SOIL CONNECTS

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

Issue 4 - June 2016

International Decade of Soils 2015-2024

this edition

Welcome to SOIL CONNECTS - 4

It is a pleasure to release the fourth 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 the decade of the soil has now begun, as declared at the EGU Assembly in Vienna. So the celebration does not end but is merely beginning 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 - Students experience planting rice in central Laos.

Photo provided by Damien Field

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) facebook

Over the last several months there have been some email musings focusing on the 'role and visibility of soil science in the world'. Reading through these I have been inspired by some of the comments made by John Norman, Professor Emeritus, Dept. of Soil Science at the University of Wisconsin-Madison. In place of my usual chairs report I have asked Prof. Norman to share some of his thoughts with us in this issue of Soil Connects. He has kindly agreed and I now have the great pleasure in including this, the first of a two part instalment. I am sure you will enjoy this as much as I have.

PART I. Some words on the role and visability of soil science,

by John Norman
Emeritus Professor
University of Wisconsin-Madison

My four decades in academia began at a time when the U.S. reaction to the Sputnik awakening was in full swing and many viewed academia as a key to restoring the image most Americans wanted to believe about themselves. Becoming a professor was never more glamorous as the academic enterprise was expanding. How conditions can change in a single career. For several decades now I have observed declines in student enrollments and disappearance of departments of soil science. Although many factors are involved with this decline, most beyond our reach to influence, to me one stands out as squarely in our hands—neglect of our relationship with those we serve.

Here is how I see recent trends in soil science and the academy in general.

We submit our research proposals for review to our colleagues and our colleagues decide on the priority even though distant agencies provide the funding itself. These agencies are mostly run by former academics or at least fairly highly educated persons who have been trained to look to the expert to determine priorities. Thus what we propose is mainly evaluated by those we have trained. Then we do the research with the funding and publish the results. What gets published is peer-evaluated by our colleagues. The reward system we academics must respond to is also heavily if not totally influenced by our colleagues with major input from administrators, many of whom are former colleagues.

Perhaps you see my point here! We in this academic community have pretty much divorced ourselves from the larger community that finances us and whom we are supposed to serve. In our zeal to respond to subsequent declining interest in what we do, we have resorted to premature press releases that have confused the public and further diminished our support base. I suspect that our more or less innocent efforts to be masters of our destiny has had an unintended result. We in the academic community have been gently reminded of this condition for a long time, and in the U.S., but for Sputnik, this decline might have come sooner. I see soil

science as a particularly vulnerable discipline because research has traditionally been aligned with production agriculture, and with declining research support from government we have unwittingly become more closely aligned with an increasingly unpopular industry.

How do I think we got here? Very slowly.

As we have become more specialized in our disciplines, we have become more isolated from those we serve and more dependent upon each other. This seems a natural progression as science builds on itself using reason. From my study, there are many kinds of reason (inductive, deductive, abductive, reductive, etc.) but ultimately all reason is based on premise in one way or another. A premise is an assumption—basically an unprovable statement. We have become so busy that we have not had the time to reflect on the assumptions embedded in our work, most of these assumptions being unstated. When this happens, we tend to build on the work of others without truly independent considerations. The more we do this, the more we begin to depart from the "real-world problems" for the sake of recognition and benefits of our reward system.

Addressing real-world problems usually requires collaborative observations that are challenging, frustrating, time consuming and generally expensive compared to just adding some incremental detail to what others have done; this is easy because of the relatively unconstrained freedom that reason offers with assumptions. Eventually we lose track of the buried, unstated assumptions and we actually drift from what is useful to the larger society that funds us and whom we intend to serve. In fact, we increasingly serve ourselves and our curiosity—after all, we have almost no accountability to the greater constituency we purport to serve. As we have drifted from serving the public that supports us, some of our prominent, self-appointed spokespersons have taken aggressive stances in a precarious gray arena for scientists—that is, seeking to influence the decision of the public and policy makers rather than serving as "expert" resources.

This has served to alienate a significant portion of the public, some politically powerful. With all the uncertainty manifested in science over the past four centuries surrounding dubious assumptions (phlogiston, resistance to glacier and plate-tectonics concepts, infinite speed of light, the ether, etc.), and the numerous examples of intellectual inertia that few of us actually study—few practicing scientists have read about the history of science—we should approach the unknown with humility and respect, not arrogance. Expressing a scientific result with certainty denies the reality that we only know what we have investigated and future results could modify our conclusions—what we don't know does matter, we just honestly present our current state of knowledge.

We need to look at our collective behavior when considering our plight.

see December issue of Soil Connects for PART II by John Norman.

OPINION

How to keep soils sexy after the IYS?

Cristine Carole Muggler
Departamento de Solos, Universidade Federal de Viçosa, Brasil

The IYS brought soils to the stage, how much have we reached minds and souls of people?

To partly answer this question we must think WHAT and HOW are we communicating about soil? Which soil knowledge is relevant, meaning knowing who we are speaking to and what approaches should we use?

For us knowledge of soil is intrinsic to human knowledge and underpins on-going human health. This may be through producing the food we need and cleaning the water, storing carbon affecting climate change and maintaining biodiversity which moderates a healthy environment.

Natural sciences and technology experienced extraordinary development and expansion in the 19th century, and this is also true for soil, becoming an independent and autonomous science field continual developing its own set of tools and techniques.

With the birth of modern science this brought rationality overcoming subjectivity and the idea that nature has not only to be understood, but dominated. The Cartesian rationality guides the development of science with its main methodological steps: : to know the whole, it is necessary to split it in its components and study each one separately

- Investigation only of real facts and objects;
- Fragmentation of the study object;
- Simplification;
- Outline of general laws that are widely applied.

This also was a time of great development of soil science towards high specialization (and fragmentation), dominantly focused on production and with little consideration for soil's role in the soils environment and biodiversity maintenance.

In tropical environments this has been a risky perspective, since the favourable climate and abundant solar energy produce natural systems that are energetic, chaotic and very complex. When those systems are approached on a reductionist and fragmented viewpoint, facts and phenomena become distorted in a way that interactions are not perceived or are considered a source of errors and discarded.

This bias in perception of nature is in the basis of the Cartesian paradigm and has been hegemonic in tropical soil science. The complexity of soils was not taken into account; on the contrary, specific attributes that could be more efficiently related to agricultural production were privileged. It was the basis to green revolution that was

very unsuccessful in tropical environments with huge impacts that are showing more and more. Soil degradation was accelerated, especially in the seventies and eighties, resulting not only in an agricultural crisis, but also in an environmental one.

Nevertheless, there has been a great move from the approach of soil properties towards the soil functions one. Still, there are problems in the coupling of theory and practice and soil science at universities, research centres and places that "produce the knowledge" is done in a fragmented way, by the Cartesian rationality.

If we are not able to change the approach how can we communicate? There is still much to be done in assuming this approach.

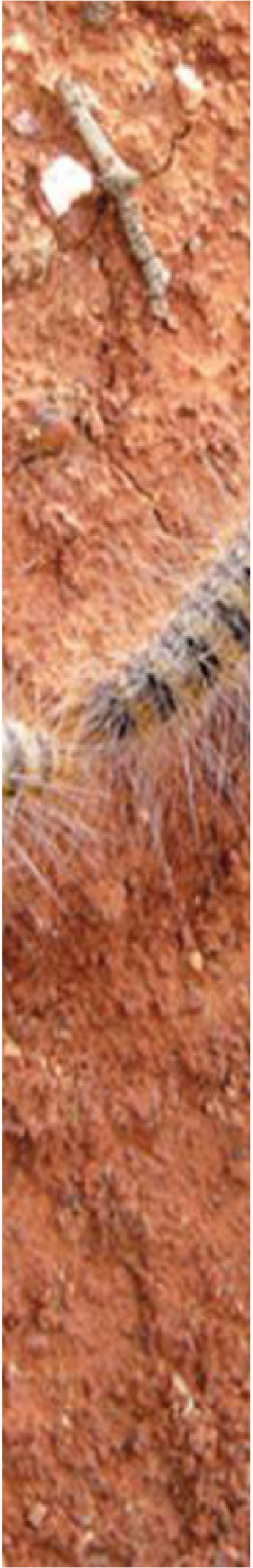
Soil is not soil without life. If there is no life, there is no soil; those materials are just sediments or weathered mantle. And we can even advocate that soils have been so badly threated because they were considered just as substrates.. For instance, soil courses are very much focused on properties and those do not encompass life. Usually soil biology is taught or researched in different departments or institutes.

Soils are alive! And this makes a big difference: It is different to care about a living and a not living thing. It is different to talk about health of a living or not living being!

Assuming that soils are living organisms and that to care and conserve them we have to care about its life and SOM means to assume and recognize agroecology as a science and an agricultural practice that does it. Despite the Agroecological perspective is growing among different groups everywhere in the world, it is still publicized as a marginal and ideological set of ideas. Why?

The IUSS has launched this new initiative building on the momentum created during the International Year of Soil. The proclamation was made by Professor Rainer Horn, IUSS President, to ensure that the significance of soils in maintaining healthy life and environment remain continually at the forefront of political and scientific planning and decision making. Details can be found at:

http://www.iuss.org/index.php?article_id=588



CONGRATULATIONS

One of our own elected as a Fellow of the Australian Academy

The Australian Academy of Science champions, celebrates and supports excellence in Australian science, promotes international scientific engagement, builds public awareness and understanding of science and provides independent, authoritative and influential scientific advice

Professor Alex McBratney, Dean of the Faculty of Agriculture and Environment of the University of Sydney has received one of Australia's highest scientific honours, being inducted as a Fellow of the Australian Academy of Science on Monday 23 May 2016.

Alex is thrilled to receive the honour in recognition of his, and his colleagues' contributions to soil and agricultural science in Australia and around the world.

"An accolade such as this brings soil science into the forefront of community thinking. It gives myself, and other scientists in this field recognition of the innovative, advanced and novel research being conducted. We are working to improve our understanding of the fundamental properties of this remarkable 'skin' of the Earth and determining how crucial soil is in contributing to growing food today and into the future," said newly admitted Fellow, Professor Alex McBratney.

"Soil science is a comparatively small discipline, so to receive this recognition is a major boost not only to me, but to the thousands of soil scientists in Australia who are considering soil health, soil security, carbon sequestration and a plethora of vitally important factors that improve our knowledge base and provide ways to move forward," he said. newly admitted Fellow, Professor Alex McBratney.

Soil science is a comparatively small discipline, so to receive this recognition is a major boost not only to me, but to the thousands of soil scientists in Australia who are considering soil health, soil security, carbon sequestration and a plethora of vitally important factors that improve our knowledge base and provide ways to move forward," he said.

"I'm very humbled by my election as a new Fellow and I do hope that I can continue to communicate the importance of collaborative research to protect this precious resource and to highlight the value of soil science within the scientific community, the political arena, agricultural and environmental sectors and the public sphere on a local, national and global scale," said Professor McBratney.

The Australian Academy of Science describes Professor McBratney as a "world-leading soil scientist who conceived and developed pedometrics, digital soil mapping and soil security, radically strengthening the knowledge base of soil science. He has established new theory and empirical models of soil variation in landscapes and developed their applications, for example, in precision agriculture. His contributions have revolutionised the availability of soil information and led to improved agricultural practices with reduced environmental impacts and enhanced security of the world's soil.

The full citation can be found here;

https://www.science.org.au/fellowship/fellows/professor-alexander-broadfoot-mcbratney

Article abridged from The Faculty of Agriculture and Environment News feed;
http://sydney.edu.au/news/agriculture/1272.html?newsstoryid=15849

Can microbes survive the drying of the world's soils.

An article in The Conversation highlights emerging concerns around the forecasted drying trends that will affect the amount of water held in soils in many regions around the world. Looking at 80 sites around the world and they found that soil bacterial and fungal diversity and abundance reduced as drylands get drier.[a] It is speculated that this is largely because when soils dry out, plant cover and soil organic carbon content both decline, which in turn affects the bacteria and fungi living in the soil.

In further studies the relationship between microbial diversity and soil functions was investigated and as expected a high level of microbial diversity is linked to higher plant productivity and soil fertility in drylands[b]. The risk of aridity-linked decline in microbial diversity is significantly greater in dryland soils. Therefore, these already dry areas are particularly vulnerable to further drying

The full citation can be found here;
http://theconversation.com/if-the-worlds-soils-keep-drying-out-thats-bad-news-for-microbes-and-people-53937

The studies can be found at:
[a] http://www.pnas.org/content/112/51/15684.abstract &
[b] http://www.nature.com/ncomms/2016/160128/ncomms10541/abs/ncomms10541.

Signatures of the Anthropocene in contemporary soils

Budiman Minasny & Alex McBratney
The University of Sydney

A paper published in the journal Science in January 2016 argued for formal recognition of a new geological epoch:- the Anthropocene. The review reflected on how humans have left large anthropogenic signals on the sediments and ice: altered the carbon and nutrient cycles, perturbed the climate, and caused imbalanced biodiversity. The signals of human influence are characterised by accelerated technological development, rapid growth of the human population, and increased consumption of resources. These combined signals are signatures of the Anthropocene and are distinct from the post-glacial Holocene.

Although much of the argument is about changes to current sediments, most of the world's land surface is covered by soil. We know that ancient soils can be preserved in the geological record. Soil scientists have observed paleosols, which are buried under sediments. Such soils are used to indicate climatic conditions of the past.

Are there Anthropocene signatures in contemporary soil?

To answer that we should recognise some basic facts about soil, it is not simply the material immediately beneath our feet or which we dig in our gardens. The basic unit of a soil is a profile with horizons that are formed in situ through unique earth-system processes that record the transformation of relatively unaltered material (rocks) subjected to interaction of climatic, biotic, and hydrological processes. Soil horizons are distinct from sedimentary layers, as they represent different stages of soil development from relatively unaltered material, and these horizons can be further developed with time. Soil scientists recognise characteristic sequences of horizons.

Processes of accelerated erosion and deposition which thinned or missing surface or over-thickened surface horizons have been observed worldwide since humans began cropping approximately ten millennia ago. This began apparently independently in several continents and spread across the world. Does the beginning of agriculture represent the beginning of the Anthropocene? Australia was the last continent to succumb to cultivation at the beginning of the nineteenth century, perhaps another indicator of a fully-fledged Anthropocene.

Soil can carry signatures of the Anthropocene. Although it can be argued that contemporary soils all are influenced by anthropogenic activities, we can still compare soil under its natural vegetation as a "natural body" and under intensive cropping. Land use change and cultivation, the invention of tractor 123 years BP, the invention of Haber-Bosch process 106 years BP, and the green revolution 65 years BP were events that significantly changed our soils. Conversion of natural vegetation to cropping system caused a significant decrease in biodiversity. In addition, soil organic matter that is responsible for holding the particles together, has been halved since the introduction of intensive cropping. Cropping, cultivation and fertilization have

caused imbalanced nutrient cycling, accelerated acidification, salinization, and erosion. In addition, climate change also has altered soil temperature and microbial respiration rates. Challenges lie ahead on how human induced soils change should be managed to maintain its sustainability.

Are soil's developed in the Anthropocene different from soil's developed in the earlier geological epochs?

"Golden spikes" for Anthropocene can be observed in soils: plough layers and occurrence of artefacts. Soil taxonomists have recognised Anthroposols, soils resulting from human activities which have led to a profound modification, truncation or burial of the original soil horizons or the creation of new soil parent materials by a variety of mechanical means. These Anthroposols can be further divided into Anthrosols soil profiles heavily altered by human activity and Technosols soil profiles completely created by human activity and found in urban, industrial areas, and reclaimed mines. Anthrosols and Technosols did not exist in previous geological epochs. One of the golden spikes suggested for the Anthropocene is the occurrence of certain radionuclides from thermonuclear weapons (tests) from the 1940s to seventies and from nuclear accidents like Chernobyl and Fukushima. These radionuclides occur in contemporary soil usually at sub-risk levels. Interestingly one radionuclide 137Cs has been used widely to measure contemporary processes of soil erosion.

Soil memory

Soil accumulates information, stores memory of its development, and stages of development. Indeed it is one of the best time-integrated records of the earth system. It also records human-induced modifications of the environment. Soil has now transformed from a natural to a human-natural body. An important question that is related to humanity is how vulnerable and resilient of soil to human-induced change, as soil is needed to produce food. Recognising anthropogenic signatures is important not only to improve our understanding on the impact of human on soil but allow us to quantify the rate of change and to improve the way we manage the soil for sustainable development. As soil is developed in situ, the anthropogenic changes may be more subtle than in sediments. Soil profiles are key indicators of the Anthropocene and can measure the intensity and kind of human activity across the earth's surface. Besides sediments, today's soil profiles will also be preserved in the geological record.

Picture: An Anthroposol (Figure courtesy of Dr. Stephen Cattle)

Five years have passed since the nuclear accident at Fukushima, Japan

Masamichi Takahashi
Forestry and Forest Products Research Institute, Japan

March 11, 2011, is an unforgettable day for Japan. A mega-earthquake and subsequent tsunami hit the densely populated areas of Japan, leading to approximately 20,000 earthquake-related deaths. Fear regarding the four nuclear electric power plants damaged by tsunami becoming out of control spread around the world; the damage led to the release and diffusion of radioactive substances in the surrounding land and ocean.

Four and half years have passed since the accident, and people seem to have forgotten about it. Many tourists come from around the world and enjoy the Japanese traditional and modern cultures, and a record breaking number of tourists will visit Japan this year. Decontamination pertaining to the residential areas and farmlands has been completed in the areas outside the exclusion zone (<30 km from the plant). After reducing the radioactivity by decontamination, the government has gradually removed restrictions on the residential areas in the exclusion zone; however, approximately 100,000 people continue to take refuge from Fukushima to distant prefectures.

Scientists from several disciplines such as nuclear, environmental, medical, agronomical, and soil sciences have been studying the issues of the nuclear power plant accident at Fukushima and conducting frequent technical sessions and seminars at conferences. A new relationship between scientists, residents, and farmers has developed as a result of such seminars, which could support their refugee life and may produce innovative ideas as countermeasures to the issues at Fukushima. We have conducted open seminars for helping forest owners, local officials, wood companies, and workers understand the effects of radiocesium on forest products and their working conditions. A couple of cooperative studies were initiated by scientists unfamiliar to us in the forest soils section of our institute before the accident. These studies involved radiation physics, radiology, and freshwater fisheries. Thus, different research disciplines have become connected through the movement of radiocesium in the ecosystem. Because cesium behaves like potassium, soil scientists can contribute substantially to this issue because of the large amount of knowledge and experience pertaining to the movement of potassium in soil.

Countermeasures to radiocesium contamination in agricultural fields at Fukushima are being intensively studied by soil scientists and agronomists to prevent the transfer of cesium from soil to crops. In forest ecosystem wherein decontamination is impractical, radiocesium is eventually going to accumulate in soil because of the adsorption of cesium on clay minerals. Protecting and conserving soil is a key to prevent the redistribution of radiocesium outside these areas.

Thus, soil scientists are expected to participate in decision-making processes to create a hopeful future for Fukushima. Our experiences should be recorded for future, although I definitely do not expect an accident of this magnitude to occur again.

Soil sampling from a contaminated Japanese cedar forest by wearing protective clothing and mask.

'Mud Mural' in the Rice Gallery

Memories from 2014 – the artist Yusuke Asai used the soil medium because: "Dirt is by nature very different than materials sold in art stores." Seeds grow in it and it is home to many insects and micro organisms. It is a 'living' medium."

See: http://www.thisiscolossal.com/2014/10/a-new-large-scale-mud-mural-by-yusuke-asai-at-rice-gallery/

Soil 's role in preserving archaeological heritage.

The Mystery of the mile-long 'band-of-holes' could be solved

David Neil
sciencealert.com

A mile long strip of land in Peru with mysterious holes is under scrutiny by a group of Archeologists to understand how our ancestors lived. Charles Stanish and Henry Tantaleán from the University of California, are putting forward a hypothesis that these 'Band-of-Holes' represent an ancient tax system of the Inca people.

The first discovery of three holes was from areal photography recorded in 1931 and they are now using drone technology to map the site in detail. The location of the holes close to a well-known Inca highway and the presence of pottery called colcas, which are used to store food and textiles further corroborates there hypothesis.

Others have suggested that these holes represent trail markers, a defensive mechanism, or a geoglyph. Stanish and Tantaleán wish to do further work to look for traces of maize, beans, or pepper, which will further support their hypothesis, that these are remnants of a rudimentary tax system.

For the full story visit: http://www.sciencealert.com/is-this-mile-long-strip-of-holes-an-ancient-inca-tax-system

Essentially, all life depends upon the soil... There can be no life without soil and no soil without life; they have evolved together.

— Charles E. Kellogg

SciFi brings a focus on soil to the general public

Abridged from - Victoria Woollaston
Daily mail

In the film 'The Martian' the lead character Mark Watney uses soil on Mars to grow potatoes. Based on the book written by Andy Weir in 2011, Ridley Scott's adaption for the screen tells the story of the marooned Mark Watney on Mars struggle to survive by growing potatoes in Martian soil. For the general public this was a lesson in SOIL101 which every community gardener knows about, good soil, some nutrients and water will give you a crop.

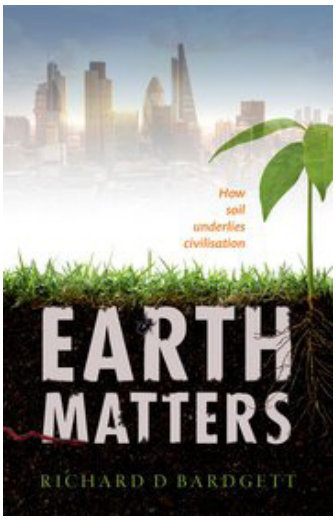
Now NASA is trying this for real. Together with the Lima's International Potato Center (CIP), work is being done in Peru to investigate if soil on Mars can support agriculture. Faced with a future of predicted hunger and malnutrition and the loss of arable land to desertification, high salt and increasing temperatures there is an opportunity to find potatoes that can with stand harsh conditions and may be suitable for Mars. Once this is achieved NASA intends to build a station that can replicate the conditions on Mars and this combined with the soil's found on this sector of the Atacama Desert believe they will succeed in finding varieties that will become aliens on Mars.

A little science fiction has focused society's eye and what is possible and in this case the possible puts soil into the lime light.

To read more see; http://www.dailymail.co.uk/sciencetech/article-3541489/Mark-Watney-proud-Nasa-attempting-grow-potatoes-Peruvian-soil-mimics-conditions-Mars.html

Publications

Books



Publ. Oxford University Press
Richard Bargett

Summary

The soils surrounding the village where I live in the north west of England have abundant fertility. They mostly formed in well-drained, clay-rich debris left behind by glaciers that retreated from the area some ten thousand years ago, and they now support lush, productive pasture, semi-natural grassland and woodland. Although the pastures are managed more intensively than they were in the past, most of them are well drained, and receive regular dressings of manure along with moderate fertiliser, and are regularly limed, which keeps the land productive and the soil in good health. Sadly, the same can't be said about soils in most parts of the world. The United Nations recently published a report on the status of the world's soils with the headline message that the majority of soils are in a poor state and urgent action is needed to redress this. But why would the United Nations concern itself with soil, which, for most, is largely out of sight and mind? Put simply, healthy soils are of vital importance for human life, and we are not paying enough attention to their health.

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

Publ: 2016 Springer
A. E. Hartemink
B. Minasny (Eds)

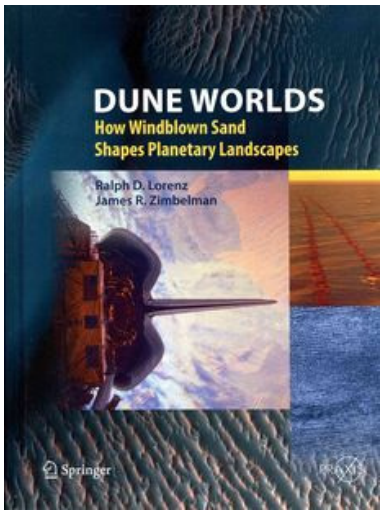
Summary

This book is about digital soil morphometrics which is defined as the application of tools and techniques for measuring, mapping and quantifying soil profile properties, and deriving depth functions of soil properties. The book is structured along four research topics: (i) Soil profile properties, (ii) Soil profile imaging, (iii) Soil depth functions, and (iv) Use and applications. The pedon is at the heart of digital soil morphometrics. The use of digital soil morphometrics exceeds the pedology and soil classification purpose that it currently serves – it is used in rapid soil assessment that are needed in a range of biophysical studies.

Digital soil morphometrics has the potential to enhance our understanding of soils and how we view them. The book presents highlights from The IUSS Inaugural Global Workshop on Digital Soil Morphometrics held in June 2015 in Madison, USA.

Details found at:
http://www.springer.com/us/book/9783319282947

Summary

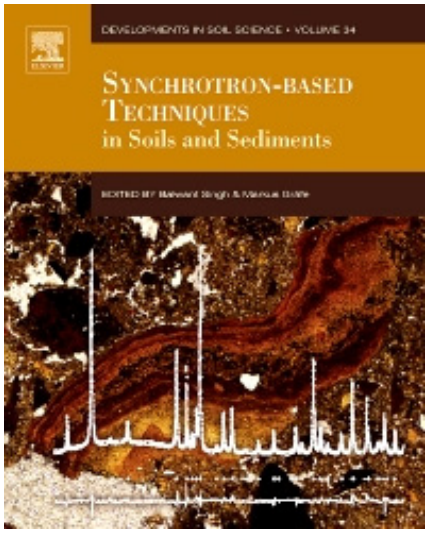


Publ. 2014 Springer
Ralph Lorenz

This book describes how sand dunes work, why they are the way they are in different settings, and how they are being studied. Particular attention is paid to their formation and appearance elsewhere in the solar system. New developments in knowledge about dunes make for an interesting story - like the dunes themselves, dune science is dynamic - and the visual appeal of Aeolian geomorphology ensures that this is an attractive volume. The book is divided into 4 parts, the first of which introduces dunes as a planetary phenomenon, showing a landscape reflecting the balance of geological processes - volcanism, impact, tectonics, erosion, deposition of sediments. Dunes are then considered as emergent dynamical systems: the interaction of sand and wind conspires to generate very characteristic and reproducible shapes. Analogies are given with other emergent structures such as patterned ground before the influence of dunes on desert peoples and infrastructure is studied, together with their use as forensic climatological indicators.

Details found at:
http://www.springer.com/us/book/9783540897248

Summary

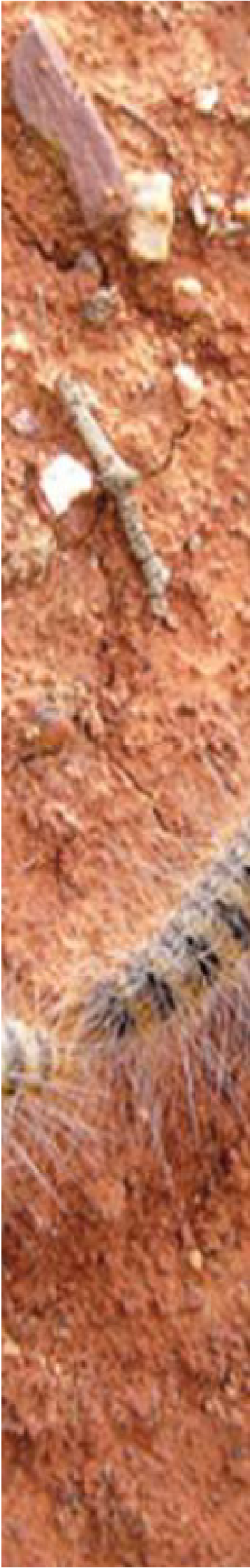


Publ: 2010, Elseiver
B. Singh & M. Graffe

Over the past 20 years, synchrotron-based research applications have provided important insight into the geochemical cycling of ions and the chemical and crystallographic properties of minerals in soils and sediments.

This book provides the most up-to-date information on synchrotron-based research applications in the field of soil, sediment and earth sciences. Invited authors provide chapters on a wide range of research topics including multiphase flow and transport processes (physical aspects), rhizosphere and microbial life (biological aspects), and dynamics of C, N, S, P and heavy metals and metalloids (chemical aspects). In addition, perspectives on the impact of synchrotron based applications, particularly X-ray absorption spectroscopy, and the role of synchrotron applications in remediation, regulatory, and decision making processes are considered.

Details found at:
http://store.elsevier.com/Synchrotron-based-Techniques-in-Soils-and-Sediments/isbn-9780444532619/



Journal - Feature Article

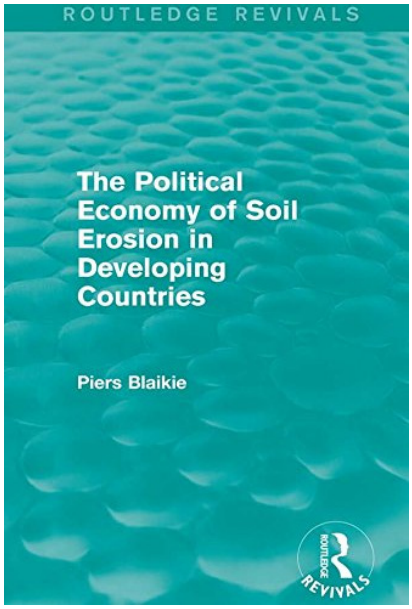
Soil slaking assessment using image recognition.

This paper describes the development of user friendly approach to help farmers easily connect with their soil through the measurement of soil slacking.

Fajardo M., McBratney A. B., Field D. J., Minansy B. 2016. Soil slaking assessment using image recognition, Soil & Tillage Res. 163, 119-129.

Abstract: We have developed a new methodology for the assessment of soil slaking under fast wetting conditions. We applied an image recognition algorithm to a set of digital images of soil aggregates immersed in water taken at regular time intervals. The kinetics of the slaking process was captured by measuring the projected aggregate's area change over time. The methodology was tested in a dataset covering a great part of the agro-ecological variability of New South Wales (NSW), Australia. An empirical model which captures the rapid and slow slaking process was fitted to the data and three new slaking coefficients (a, b and c) were obtained and related to selected soil properties and land-use. The coefficient a, equivalent to the maximum slaking potential of the samples, was linearly related to exchangeable sodium, pH, clay percentage, calcium/magnesium and total carbon/nitrogen, and non-linearly related to total carbon. The coefficients b and c, equivalent with the initial slaking and the rate of change respectively, were found to be linearly related to nitrogen and total carbon. The coefficient a, was significantly lower in the natural sites reflecting a higher aggregate stability in those soils. The methodology is fast, inexpensive and simple; furthermore, it provides a new perspective in soil aggregate stability experiments, since it considers the slaking dynamics during the entire disaggregation process.

Books (Soil and the economy)



Publ: 1992 University of California Press

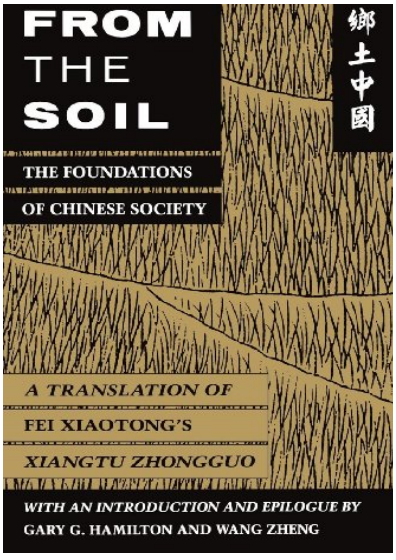
Piers Blaikie (Author)

Summary

First published in 1985. This book examines wide variety of ways in which environmental deterioration, in particular soil erosion, can be viewed and the implicit political judgements that often inform them. Using the context of developing countries, where the effects tend to be more acute due to underdevelopment and climatic factors, this work aims to examine this source of uncertainty and make explicit the underlying assumptions in the debate about soil erosion. It also rejects the notion that soil erosion is a politically neutral issue and argues that conservation requires fundamental social change. This title will be of interest to students of environmental and developmental studies

Details found at: https://www.amazon.com.au/Political-Economy-Erosion-Developing-Countries-ebook/dp/B01FXZRWVQ/

Books (Popular)



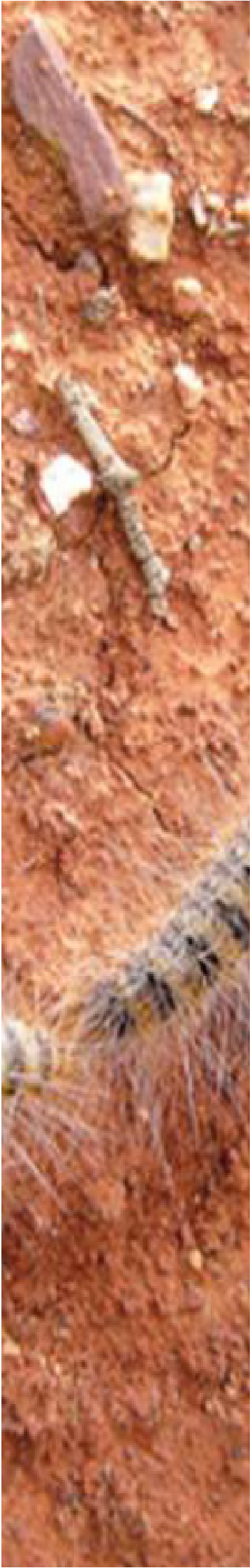
Publ: 1985 Routledge

Xiaotong Fei (Author)

Summary

This classic text by Fei Xiaotong, China's finest social scientist, was first published in 1947 and is Fei's chief theoretical statement about the distinctive characteristics of Chinese society. Written in Chinese from a Chinese point of view for a Chinese audience, From the Soil describes the contrasting organizational principles of Chinese and Western societies, thereby conveying the essential features of both. Fei shows how these unique features reflect and are reflected in the moral and ethical characters of people in these societies. This profound, challenging book is both succinct and accessible. In its first complete English-language edition, it is likely to have a wide impact on Western social theorists.

Details found at: https://www.amazon.com.au/Soil-Foundations-Chinese-Society-ebook/dp/B008QAHA8Q/



Special Issue - SOIL

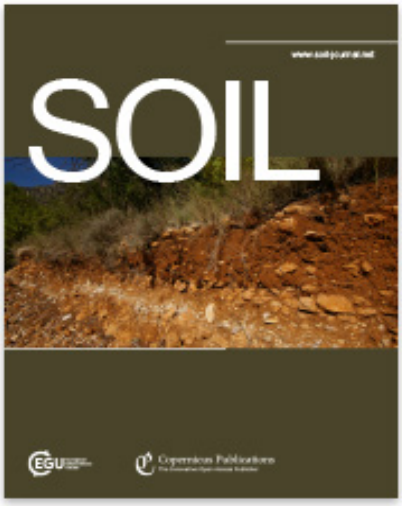
Soil science in a changing world: contributions of soil science for solving global challenges of our time

A conference held in Wageningen in 2015 recognised that mankind in only now just starting to grasp the magnitude of our impact on the global environment and the related risks to our society. Framing this conference was that fact that the solutions to this impact will be addressed by many scientists participating in multidisciplinary think tanks, but its seems that soil scientists have kept a low profile in these discussion fora. As recognised in the earlier paper launching the concept of Soil Security[a] the importance of soil science for mitigating the challenges of food security, water resources, climate change, ensuring biodiversity, which all rely on integrating the concept of functional soil in policy creation.

The journal Soil is now delivering a special issue looking at Soil Science and its responsibility in a changing world. This special issues has articles covering the big picture calling for soil and its science to focus on the United Nation's Sustainability Goals and look at the challenge of feeding the world working with agriculture to embrace sustainability and understand the complexity and uncertainty associated with this. Quantifying the impact of hydrology climate change and how these are affecting the choice of appropriate species to re-vegetate areas and the effects of soil salinity are also included. Through to the use of new technologies to measure soil its carbon and how soil carbon is linked to soil fauna is needed in future soil carbon models.

This special issue once again builds on the realization that soil science needs to engage across disciplines building an understanding soil security and the linking of soil functions to the existential global challenges faced by society.

For more details about this meeting visit:
http://www.soil-journal.net/special_issue823.htm



[1]McBrantey A. B., Field D. J., Koch. A. 2013. The dimensions of soil security, Geoderma, 213, 203-213

RIO18
21st World Congress of Soil Science
Rio de Janeiro August | 12 - 17

Soils to feed and fuel the world

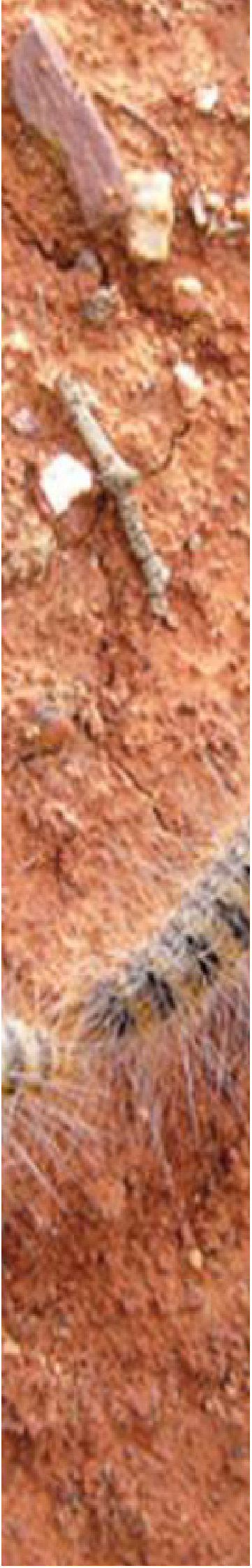
The Brazilian Soil Science Society and the Latin American Soil Science Society are pleased to welcome the international soil science community to Rio de Janeiro for the 21st World Congress of soil science . The Congress theme "Soils to feed and fuel the planet" is an invitation to answer the following questions:

How to feed a hungry planet?
How to fuel an energy-hungry planet?
How to drink a thirsty planet?
How to clean up our polluted planet?

The Congress will be held in RioCentro Exhibition & Convention Center, in August, 12 to 18, 2018. The city of Rio de Janerio is a cosmopolitan metropolis, known worldwide for its scenic beauty and its natural resources, the city provides a harmonic and agreeable environment for its inhabitants and visitors, for both leisure and work, which combined with its infrastructure, makes Rio an important center for commerce and services with the advantage of modern and diversified industrial sector.

Visit: http://www.21wcss.org/

IUSS SLCS Sociedade Brasileira de Ciência do Solo



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/#

Paris, France, 5-6 December 2016

The 2nd Global Soil Security Conference aims to demonstrate that soil, this highly pressurized and crucial resource, is indispensable partner to meet sustainable development goals. The demonstration will be done by linking businesses, practitioners, policymakers and researchers on soil security dimensions through good working practices, business solutions, scientific outcomes and international initiatives that enhance protection and sustainable management of soils

From details visit: https://gssparisen.wordpress.com/

An Underground Adventure

Get a bug's-eye view of the world when you magically "shrink" to 1/100th of your actual size—smaller than a penny—to explore an immersive environment of worm tunnels and soil chambers. This exhibition reveals soil to be home to an incredible diversity of living things, and shows how not a single plant or animal could survive without it. After regaining your regular size, become a soil scientist to investigate how life above ground connects to life below

The Field Museum

Monday, 1 August 2015 to Sundy, December31, 2017

The Field Museum was founded in 1893 as the Columbian Museum of Chicago and has spent more than 120 years in the pursuit of scientific knowledge about the world around us

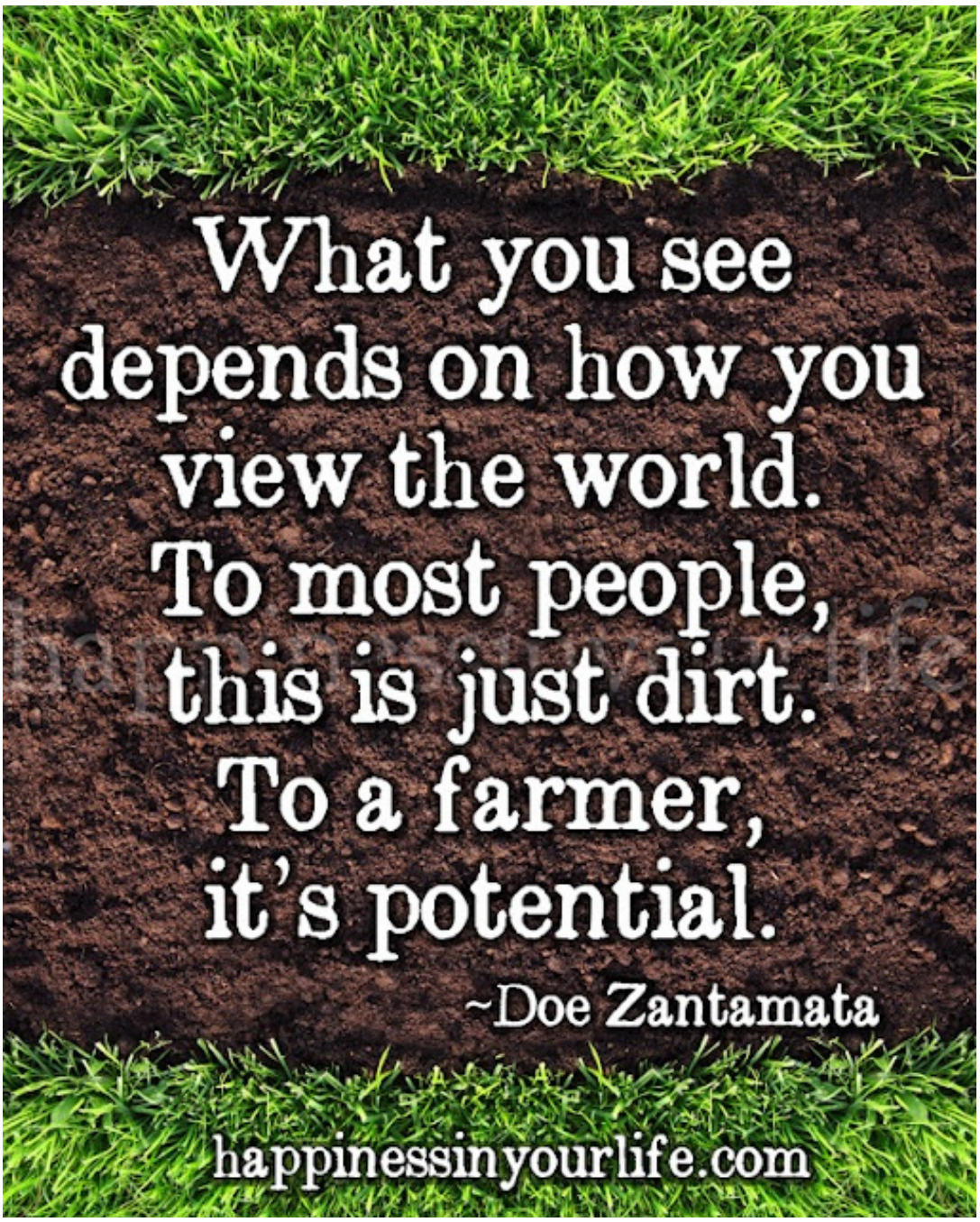
Please visit:
https://www.fieldmuseum.org/at-the-field/exhibitions/underground-adventure

A Retrospective - the IYS 2015

Remembering Soil Saturday

From 4th July to 26th August 2015, in Bristol, exhibitions on soil matters opened from 10am to 5pm Monday-Saturday. Each Soil Saturday was reserved for special sessions on interweaving aspects of the soil accompanied by organic brunches with local seasonal food and inspired by healing culinary traditions. During the eight Soil Saturdays, people experienced the soil's significance for the health of body, community and planet. The sequence of soil Saturdays was; i) Soil Interdependence Day; ii) What is Soil?; iii) Soil of Bristol; iv) Living Soil Living Food; v) Growing Soil; vi) Whose Soil; vii) Fallow Field; viii) Art of Soil

Check out the video at: https://vimeo.com/147749985



'Don't forget to get your story into the next edition of Soil Connects, send it in now.....'

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