SOIL CONNECTS

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

Issue 3 - December 2015

2015 International Year of Soils

this edition

Welcome to SOIL CONNECTS - 3

It is a pleasure to release the third 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 has ended there have been a myriad of activities to celebrate and share peoples involvement with soil. This celebration does not end with the close of the year and I am sure the efforts to connect people to soil will continue.

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 - Soil Judging in Western Australia, 2015. Watch out world the Aussies are still practicing.

Photo provided by Stephen Cattle

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) and the participation of **Ian Hollingsworth** (Commission 4.1 vice-chair) and **Adelheid Spiegel** (Commission 4.2 vice-chair)

Some future challenges.

Now that the IYS is coming to a close allow me to muse on some of the future chal¬lenges that will guide Division 4. These challenges were discussed at Vienna during the IUSS 7th December meeting celebrating the end of the International Year of Soils and lead to some recommendations (R) for Division 4

One can recall the main objectives of Division 4, being "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 inform¬ing 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".
These objectives could be described by the following 3 characteristics: soil as a natural, a cultural and as an inherited body.

Soil as a natural body - providing numerous ecosystem services to society.
The importance of soil and soil science is under appreciated by the society and so Division 4 needs to work on this in a multi-pronged manner. Currently soil is not considered at the same level by the general public as water and air, nor as it protect¬ed as a finite resource, one only very slowly renewable, which must be protected through wise use and management.

Many modern human societies (often urban) do not perceive the current pressures on soils nowadays including: the disappearance of soils to urban uses, compaction, erosion, contamination and organic matter losses.

With this in mind, Division 4 has the opportunity to broadly extend and present the concept of Soil Security "an idea which placed the soil at the interface and as the same level as Water security, Food security, etc, and are strongly interdependent. When reading 'Soil tells us a story (Alfred Hartemink, 2014) having a connection to is needed from those on both a rural and urban lands.

R1. To inform the general public and decision makers Division 4 needs to reinforce its activities to:
- Soil education: children and teachers.
Among actions there is a need to discover soil and its productivity at the level of a school garden
- Farmers and extension services.
The action must include to look at soil in the field and learn to soil agricultural diagnostics through the soil morphology. Some farmers in Conservation Agriculture already are using this approach.

- Policy arena at different scale levels (local, national, international). One important action concerns the teaching of soil in all countries in the official programs of primary and secondary schools.

Soil as a cultural body - If the soil is framed as a "natural landscape body (pedon)" beyond its association with agricultural or forestry uses, it might then be considered a 'partner' for cultural purposes or techniques. For example, the soil's use as a pigment (ochre) for drawing, as a ceramic material or, for customary or ritual body painting/ cosmetics etc. This emphasises the importance and beauty of the soil to a new public outside of agriculture.

R2. Division 4 needs to develop interactions with storytellers/poets, crafts-peo¬ple, film makers, photographers and creative artists concerned and interested by "soils" to illustrate the importance and beauty of the soil to the general public. These people need to be acknowledged as "soil ambassadors", and be included in scientific soil conferences or debates.

Knowing soil itself can still be a challenge for a larger public because, beyond its scientific definition some traditional, religious or mythical uses of the word "soil" or "earth" have other meanings. For example, in some religions, "soil" or "earth" is associated to the concepts of "origins" (creation of Earth and Mankind) and to fertility, and this presents a challenge when trying to extend new agricultural alterna¬tives to farmers, and needs to be considered when developing strategies for change.

R3. Division 4 needs to develop stronger interactions with humanities (sociol¬ogy, anthropology and archeology) for a better understand the perception of soil in different cultures, and take this into consideration when recommending in soil or land management strategies.

Soil as an inherited body

Soil is inherited by the individual as well as by society as a whole. Soil needs to be protected both legally and recognized for its natural capital. In some areas this is recognised in frameworks governing property rights but may not be as well estab¬lished in governance and value when considering the broader services it provides for society. There is an important need to further understand:

- the jurisdictions concerning soil degradation related to losses in ecosystem ser¬vices provided by soils,
- developing an 'account' for the evaluation of soil costs or benefits related to losses or gain in ecosystem services it provides.

To realise this contribution of lawyers and economists is crucial, which is not strongly represented in Division 4's objectives and organization.

R4. Div4 needs to develop a strong cooperation with environmental lawyers and economists in relation to the ecosystem services provided by soils. To allow common integrated actions between soil scientists, lawyers and economists, it is recommended to act at the watershed level.

Historic climate change agreement reached at COP21

The global climate change conference in Paris has adopted an international accord aimed at transforming the world's fossil fuel-driven economy within decades and slowing the pace of global warming to well below 2 degrees Celsius.

With this claim Mr Fabius declared, "I see the room, I see the reaction is positive, I hear no objection. The Paris climate accord is adopted".

World leaders unanimously declared this as a turning point. In 1997 the world's biggest emitters of climate changing greenhouse gases signed up to the Kyoto Protocol, but it was an agreement always fraught with disagreement.

United Nations

Framework Convention on Climate Change

FCCC/CP/2015/L.9

Distr.: Limited
12 December 2015

Original: English

Conference of the Parties
Twenty-first session
Paris, 30 November to 11 December 2015

Agenda item 4(b)
Durban Platform for Enhanced Action (decision 1/CP.17)
Adoption of a protocol, another legal instrument, or an agreed outcome with legal force under the Convention applicable to all Parties

ADOPTION OF THE PARIS AGREEMENT

Proposal by the President

Draft decision -/CP.21

The *Conference of the Parties*,

Recalling decision 1/CP.17 on the establishment of the Ad Hoc Working Group on the Durban Platform for Enhanced Action,

Also recalling Articles 2, 3 and 4 of the Convention,

Further recalling relevant decisions of the Conference of the Parties, including decisions 1/CP.16, 2/CP.18, 1/CP.19 and 1/CP.20,

Welcoming the adoption of United Nations General Assembly resolution A/RES/70/1, "Transforming our world: the 2030 Agenda for Sustainable Development", in particular its goal 13, and the adoption of the Addis Ababa Action Agenda of the third International Conference on Financing for Development and the adoption of the Sendai Framework for Disaster Risk Reduction,

Recognizing that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions,

Also recognizing that deep reductions in global emissions will be required in order to achieve the ultimate objective of the Convention and emphasizing the need for urgency in addressing climate change,

Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples,

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Please recycle

With its scheduled conclusion in 2012, the world scrambled to find a replacement. The negotiations in 2009, held that year in Copenhagen, were highly anticipated, but ended in chaos and disappointment. In the lead-up to this year's meeting, the French hosts worked hard to avoid the same conclusion.

There was a call made for soil to play its role from the French president. To read this and an immdiate response read the article, *C dans le sol - 4 pour 1000 sens? Réalisable? Utile ?* page 12 of this issue.

New Institute Launched to Help Improve a Nation's Soil Health

Provided by Adam Calaway
The Noble Foundation

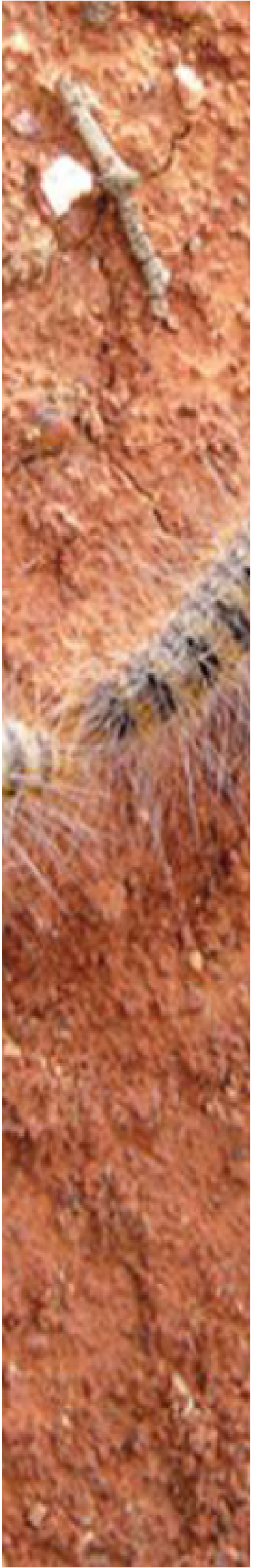
'*This new organization aspires to be the hub for measurement, research, economic analysis and education*'

To ensure that soil continues to be a vital natural resource for generations to come, The Samuel Roberts Noble Foundation and Farm Foundation, NFP, announced the formation of the Soil Health Institute. This announcement coincided with World Soil Day (Dec. 5) and celebrates the 2015 International Year of Soils.

Its mission is to safeguard and enhance the vitality and productivity of soil. It will work directly with conventional and organic farmers and ranchers, public- and private-sector researchers, academia, policymakers, government agencies, industry, environmental groups and consumers – everyone who benefits from healthy soils.

The organization will serve as the primary resource for soil health information, working to set soil health standards and measurement, build knowledge about the economics of soil health, offer educational programs, and coordinate research in all aspects of soil and soil health.

"Leonardo DaVinci once mused 'We know more about the movement of celestial bodies than about the soil underfoot," says Bill Buckner, president and chief executive officer, Noble Foundation. "Hundreds of years later that sentiment is just as accurate. The Soil Health Institute will provide much needed research funding so we can better understand our soil. We will make that research publicly available, so we can work together to provide solutions for improving our soil and protecting it for our children and grandchildren."



The Soil Health Institute is an evolution of the Soil Renaissance, an initiative established in 2013 by the Noble Foundation and Farm Foundation to advance soil health and make it the cornerstone of land use management decisions (*see Soil Connects Issue 2 for more details*).

The Soil Renaissance brought farmers, ranchers, soil scientists, economists, environmental interests, agribusinesses, NGOs and government agencies together to examine the role of soil health in a vibrant, profitable, sustainable natural ecosystem. Their work identified the need for a national organization to serve as a hub for measurement standards, economic data and coordinated research.

With more than one million organisms in a single teaspoon of Earth, soil is the starting point for plant, animal and human life. It is the foundation for society, providing the basis for food production, healthy families and economies. - ARDMORE, Okla. (Dec. 3, 2015)

"There are many short-term initiatives in progress that are regionally focused or examining only selected elements of soil and soil health," says Neil Conklin, president, Farm Foundation. "The Soil Health Institute will be a permanent organization that will coordinate the long-term work needed in this area." The Noble Foundation will continue to provide financial support for the new institute. Next steps will be to broaden the base of involvement with both private and public entities to provide necessary funding for the Soil Health Institute's activities.

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How Can You Help?

For more information about the Soil Health Institute, visit;
www.soilhealthinstitute.org.

Please note: media may access b-roll/video clips and audio clips regarding the Soil Health Institute announcement at;
https://woodruffsweitzer.egnyte.com/Soil_Health_Interviews.

Farm Foundation, NFP serves as a catalyst for sound public policy by providing objective information to foster a deeper understanding of issues shaping the future for agriculture, food systems and rural regions. The Foundation does not lobby or advocate. Our 83-year reputation for objectivity allows us to bring together diverse stakeholders for discussions on economic and public policy issues. The issue of soil health became prominent in discussions of A Dialogue on Food and Agriculture in the 21st Century, a Farm Foundation initiative to promote discussions on the challenges to be addressed if agriculture is to feed 9 billion people in 2050, while protecting and maintaining natural resources.

SOIL HEALTH INSTITUTE

For more information: Sue Dillon, Paradowski
sdillon@paradowski.com

The Samuel Roberts Noble Foundation, has focused on soil health since it was created by Lloyd Noble in 1945 to help protect the soil and safeguard the land for use by future generations by working directly with agricultural producers to effect change in regional soil health. An independent, nonprofit institute headquartered in Ardmore, Okla., the Noble Foundation conducts direct operations, including assisting farmers and ranchers, and conducting plant science research and agricultural programs to enhance agricultural productivity regionally, nationally and internationally.

Taking account of uncertainties in digital land suitability assessment.

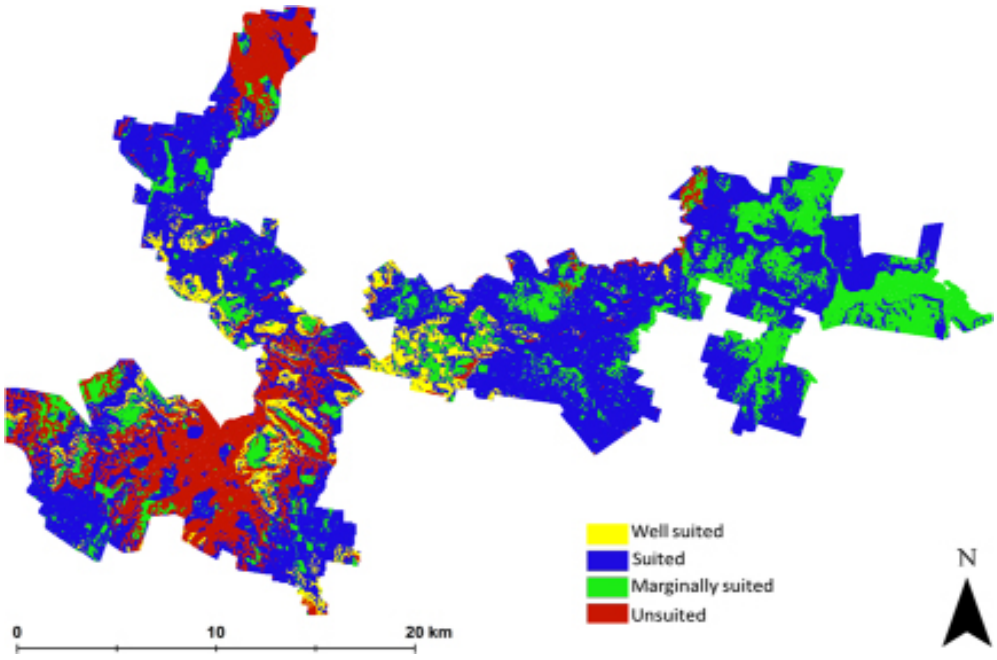
Brendan Malone
The University of Sydney

The establishment of a given land use upon land or a given site is usually predicated with an initial assessment of suitability. The question may be asked: Will the condition of the soils and their capability be able to support this given agricultural enterprise, together with what water resources are available, and the prevailing weather conditions.

Biophysical assessments of land are not new. Human civilization and its modernization attests to this. Land suitability assessment (LSA) essentially fueled national soil survey programs throughout the world, whose efforts are documented in numerous volumes of literature. Similarly, Food and Agriculture Organization of the United Nations type approaches to LSA are have been and continue to be widely applied throughout the world.

We came to this study with full knowledge of the context of LSA. We also recognized that in recent times, there has been a global resurgence in LSAs. Increasing global pressure on soil and water resources has likely compelled some of this activity.

Another reason is at the technical level; where performing an LSA has become a whole lot more efficient and specified since digital soil mapping has become operationalized in terms of the characterizing spatial variability of soil attributes. One can derive with digital soil and climate modeling, very attribute specific mapping. This facilitates the opportunity for deriving quite complex LSA frameworks.



Suitability maps for hazelnuts from Malone et al., 2015

What was recognized early in our investigations was that LSAs generally assume the information about the biophysical variables is error free. In reality, clearly this is not the case. Spatial mapping of these variables always results in some quantifiable (and probably unquantifiable) prediction uncertainties. Subsequently we were motivated to devise a LSA that incorporated the quantifiable uncertainties of the biophysical variables.

This work was done in Tasmania, Australia, where there has been much effort towards digital soil and climate assessment to support the expansion of irrigation throughout the state. From our research we found a few things. 1) Taking account of the uncertainties adds to the overall LSA because one can actually assess the reliability of the assessment. 2) Because the input variables are generated through a digital soil mapping approach, there is an ability to continually update the mapping as a means to improve accuracy, which will in turn, yield a more reliable LSA. 3) It is possible to identify and assess the magnitude to which biophysical variables contribute most to a classification of 'unsuitable' in a LSA.

Taking into account the biophysical variable prediction uncertainties is a slight sophistication to many LSA analyses which mainly consider inputs to be error free. One caveat to this is that the workflow becomes more computationally demanding. The age of Big Data is upon us. Our workflow attests to this, yet showcases some advanced methods using high performance computing abilities to evaluate research questions that have been out or reach until now.

Orginal Paper:

Malone, BP, Kidd, DB., Minasny, B., McBratney, AB. (2015), Taking account of uncertainties in digital land suitability assessment. PeerJ 3:e1366; DOI:10.7717/peerj.1366

Lost but will not be forgotten

I am saddened to inform you that Nyle Brady passed away November 24 at age 95.

He joined Cornell as a professor of soil science in 1947 and chaired the Department of Agronomy from 1955 to 1963, followed by a role as assistant dean at CALS until 1973. After retiring from Cornell in 1976, he worked in the Philippines as director of the International Rice Research Institute to combat poverty and hunger through the improvement of rice cultivation.

Ray Weil remembers, "He was a giant in soil science and agriculture, and left an important legacy in many ways. I feel very fortunate to have worked closely with him over several decades." He goes further to say, "The word has lost a great man....and I have lost a good friend and cherished co-author."

C dans le sol - 4 pour 1000 sens? Réalisable?

4 per 1000: Soil Carbon to mitigate Climate Change

Budiman Minasny
The University of Sydney, Australia

Australia's per capita CO2 emissions are one of the highest in the world. However Australia has the largest agricultural land, and there is an opportunity to offset emissions following the 4 per 1000 initiative.

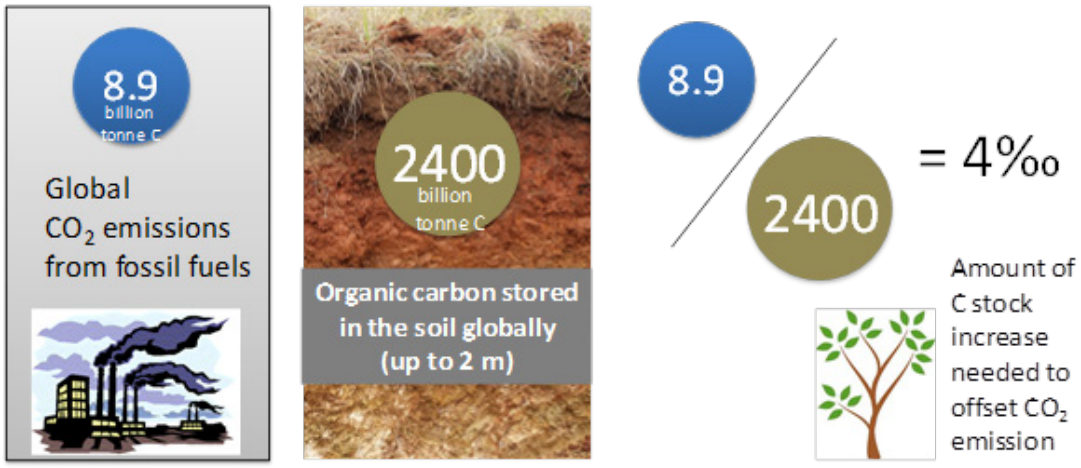
One of the major aims of COP21 meeting in Paris is, "…for the first time in 20 years of UN negotiations, to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C".

In response the French government is focussing on the soil's ability to sequester carbon and mitigate the greenhouse effect. To achieve this, the French Minister of Agriculture Stéphane Le Foll has set an ambitious international research program, the "4 pour mille" or "4 per 1000", meaning an increase global soil organic matter stocks by 0.4 percent on an annual basis.

Backed by the FAO and the US, we can already meet this challenge and determine the amount of carbon that needs to be sequestered locally across the globe using the recently published maps of global soil C stocks from research developed by the Faculty of Agriculture & Environment.

Soils store lots of carbon!

At about 2400 billion tonnes (2400 × 1015 g) of C, the soil is the largest terrestrial carbon pool. The top 2 metres of soil in fact hold 4 times the amount of carbon that is stored in plant biomass. Soils also have the potential to store carbon for a very long time by various protective mechanisms.



The 4 per 1000 soil carbon sequestration initiative (adapted from Ademe, 2015).

The potential of soil to sequester C to offset greenhouse emissions has been widely debated. So the million dollar question here is how do we realistically increase the soil organic matter stock by 0.4% on a year-to-year basis? Some would interpret this figure as an increase of 0.4% soil C per year, which is virtually impossible.

First we need to understand where "4 pour mille" or 4 parts per thousand comes from. The annual greenhouse gas emissions from fossil carbon are estimated at 8.9 billion tonnes (8.9 x 1015 g), and a global estimate of soil C stock to 2 metres of soil depth of 2400 billion tonnes (2400 x 1015 g). Taking the ratio of global anthropogenic C emissions and the total soil organic C stock (8.9/2400), results in the value of 0.4%. But to come up with a meaningful number for farmers to use, we need to work out how much C the soil is storing on a per hectare basis. 0.4% of this total estimate will then give us the required annual sequestration rate that needs to be achieved to reach the "4 pour mille" goal.

The land area of the world has 149 million km2, and it would be estimated that on average there are 161 tonnes of C per hectare. So 0.4% of this equates to an average sequestration rate to offset emissions at 0.6 tonnes of C per hectare per year. We know that soil varies widely in terms of C storage, for example peat soils in the tropics hold about 4000 tonnes of C per hectare, while sandy soils in arid regions may only hold 80 tonnes of C. The type of aboveground vegetation and how quickly the soil biota uses the carbon also can affect this rate. Taking this into account, we would need to add about 4 times the amount of organic matter to meet this sequestration rate.

Studies across the globe have measured soil C sequestration rates and they suggest that a C sequestration rate of 0.5 tonnes of C per hectare per year is possible, after the adoption of best management practices such as reduced tillage in combination with legume cover crops. These estimates do change however with soil type and climatic regions. Our work mapped out the global C stock in the world and showed that some cropland areas in the world have C contents that are below critical limits. Restoring the soil's C content in these areas is a win-win situation, as it offsets greenhouse gases emissions and provides benefits of enhanced soil quality.

Now let us look at some numbers for Australia, where we are considered to be one of the worst carbon emitters per capita. Our current annual CO2 emissions are 309,000 kilo tonnes (or 106 x 1012 g C). If we use the C stock estimates for Australian soil of the top 30 cm as 25,000 million tonnes (or 25,000 x 1012 g), then the ratio of C emissions over soil C stock is remarkably at 0.4%. If we consider the proportion of agricultural land at 470 million hectares, then annually we need to sequester an average of 0.22 tonnes of C per hectare. This value falls between the estimation of sequestration rates, 0.19-0.3 tonnes of C per hectare per year, for best management practices in Australia where water is not severely limiting.

The "4 per 1000" is an ambitious aspiration, however it is for the first time setting a global goal to promote good soil management that can help mitigate climate change. To achieve this we need disruptive technologies that can help agricultural practices to soak up more carbon in the soil, create soil security to achieve food security and mitigate climate change. Australia should be part of it!

Soil to save our planet

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

The University of Sydney hosted the 2015 Research Symposium titled "Soil to save our planet" on 14 of July 2015.

The Symposium brought together International and Australian experts to present their latest research and ideas on future innovations, focusing on how soil contributes to our planet's continued functioning and human wellbeing.

Attendees were made aware of the newest approaches and contributions of soil science in relation to three topic areas namely: Food Security and Human Health; Climate and Energy; and Water and Biodiversity. Australia's Advocate for Soil Health, Major General the Hon. Michael Jeffery officially opened the Symposium, followed by an inspiring keynote discussing the role of soil in global food security given by Dr Brian Keating, Executive Director Agriculture and Food Health CSIRO.

Dr Richard Doyle from the University of Tasmania gave a motivational overview about the role of Soil Science Australia in the International Year of Soils. Furthermore, Prof Cristine Morgan from Texas A&M University in the US talked about the value of soil knowledge and the importance of the soil layer in land surface models.

Professor Alex McBratney, Dean of the Faculty of Agriculture and Environment at the University of Sydney, discussed the role of Digital Soil Mapping in securing the soil resource. Dr Brent Clothier, Plant and Food Research New Zealand, concluded the keynotes and spoke about natural capital delivering ecosystem services.

The Symposium also featured a panel discussion on the question 'Can soil save our planet?' facilitated by Mr Mike Grundy of CSIRO Sustainable Agriculture Flagship. All panellists agreed that valuing our natural assets is critical and essential for decision making.

In summary, the symposium emphasised, recognised and discussed the positive impacts that the profound understanding and superior management of soils will have on quality of life and the sustainable future of our planet.

You can find the talks and presemtation slides here;
http://sydney.edu.au/agriculture/outreach/symposium.shtml

Mundura, SW, Western Australia. Photo provided by Stephen Cattle.

Connecting through food

Everyone has an agenda and a cause that drives them.

The Soil Association http://www.soilassociation.org/ has been busy making YouTube information pieces to get people to connect with soil. These and other groups in their own way are trying to recognise soil and put it in its rightful place. Have a look at;

https://www.youtube.com/watch?v=Fd871cZzGI4

International Field Course and Soil Judging

Erika Michéli
Professor and Head of Dept, AG. Chem & Soil Sci, Szent István University

As part of the celebrations of the International Year of Soils (IYS), an International Field Course and Soil Judging Contest was organized by International Union of Soil Sciences (IUSS), the Hungarian Soil Science Society and Szent István University, Hungary in partnership with the EU Joint Research Center, the Hungarian Academy of Sciences and Miskolc University, between 1-5 September in Hungary.

Participants registered and came from all continents, 28 countries (Afghanistan, Albania, Armenia, Australia, Bosnia and Herzegovina, Brazil, Croatia, Germany, Hungary, Japan, Kenya, Kosovo, Laos, Montenegro, Nigeria, Philippines, Rwanda, Serbia, South Africa, South-Korea, Spain, Sudan, Tajikistan, Tunisia, Turkey, Uganda, United Kingdom, USA). Including the instructors and local supervisors 120 people participated in the event.

The four days of training included indoor and field sessions. An international team of soil experts gave an overview of site and profile descriptions and soil classification based on IUSS endorsed standards. Interpretation of soil properties and potential soil functions were also a significant part of the topics. The locations of the field training covered a great variety of soil forming environments where local experts introduced the landscape and soil conditions with a focus on the contest themes.

The 16 teams included national and multinational teams from 3 to 5 members plus coaches. After visiting and investigating 10 soil profiles (including Anthrosols, Calcisols, Chernozems, Kastanozems, Phaeozems, Gleysols, Luvisols, Solonetz and Vertisols according to the WRB; Mollisols, Alfisols and Inceptisols – according to Soil Taxonomy) the contest was organized on the 5th day for teams and individuals. During the Soil Judging Contest the participants used their knowledge and practical skills to describe classify soils and interpret soil characteristics in the field. The contestants could not communicate to their coaches or other contestants.

Although the weather conditions were not favourable the teams and individuals were working hard and completed the contest in the rain in unforgettable spirit.

Evaluation was conducted for the teams, individuals and in an overall approach (considering team and individual scores of the team members).

The IUSS trophies that were introduced after the 1st international contest as part of the World Congress in Jeju, were handed to the winning team and the winning individual: the multinational African team "Hakuna Matata" and to Kirsten Pegues, USA team member.

The short lists of the top 3 are below, the details of the event and the results are available on the home page and facebook site of the International Field Course and Soil Judging Contest:

http://soiljudging-iys2015.com/
https://www.facebook.com/soiljudging2015

The Winners

1st Team: Hakuna Matata, Africa: Ampurire Amias Aryampa (Uganda), Osman Gaafer Abdelgufar (Sudan), Nmerem Chukwuemeka Ezinwanne (Nigeria), Brenton Mabuza (South Africa)

2nd Team: USA, Kristen Pegue, Erin Bush, Adrienne Nottingham Stephen Geib, and

3rd team, H-Moles, Hungary, Hella Fodor, Annamária Laborczi, Imola Hausz, Tamás Mester

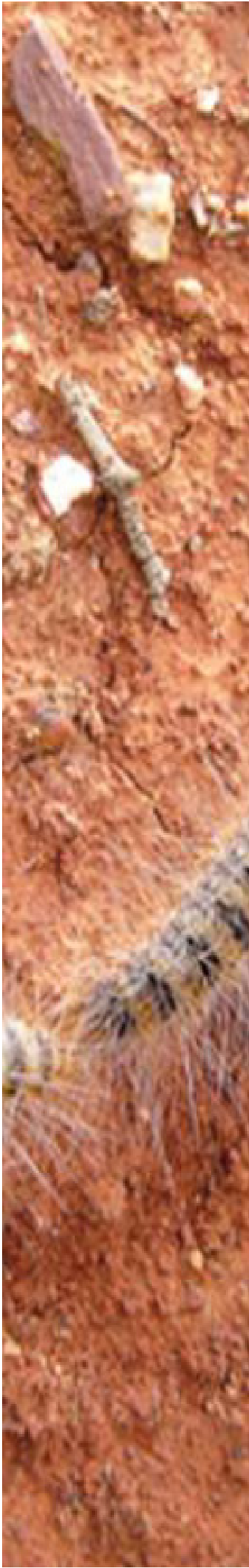
1st individual, Kristen Pegues and coach Joey Shaw followed by,
2nd. Andrés García, Spain
3rd. Yves Uwiragiye, Rwanda

Overall contest:

1. Team USA, United States of America, Stephen Geib, Kristen Pegue, Erin Bush, Adrienne Nottingham

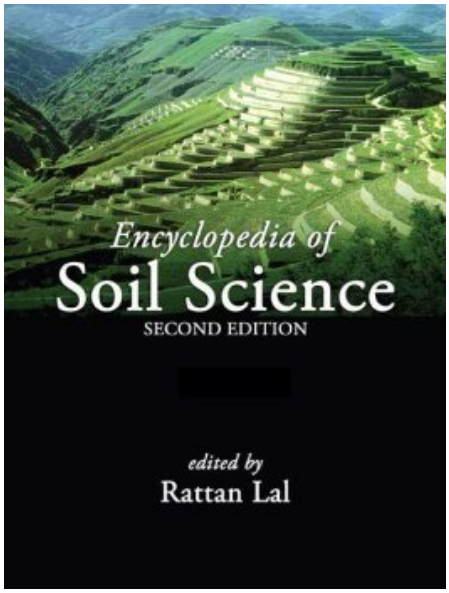
2. SECS, Spain, Noemí Mateo, Irati Laiseca, Andrés García, Joaquín Cámara SECS

3. H-Moles, Hungary, Fodor Hella, Laborczi Annamária, Hausz Imola, Mester Tamás



Recent Publications

Books

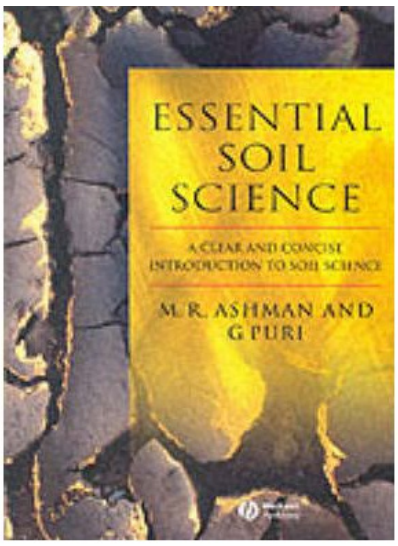


Publ: 2005 Taylor & Francis
Eds. R. Lal

Summary

Compiled by more than 400 experts, the Encyclopedia of Soil Science, Second Edition covers all branches of soil science including pedology, mineralogy, physics, soil mechanics, hydrology, chemistry, biology, ecology and management, and restoration of problem/degraded soils. Thematic topics dealing with soil management address numerous challenges including soil structure, tillage methods and mulch farming, irrigation, drainage and water table management, fertilizer and nutrient management, erosion control, and management of soil organic matter. Entries are alphabetically arranged, and subject and author indices are available for easy access.

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

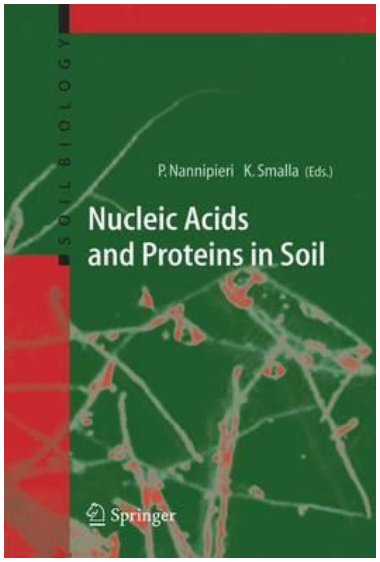


Publ: 2002 John Wiley & Sons
M. R. Ashman & G Puri

Summary

This textbook is aimed at the majority of students, who need to quickly acquire a concise overview of soil science. Many current soil science textbooks still cater for a traditional student market where students embark on three years study in a narrow discipline. The growth in modular degree schemes has meant that soil science is now often taught as self-standing unit as part of broad based degree program. Students pursuing this type of course are increasingly reluctant to purchase expensive textbooks that are too detailed and often assume a scientific background. For those opting to specialise in soil science there are a variety of good textbooks to choose from. Only textbook to cater for introductory courses in soil science. Provides an affordable concise overview of soil science. Annotated suggestions for further reading. No scientific background assumed.

Details found at:
http://au.wiley.com/WileyCDA/WileyTitle/productCd-0632048859.html



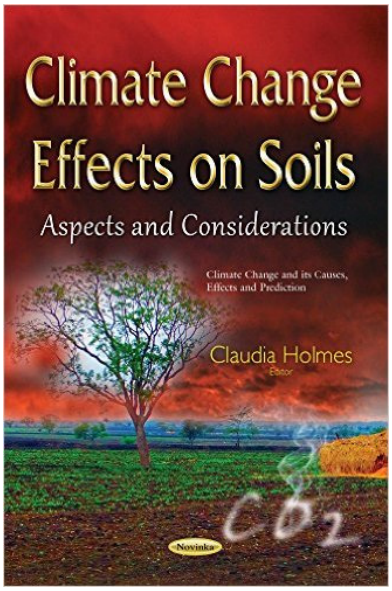
Publ: 2006, Soil Biology, Springer
Eds. Paolo Nannipieri, Kornelia Smalla

Summary

With millions of different bacterial species living in soil, the microbial community is extremely complex, varying at very small scales. Microbe-driven functions are essential for most processes in soil. Thus, a better understanding of this microbial diversity will be invaluable for the management of the various soil functions.

Nucleic Acids and Proteins in Soil combines traditional approaches in soil microbiology and biochemistry with the latest techniques in molecular microbial ecology. Included are methods to analyse the presence and importance of nucleic acids and proteins both inside and outside microbial cells, the horizontal gene transfer which drives bacterial diversity, as well as soil proteomes. Further chapters describe techniques such as PCR, fingerprinting, the challenging use of gene arrays for structural and functional analysis, stable isotope probing to identify in situ metabolic functions, and the use of marker and reporter genes in soil microbial ecology.

Books (Popular)



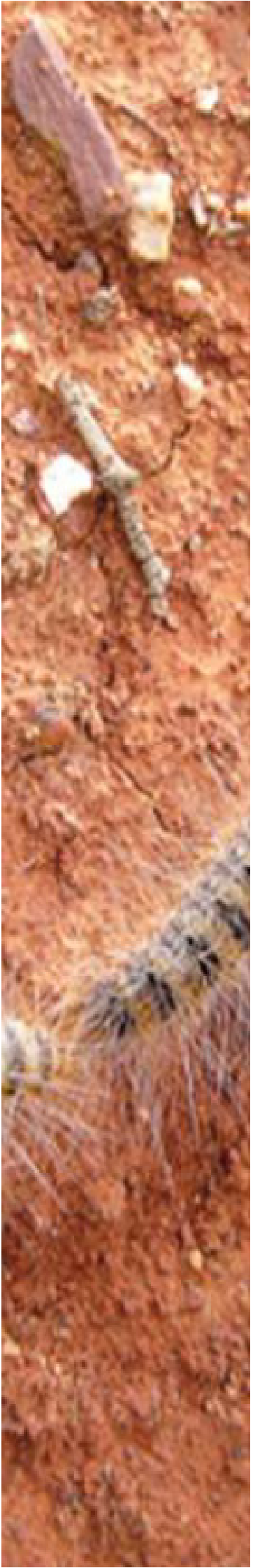
Publ: 2015, Nova Science Publishers
Auth. Claudia Holmes

Summary

Climate change has and will significantly affect soil properties. Biotic processes that consume atmospheric CO2 and create organic carbon (C) that is either reprocessed to CO2 or stored in soils, are the subject of active current investigations with great concern over the influence of climate change. In addition, abiotic C cycling and its influence on the inorganic C pool in soils is a fundamental global process in which acidic atmospheric CO2 participates in the weathering of carbonate and silicate minerals, ultimately delivering bicarbonate and Ca2+ or other cations that precipitate in the form of carbonates in soils or are transported to the rivers, lakes, and oceans. Soil responses to climate change will be complex, and there are many uncertainties and unresolved issues.

This book reports recent discoveries and identifies key research needs required to understand the effects of climate change on soils

Details found at:
http://www.amazon.co.uk/Climate-Change-Effects-Soils-Causes/dp/1634827732

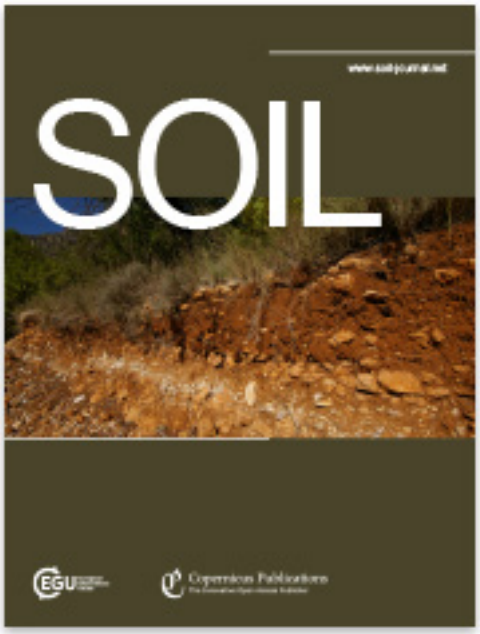


Journal - Feature Article

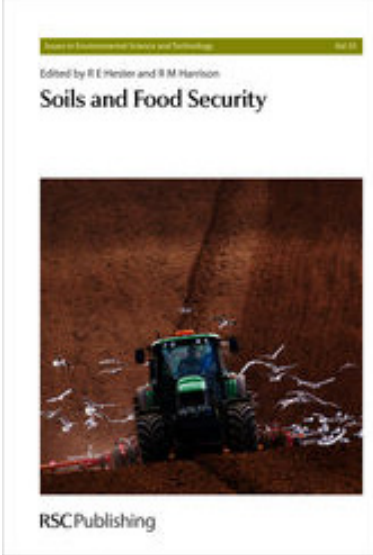
Case studies of soil in art

C. Feller, E. R. Landa, A. Toland, and G. Wessolek
SOIL, 1, 543-559, 2015

ABSTRACT: The material and symbolic appropriations of soil in artworks are numerous and diverse, spanning many centuries and artistic traditions, from prehistoric painting and ceramics to early Renaissance works in Western literature, poetry, paintings, and sculpture, to recent developments in film, architecture, and contemporary art. Case studies focused on painting, installation, and film are presented with the view of encouraging further exploration of art about, in, and with soil as a contribution to raising soil awareness.



Books

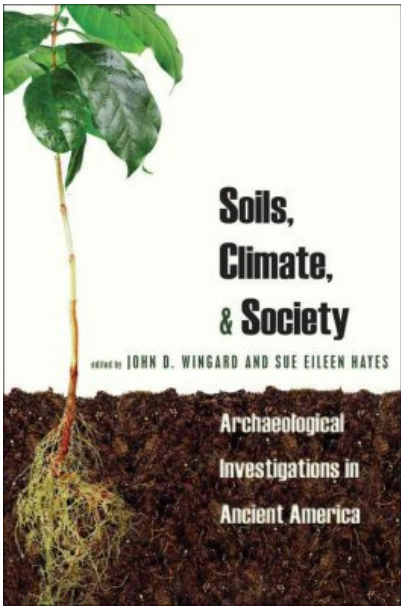


Publ: 2012, RSC Pub,ishing
Auth. R. E. Hester, R. M. Harrison

Summary

Soil is essential to agriculture and a resource that cannot be replaced easily. Nevertheless, its importance to food production and the threats to its sustainability are often overlooked. Threats, such as the degradation, pollution and erosion of soil are discussed, along with the possible consequences of climate change for soil and food production. As an ecosystem service, soil also serves to capture nutrients and sequester carbon, and these issues are discussed in the context of adding value to soil protection. The influence of modern agricultural techniques in enhancing soil productivity is also discussed. This is essential reading for anyone concerned with the environment, whether as scientist, policy maker, student or lay reader.

Details found at:
http://pubs.rsc.org/en/content/ebook/978-1-84973-426-4#!divbookcontent



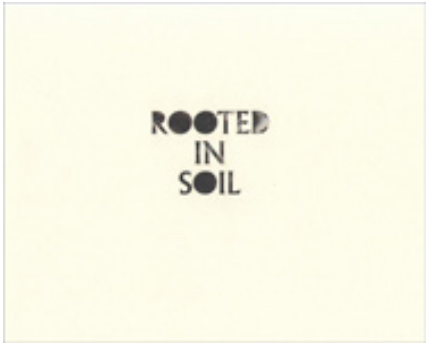
Publ: 2013 Uni. Press Colorado
Auth. John Wingard & Sue Hayes

Much recent archaeological research focuses on social forces as the impetus for cultural change. Soils, Climate and Society, however, focuses on the complex relationship between human populations and the physical environment, particularly the land--the foundation of agricultural production and, by extension, of agricultural peoples.

Soils, Climate and Society demonstrates that renewed investigation of agricultural production and demography can answer questions about the past, as well as stimulate further research. It will be of interest to scholars of archaeology, historical ecology and geography, and agricultural history.

Details found at:
http://press.uchicago.edu/ucp/books/book/distributed/R/bo22577388.html

Books (Popular)

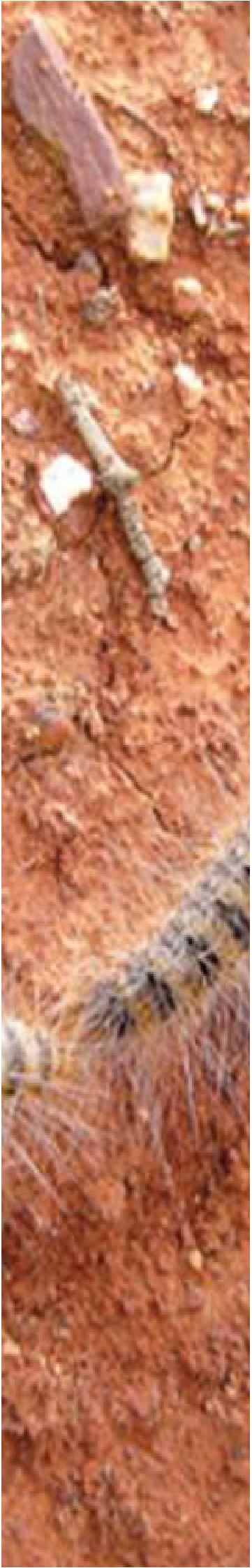


Publ: 2015, Uni. Chicargo Press
Auth. Laura Fatemi & Farrah Fatemi

Summary

In Grass, Soil, and Hope, Courtney White looks at Eco and environmental art can highlight the primal importance of natural resources for human life and the need to be responsible environmental stewards. This catalog for a recent exhibition at the DePaul Art Museum explores one particularly undervalued resource: soil. Bringing together the work of fifteen artists, including that of photographers Sally Mann and Jane Fulton Alt, interdisciplinary artist Claire Pentecost, and Baroque painter Adriaen van Utrecht, Rooted in Soil addresses critical issues of soil degradation and combines scientific approaches with fresh philosophical perspectives. Though we rarely recognize it, soil is an integral part of the natural cycles of life and death.

Details found at:
http://press.uchicago.edu/ucp/books/book/distributed/R/bo22577388.html



Special Issue - Geoderma

Soil mapping, classification, and modelling: history and future directions

Soil mapping, classification, and modeling have been important drivers in the advancement of our understanding of soil from the earliest days of the scientific study of soils. Soil maps were desirable for purposes of land valuation for taxation, agronomic planning (Brevik and Hartemink, 2010 and Miller and Schaetzl, 2014), and in military operations (Lark, 2008 and Brevik et al., 2015a). Soil mapping required classification systems that would allow accurate and succinct communication of mapped information (Brevik and Hartemink, 2013), classification systems required understanding of the soil system (Marbut, 1922), and gaining that understanding included the creation of soil models (Wilding, 1994). Therefore, advancement in one of these highly interrelated areas tended to lead to corresponding advances in the others, and these relationships persist into the modern era. Furthermore, studying our field's history allows us to understand how we arrived at our current theories, including better understanding of both the strengths and weaknesses of those theories. Within this Special Issue (SI), historical aspects of soil mapping, classification, and/or pedogenic models are emphasized in papers by Brevik et al. (2015b), Calzolari and Filippi (2015), Miller and Schaetzl (2015), and Minasny and McBratney (2015).

The expansion of the use of soil knowledge to address issues beyond agronomic production, such as land use planning, environmental concerns, food security, energy security, water security, and human health requires new ways to communicate what we know about the soils we map as well as bringing forth research questions that were not widely considered in earlier soils studies. At present this information is communicated using dozens of national soil classification systems as well as WRB, but a more universal soil classification system would facilitate international communication of soils information. There are still many significant research needs in the area of soil mapping, classification, and modeling going into the future. Therefore, this Special Issue was developed to 1) document the history, 2) present some of the latest research, and 3) provide some perspectives on future needs in these areas. This has been accomplished by providing a mix of review papers and original research articles.

For more details about this meeting visit:
http://www.sciencedirect.com/science/journal/00167061/264/supp/PB

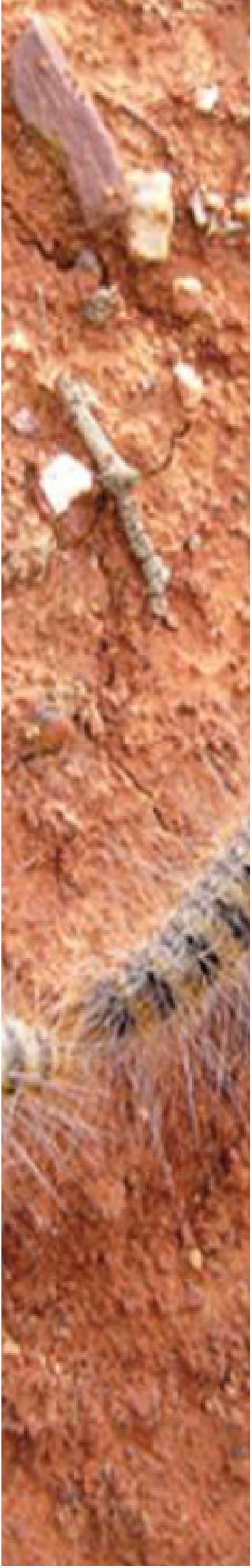
International Conference-Exhibition on Soils, Sediment and Water.

Polluted sites and soils and health risks – Diagnosis and Solutions: how far can we go?

Lille, France - 15, 16, 17 March 2016. See: http://www.intersol.fr/

The application of Conservation Agricultural Systems is spreading worldwide. New results in the field of scientific and practical applications are accumulating continuously and therefore it seems to be important to present and discuss about the new achievements. To support this intention the Geographical Research Institute of the Hungarian Academy of Sciences and the Hungarian Geographical Society are organizing the International Conference on Conservation Agriculture and Sustainable Land Use.

Visit for more details: http://caslu2016.mtafki.hu/



SensFor

International Summer School for the study of *Advanced methods and new integrated approaches to study soil processes in mountain ecosystems*

Visit for more details: http://www.sensfor-cost.eu/ and get the program at: http://www.iuss.org/files/poster_summer_school.pdf

EUROSOIL istanbul 2016
17 - 22 July

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

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