollution and industry can increase levels of contamination the risks of gardenign in these soils may not be as high as first thought.

Researhers at Kansas State Univeristy have looked into how vegetables take up different soil contaminants and how different gardneing practices could reduce this uptake. There resutls show that in a majority of cases studied eating vegetables grown

in contaminated soils was safe.

They grew tomatoes, collard greens and carrots and looked at lead contaminants as well as arsenic and compounds called polycyclic aromatic compounds, which are suspected carcinogens.

Most the vegetables grown has low levels of the contaminants, but the safety of root crops was less certain. However, Dr. Ganga Hettiarachchi from Kansas State University cautions against using these results as a reason not to grow urban gardens.

"It's important to know how these safety levels are calculated," she explained. "A person isn't going to be eating those carrots for every meal 365 days a year. In the grand scheme personally I wouldn't worry much about the possibility of contaminants in carrots because I know I'm not really eating that many."

She added that, as a precaution, concerned gardeners could grow carrots in containers filled with clean soil.

Visitors from Keeping Indianapolis Beautiful, a Non-profit organization, inspecting the test plots.
Photo courtesy: Virginia (Ginny) Roberts (Purdue University Cooperative Extension Service, Marion County Office).

The presence of lead in the soils is a result of leaded gasoline and lead-based paint use. Arsenic can get into the soil from arsenic based pesticides and wood preservatives. The burning of fossil fuels and creosote can cause build-up of the hydrocarbons that were studied.

"Fruiting, leafy and rooting vegetables all take up and accumulate contaminants differently and that's why we tested three different types of plants." Hattiarachchi said. "to those worried about possible soil contamination we say to get your soil tested and avoid directly ingesting it."

To reduce the risk of direct exposure to these specific contaminants first,

researchers tested different cleaning methods of the vegetables to see which worked best to decrease the chance of consuming soil particles.

"Thorough washing is definitely the key, " said Ganga. "Soap isn't even really necessary if you wash all the visible soil off with water in your kitchen. The main point is to make sure you're not intentionally eating soil."

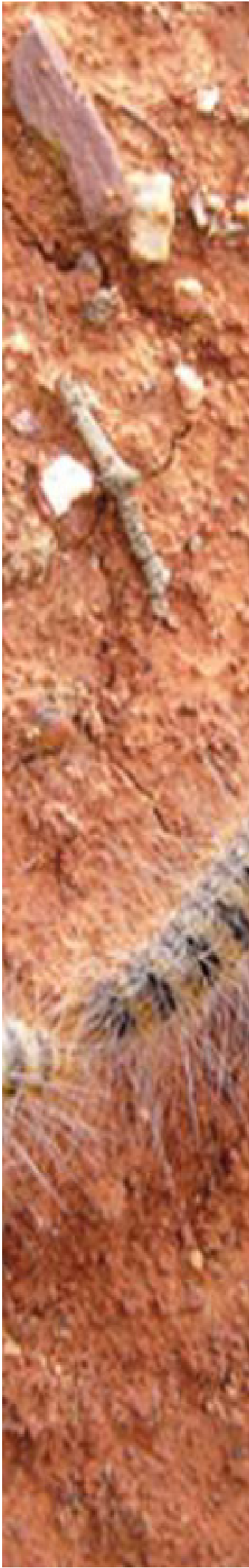
The ability for compost to lower the concentration of contaminates was tested and the results showed that the addition of compost can dilute the concentration of contaminants but this was not related to any particular type of compost.

It is easy to see how by simply adding compost to the contaminated soil, you can increase the volume and dilute the contaminate levels, she said, "besides compost, an urban gardener can also bring outside clean soil to help dilute the contaminant levels."

A last suggestion from Ganga is to be sure the nutrient levels in the soil are appropriate. Research shows plants are less likely to take up contaminants when they have ideal nutrients.

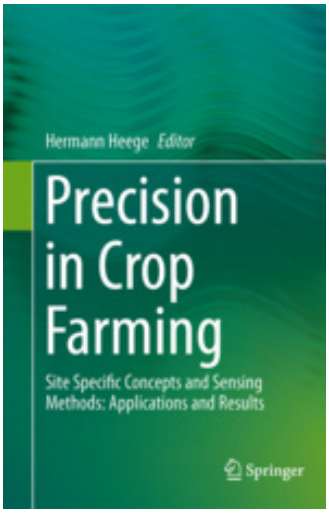
"Soil chemistry is complex and people need to understand that even though there may be contamination, there are countless factors, including plant factors, that determine whether it will be taken up by plants," she said. " The most important thing is that you test your soils to get to know your soils better. In the end the benefits really outweigh any possible contamination if testing is done and precautions are taken. Urban gardens give people access to fresh fruits and vegetables and are also good for physical, mental and community health".

Photo courtesy: Virginia (Ginny) Roberts (Purdue University Cooperative Extension Service, Marion County Office).
Orginal Story: https://www.soils.org/story/gardening-polluted-paradise



Recent Publications

Books

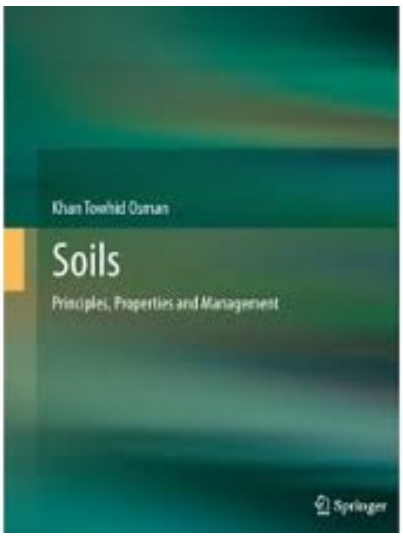


Publ: 2013, Springer
Eds. Heege, Hermann J.

Summary

High yields and environmental control in crop farming call for precise adaptations to local conditions. Treating large fields in a uniform way cannot be regarded as a sustainable because differences existing within single fields must be managed. High tech methods that include proximal sensing and signals from satellites can provide for controls that allow adjusting farming operations to small fractions of one ha and sometimes even down to some m^2, hence in a site-specific mode. This applies to operations for soil cultivation, sowing, fertilizing and plant protection. This book deals with site-specific concepts, applications and results

Details found at:
http://www.springer.com/us/book/9789400767591



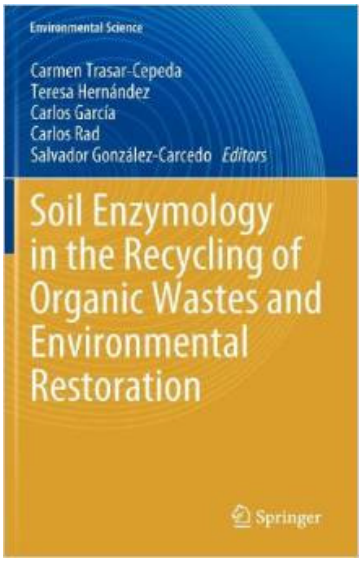
Publ: 2013, Springer
Eds. Osman, Khan Towhid

Summary

Aimed at taking the mystery out of soil science, Soils: Principles, Properties and Management is a text for undergraduate/graduate students who study soil as a natural resource. Written in a reader-friendly style, with a host of examples, figures and tables, the book leads the reader from the basics of soil science through to complex situations, covering such topics as: the origin, development and classification of soil, physical, chemical and biological properties of soil, water and nutrient management, problem soils, wetland and forest soils,

Further, the ecological and agrological functions of soil are emphasized in the context of food security, biodiversity and climate change. The interactions between the environment and soil management are highlighted. Soil is viewed as an ecosystem itself and as a part of larger terrestrial ecosystems.

Details found at:
http://www.springer.com/us/book/9789400756625



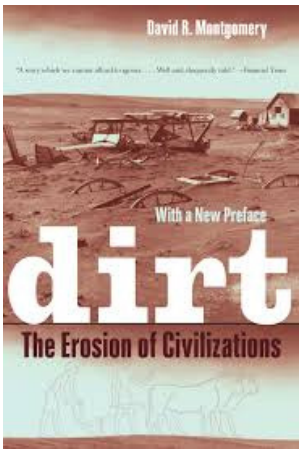
Publ: 2012, Springer
Eds. Trasar-Cepeda, C., Hernández, T., García, C., Rad, C., González-Carcedo, S.

Summary

Soil enzymes play a fundamental role in many soil processes such as the mineralization of organic matter, the synthesis of humic substances, the degradation of xenobiotics or the mechanisms involved in the biocontrol of plant pathogens. Their direct link with soil microorganisms gives them a key role as biomonitors of the evolution of soil quality or in the monitoring of the application of organic amendments to degraded soils. As a consequence of the importance of soil enzymes on soil processes, there is an increasing interest in their study, as well as in the application of molecular techniques as diagnostic tools.

Details found at:
http://www.springer.com/us/book/9783642211614

Books (Popular)

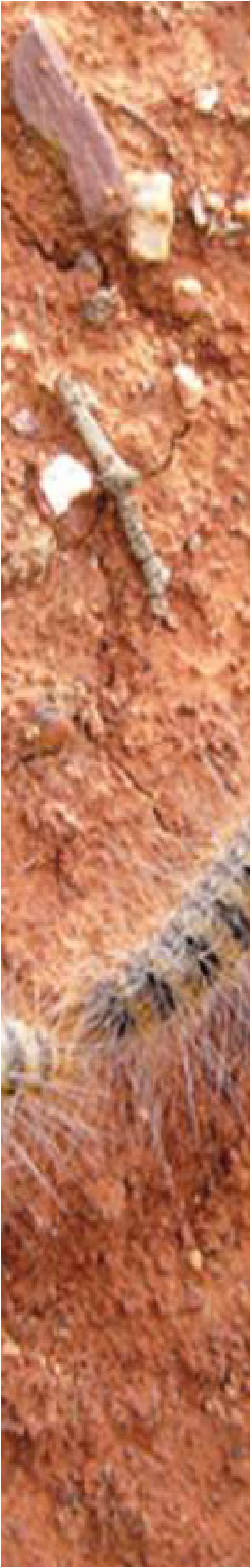


Publ: 2012, Uni. Calfornia Press
Auth. D. R. Montgomery

Summary

Dirt, soil, call it what you want—it's everywhere we go. It is the root of our existence, supporting our feet, our farms, our cities. This fascinating yet disquieting book finds, however, that we are running out of dirt, and it's no laughing matter. An engaging natural and cultural history of soil that sweeps from ancient civilizations to modern times, Dirt: The Erosion of Civilizations explores the compelling idea that we are—and have long been—using up Earth's soil. A rich mix of history, archaeology and geology, Dirt traces the role of soil use and abuse in the history of Mesopotamia, Ancient Greece, the Roman Empire, China, European colonialism, Central America, and the American push westward. We see how soil has shaped us and we have shaped soil—as society after society has risen, prospered, and plowed through a natural endowment of fertile dirt. David R. Montgomery sees in the recent rise of organic and no-till farming the hope for a new agricultural revolution that might help us avoid the fate of previous civilizations

Details found at:
http://www.ucpress.edu/book.php?isbn=9780520272903



Books

Silicon in Agriculture. Liang, Y., Nikolic, M., Bélanger, R., Gong, H., Song, A. Springer, 2015

Regulation of nutrient uptake by plants. Mitra, G. N. Springer, 2015.

Soil: The skin of planet earth. Kutílek, M., Nielsen, D. R. Springer, 2015

Soil: A reflection on the basis for our existence. Wallander, H. Springer, 2015

Journal - Feature Article

Can citizen science assist digital soil mapping

Rossiter, D. G., Liu, L., Carlisle, S., Zhu A. X. 2015, *Geoderma*, 259 - 260, 71 - 80

ABSTRACT: The essential element of citizen science is the participation of non-specialists in scientific research. The citizen acts as an observer or experimenter within structures established by a project run by professional scientists. The recent explosion in projects is due to the development of enabling technology, exemplified by the spatially-enabled "smart" phone with mapping applications and its supporting networks including the GPS system. Citizen science projects have two purposes: (1) to amplify scientific research; and (2) to build citizen support for, and understanding of, science. Current initiatives in citizen soil science include the OPAL Soil and Earthworm Survey, GLOBE, and mySoil, but these are not aimed at soil mapping. We propose digital soil mapping (DSM) citizen science initiatives for countries with and without well-organized extension and advisory services and existing soil surveys, and identify types of citizens who might be motivated to contribute to such initiatives. Contributions could be in the form of tacit knowledge, opportunistic or protocol-guided new information, information from precision agriculture, and physical samples submitted for analysis. The primary beneficiary of such projects would be the professional mapper using digital information to produce or enhance maps of soil properties or types. The secondary beneficiary would be the citizen scientist, who would benefit from an enhanced map, and may be better able to participate in policy debates related to the soil resource. In addition, participation would enhance the connectivity between the soil resource and the citizen.

Special Edition: Soil Science & Plant Nutrition

Saito, M., Tsukada, H., Yamaguchi, M. 2014. Preface to the special section "Contamination of Agro-Environment and Forestry with Radionuclides from the Fukushima Daiichi Nuclear Power Station". *Soil Sci & Plant Nutrition,* 60, 749 - 750

Fujii, K., Ikeda, S., Akama, A., Komatsu, M., Takahashi, M., Kaneko, S. 2014. Vertical migration of radiocesium and clay mineral composition in five forest soils contaminated by the Fukushima nuclear accident. *Soil Sci & Plant Nu trition,* 60, 751 - 764

Shinomiya, Y. Tamai, K., Kobayashi, M., Ohnuki, Y., Shimizu, T., Iida, S., Nobuhiro, T., Sawano, S., Tsuboyama, Y., Hiruta, T. 2014. Radiocative cesium discharge in stream water from a small watershed in forested headwaters during a typhoon flood event. *Soil Sci & Plant Nutrition,* 60, 765 - 771.

Nobori, T., Kobayashi, N., Tanoi, K., Nakanishi, T. 2014. Effects of potassium in reducing the radiocesium translocation to grain in rice. 772 - 781

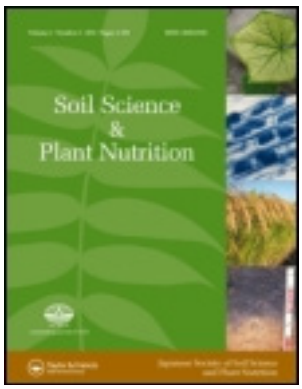
Harada, H., Amaha, K., Abe, Y., Kojima, Y., Sunaga, Y., Kawachi, T. 2014. Transfer factor of radioactive cesium to forage (*Zea Mays L.*) from soil to which contaminated farmyard manure has been applied. *Soil Sci & Plant Nutrition,* 60, 782 - 789.

Ogura, S. Suzuki, T., Saito, M. 2014. Distribution of radioactive cesium in soil and its uptake by herbaceous plants in temperate pastures with different management after the Fukushima Dai-Ichi N clear Power Station accident. *Soil Sci & Plant Nutrition,* 60, 790 - 800.

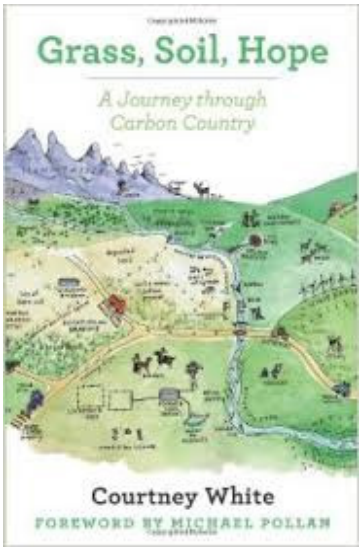
Nakanishi, H., Tanaka, H., Takeda, K., Tanoi K., Hirose, A., Nagasaka, S., Yamakawa, T., Mori, S. 2014. Radioactive cesium distribution in bamboo [*Phyllostachys reticulata* (Rupr) K. Koch] shoots after the TEPCO Fukushima Daiichi Nuclear Power Plant disaster. *Soil Sci & Plant Nutrition,* 60, 801 - 808.

Shinano, T., Watanabe, T., Chu, Q., Osaki, M., Kobayashi, D., Okouchi, T., Matsunami, H., Nagata, O., Okazaki, K., Nakamura, T. 2014. Varietal difference in radiocesium uptake and transfer from radiocesium deposited soils in the genus *Amaranthus. Soil Sci & Plant Nutrition,* 60, 809 - 817

Yasutaka, T., Miyoshi, H., Ito K., 2014. Transfer of radiocesium from hydroponic medium to potherb mustard and tomato plants. *Soil Sci & Plant Nutrition,* 60, 818 - 823.



Books (Popular)



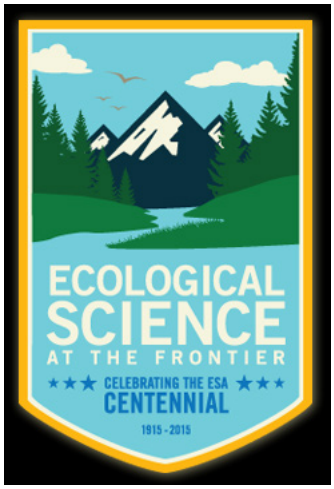
Publ: 2014, Chelsea Green Publ.
Auth. C. White

Summary

In Grass, Soil, and Hope, Courtney White looks at the major issues facing humanity, issues like global hunger, water scarcity, environmental stress, economic stability, and climate change in the context of soil health. As agricultural producers we know how important soil health is.

If you are not a fan of climate change arguments, you may want to skip the prologue but the chapters that follow have information for everyone on either side of the climate change issue. If you care about improved soil function and agricultural practice, that is the heart of this book (and the hope it brings to a burgeoning world population that needs more healthy food).

Details found at:
http://www.chelseagreen.com/farm-garden/grass-soil-hope



Ecological Society of America Meeting
August 9 - 14, 2015,
Baltimore, Maryland, USA

At this year's meeting special symposium has been included in the meeting schedule. The Symposiums titled "Assessing urban agriculture: Ecosystem services and ecological consequences" should be of great interest to readers of this newsletter.

For more details about this meeting visit:
http://www.esa.org/esa/tag/annual-meeting/

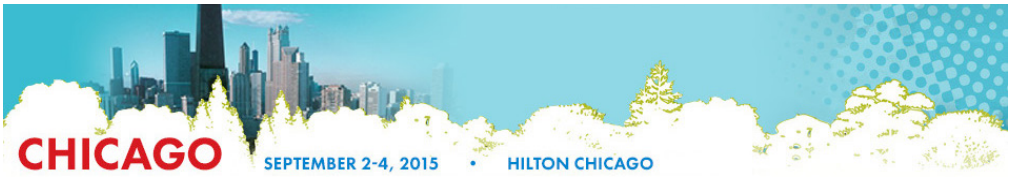
At the 36th confernce of the ACGA there will be a specail workshop on "Growing Safely to Produce Healthy Crops-Community Gardens on Previously used sites". This workshop will be held on the 15th of August and the conference runs from the 13th - 16th of August, 2015.

For more details visit:
https://communitygarden.org/conference/

ACGA
AMERICAN
COMMUNITY
GARDENING
ASSOCIATION

Soil, a living skin covering the earth, can be regarded as the mother of all living things, while tillage is the mechanical manipulation of soil to specifically promote and enhance crop growth. Our civilizations have used soil and tillage throughout their varied histories. Nowadays, when facing the challenge of food security and climate change, soil and tillage researchers have the opportunity to play a crucial role in developing sustainable agriculture and environment protection. The 20th ISTRO Conference is an excellent opportunity to present your work, share ideas and obtain new perspectives in soil and tillage research.

Details at: http://istro2015.csp.escience.cn/dct/page/1



Included in the program at the Brownfields 2015 confernce will be a special sessions address various aspects of the utilization of brownfield sites for local crop production in urban areas and human health impact. For more conference details visit: http://www.brownfieldsconference.org/en/home

International Phytotechnology Society 12th Conference, Phototechnologies for Sustainable Development 27 - 30 Sept. Manhattan, Kansas, USA

The theme of this conference on sustainable development will also include a Soil Awareness Event. For details of this event please contact Ganga Hettiarachchi, Chair Commision 2 IUSS.

This conference provides the opportunity to scientists, engineers, consultants, policy regulators and other interested individuals to explore and discuss how recent developments in phytotechnologies to address emerging environmental challenges.

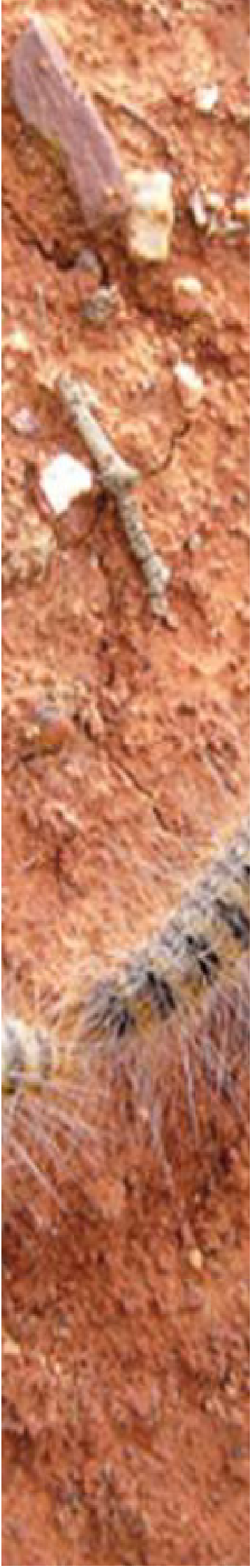
For more details about this meeting visit:
http://phytosociety.org/events

START *Enhancing scientific capacity to inspire informed action on global environmental change*

7th International Conference of the African Soil Science Society 25th Oct. - 1st Nov. Ouagadougou, Burkina Faso.

This 7th International Conference will gather soil scientists, land planners and users as well as all related specialists to deliberate on the contribution of soil science for a sustainable development in Africa, with special attention on issues such as food insecurity, climate change, land degradation, land and water knowledge management and renewable energies.
Contributions must be relevant to one of the following sub- themes: soil productivity in tropical agro-systems, land ownership and sustainable land management, soil, climate and climate change, africa Soil Landscapes and soil genesis, knowledge, education and capacity building in soil science in Africa

For more details about this meeting visit:
http://start.org/announcements/call-for-abstracts-7th-international-conference-of-the-africa-soil-science-society



Ecological of Soil Microorganisms 2015
29th Nov. - 3rd Dec. 2015, Prague, Czech Republic

The conference is planned as an interdisciplinary platform that should offer as much interaction among various subjects within microbial ecology as possible. The other important goal of the conference is a wide scope covering the ecology of all microbes: bacteria and fungi as well as archaea and protozoa.

For more details about this meeting visit:
http://www.biologicals.cz/conferences/index.php?conference_id=22

The 2015 Annual Meeting offers a unique opportunity as ASA, CSSA, and SSSA co-locate with the Entomological Society of America (ESA) to connect more than 7,000 scientists, professionals, educators, and students. Events take place at the Minneapolis Convention Center and surrounding hotels.

There will be many sessions of great interest organised, inlcuding a focus on "Chemical Processes Responsible for Carbon Fluxes". For session and meeting details make sure you visit; https://www.acsmeetings.org/

EUROSOIL 2016 will be a unique opportunity to provide an outstanding setting for all participants including young soil scientists, researchers, technical and Professional operators, company representatives and policy makers to share their projects, scientific experiences, innovations and ideas about the soil science.

The choice of the keynotes and invited speakers who will be chosen from not only Europe but all continents of our globe will set high standard and new visions in the field of soil science. Sessions covering all aspect of soil science and social and cultural events will help culminating the success of the Congress.

From details visit: http://www.eurosoil2016istanbul.org/#

The European Geosciences Union (EGU) has established the Soil System Sciences (SSS) program group which will be formed again at the next general assembly to be held in Vienna, Austria from the 17th to the 22nd April, 2016.
See: http://www.egu2016.eu/

Photo: Damien Field, The University of Sydney, Sydney, Australia

Soil Security Song.....

Richard MacEwan

Department of Economic Development, Jobs, Transport and Resources, Government of Victoria, Victoria, Australia.

Wake up, Wake up you soil scientists
What makes you sleep so sound?
The revenue men are coming
They might close your research down

Chorus
Well you're right about soil quality
And you're right about soil health,
What we need now is Soil Security
To secure this global wealth

Oh the first time I met Johan Bouma
He was molding a piece of wet clay
It looked like a flowering.....
And it really made my day

Dig a hole, Dig a hole in the Vertisol
Dig a hole in that Texas clay
Dig a hole, Dig a hole in that Vertisol
Collect some soil health data today

Chorus

Well you're right about soil quality
And you're right about soil health,
What we need now is Soil Security
To secure this global wealth

Well you've heard of Professor McBratney
He's a genius don't you see?
Do you know what his latest thing is?
It's Soil Security

Chorus

Well the first time I met Christine Morgan
Was a soil meeting down in TAS
She was grooving at the reception
Doing a 2 step on the grass

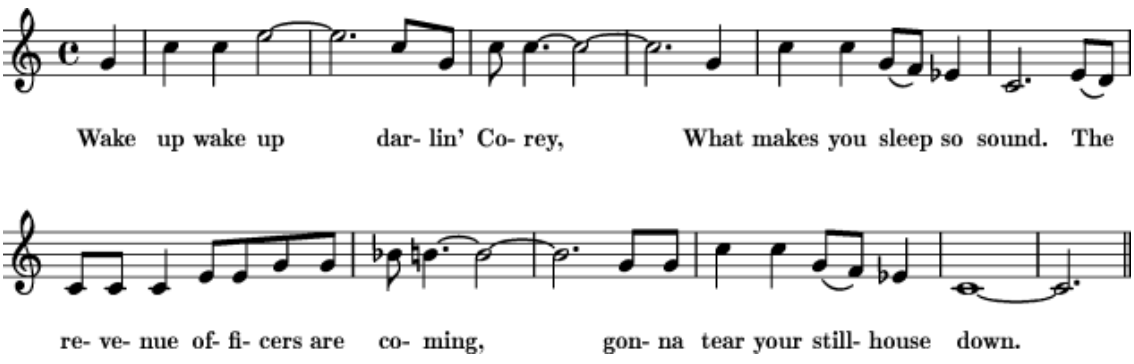
Chorus

Oh you've got some crazy language
And it's hard to make it scan
I know that I can't do it
Maybe a better poet can

Capability, Condition, Capital
Connectivity and much more
Codification is the last one
Now you can show me the door

Chorus

Lyrics and music adapted from Darling Cora, BF Shelton, 1927



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