

# IUSS Bulletin

Bulletin of the International Union of Soil Sciences (IUSS) | May 2012



120



# International Union of Soil Sciences (IUSS)

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It is freely distributed through the IUSS website.  
All contributions are welcome and should be send to the editor.

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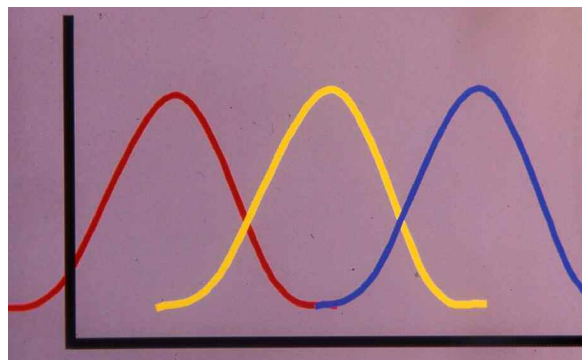
# "AHA" Moments

*By Dick Arnold*


After I retired I selected about 140 slides and wrote about each one; from stepped landscapes to Podzol profiles, from protea blossoms to the Taj Mahal. They were vivid reminders of places, events, concepts, and emotions. I loved it! One day while revisiting these memories I realized that many of them were truly, "Aha moments" for me (that is, conscious awareness), and I selected a few that meant a lot to me. Let me share several with you. The first one reinforces the concept that if you don't understand a landscape's evolution you will not get pedogenesis right and that 3-D mental models likely are better than profiles. The other one is a diagram of overlapping properties among members of a population to remind us that the uncertainty of mutually exclusive classes will create conflict if not adequately dealt with.

So why write about these moments? I consider them vital to who I am as a pedologist; they are the excitement that comes with renewed awareness; they are real turn-ons; and there is a desire to share them. Do we have original thoughts? I more or less doubt it, but we do connect facts and information together in ways that are unique to ourselves and they form the foundations of the knowledge that guide and support our decisions and future experiences.

The soil profile is an example of the Webster series in central Iowa. The underlying light brown substratum is oxidized and leached (non-calcareous) late Wisconsinian glacial till ( $\pm$  14,000 yrs BP). Above it is a tan colored de-oxidized leached layer of the till. A weakly expressed pebble band occurs in the lower part of the humus enriched materials above marking an erosional surface in a depression in the ground moraine landscape. The darker surface layers are pedisements infilling a small drainage way and reflecting poorly drained conditions. The dark spots in the lower profile are krotovinas (animal burrows filled with surface soil



materials) formed after the site was drained and a suitable habitat existed. Today the site is used for agricultural production. If one speculated pedogenesis of an in-situ calcareous till as a monogenetic set of changes, the vitality and dynamics of the landscape and its soil cover would be misrepre-




sented. Aha, the story of the periodicity of events and processes of a soil's evolution, that is, polype-dogenesis, has many ramifications.

The simple diagram of overlapping curves, a little like Venn diagrams, indicates the limited range of properties and/or conditions that we associate with a modal concept, or representative member of a class of objects or features. Eventually we realize that everything we think, recognize, or measure contains degrees of uncertainty. The sooner we have this "aha moment" the better. We want continua to consist of discrete classes at least from our perspective, but they don't; that would be artificial. Our minds readily create classes of most things we experience through our senses starting with prototypes and minimizing the uncertainty of overlapping classes. Aha, uncertainty rules and if you do not adequately address the issue, your decision making processes may become major stumbling blocks.

With these two "aha moments" I hope to entice you to share some of yours with us from time to time.

Thanks you,  
Dick Arnold





# Christian G. Ehrenberg and the Birth of Soil Microbiology in the Middle of the 19<sup>th</sup> Century

By Hans-Peter Blume and Manfred Boelter, 24098  
Kiel University, Wolf-Henning Kusber, Freie Universität Berlin, Germany

*This is a shortened version of a paper, which appeared together with Wolf-Henning Kusber in Journal of Plant Nutrition & Soil Science (2012), Vol. 175, pp. 53-59*

Early in the 19th century, the German doctor and natural scientist Christian G. Ehrenberg (1795-1878), colleague of Alexander von Humboldt (1769-1859), determined and classified by microscopic investigations species and contents of microorganisms (bacteria, algae, diatoms, protozoa) of more than 1,000 soil samples from all over the world (soils under natural vegetation including coasts, swamps, forests, steppes and mountains, as well as soils from hot and cold deserts, of all continents, including the Maritime Antarctic). Organisms, minerals and organic aggregates were fixed in Canada balsam on object plates. These “mica” were used for later comparisons with soils of other sites. His estate with 40,000 microscope preparations is now located in the *Museum of Nature History* at the Humboldt University in Berlin. These microscope preparations are re-examined actually with improved modern techniques.

Ehrenberg identified various organisms, recognizable minerals, litter residues with tissue structures, amorphous-looking humus, and clay particles. Phytoliths and minerals were identified by a polarization microscope and described the morphology of organic particles. He often investigated soil aggregates accumulated on roots. Different horizons of soils, e.g., of Russian Chernozems, were analyzed and recent phytoliths in all humic soil horizons were described, which clearly shows the influence of strong bioturbation by earthworms and other soil dwelling animals (Ehrenberg 1850).

The publications about infusorians, i.e., protozoans, algae and bacteria (Ehrenberg 1837, 1838, 1838a: Fig. 1, 1854, 1854a, 1856), dedicate Ehrenberg to a founder of soil microbiology. The descriptions of the facts about living and fossil microorganisms were performed up to his own time, from the suppositions in the ancient world and the first microscopic proofs by Antoni van Leeuwenhoek (1632-1723). The results of these studies found many quotations and descriptions of many microorganisms collected from soils are well documented in detail with respect to a worldwide research on the occurrence of microorganisms and documented their habitat conditions.

Beside bioturbation Ehrenberg identified several soil forming processes. Fermentation and decomposition of dead organic substances is related to certain infusorians (Ehrenberg, 1838) as well as mineral weathering and new formation of minerals under the influence of microorganisms long before other investigators recognized these processes in such way.

Ehrenberg observed and described first the microorganism *Gallionella ferruginea* in peat soils, in spring water as well as on bog iron. According to this description, *G. ferruginea* contains either a fleshy pink or ochre fluffy substance (Fig. 1), which he considered to be a compound of silicic acid and iron oxide. The ochre substance could be goethite, the fleshy pink substance could be ferrihydrite. Thus, microorganisms are regarded as the source for occurrence ferrihydrite of bog iron, which we today consider to be a (sub)recent Fe-enrichment in petro-gleyic Gleysols. In wide areas of northern Germany of fluvial glacial sands  $\text{Fe}^{2+}$  ions are extensively washed out from Histosols and Spodic Gleysols and laterally transported by ground water.  $\text{Fe}^{2+}$  is probably oxidized by microorganisms in a narrow influence area of  $\text{O}_2$ -rich groundwater of brooks or rivers, although

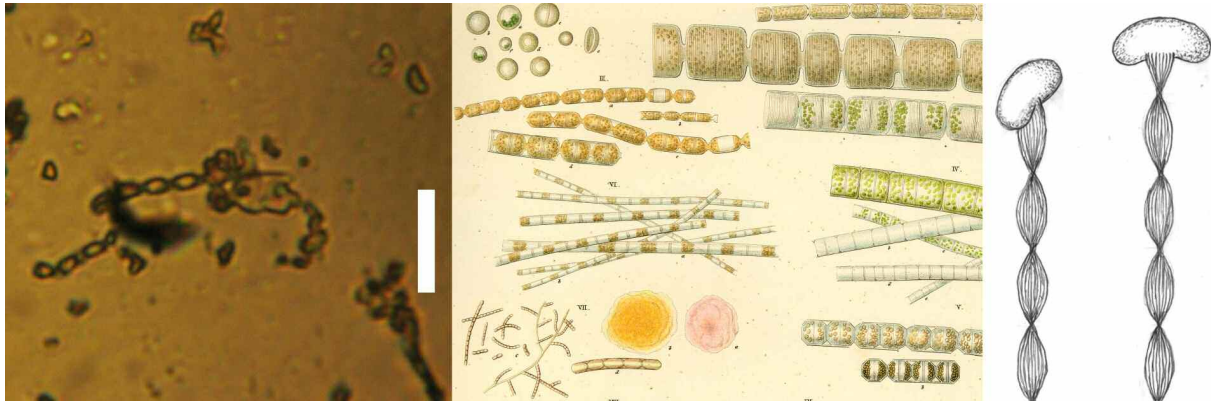


Fig. 1: *Gallionella ferruginea* Ehrenberg (aerobic oxidizer of iron)  
 left: Ehrenberg's preparation (Photo: W.-H. Kusber, scale bar = 10  $\mu$ m),  
 center: copper plate engravings in Ehrenberg (1838), Plate 10, Fig. VII,  
 right: drawing (CC BY 3.0 Brudersohn)

there is no proof available for an ATP-gaining process in microbes by  $\text{Fe}^{2+}$ -oxidation in *G. ferruginea*, *Sphaerotilus natans*, *Leptothrix* spp., *Crenothrix* spp. The  $\text{Fe(III)}$ -production is probably the result of a mineralization of  $\text{Fe(III)}$ -Chelates (Fe-precipitation) (Ottow2011: p. 367ff, and pers. comm.).

Ehrenberg also investigated coral reefs in the Red Sea and their formation caused by protozoans (Ehrenberg 1834). Calcareous protozoans also live in reduced intensity in the temperate zone, their occurrence increases partly on the periodically drying of wadden soils. In the marine shelf environments, seasonally occurring silicate containing diatoms dominate sediment formations. Ehrenberg (1856) described such observations also for the delta-area of the Mississippi (p. 19-20).

These processes generally mean soil formation by help of microorganisms. Although this was criticized during his time, it is still fully accepted today. Therefore, Ehrenberg can be regarded as the main founder of soil microbiology and as pioneer in soil micro-morphology.

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# IUSS Alerts December 2011 - May 2012

## International Union of Soil Sciences



### Information for and from the global soil science community

**IUSS Alerts** are e-mailed to more than 12, 000 people in over 100 countries. If you have information to share, please send it to [hartemink@wisc.edu](mailto:hartemink@wisc.edu). Below are the still relevant contributions that appeared in the IUSS Alerts from December 2011 till May 2012.

### Spanish Journal of Soil Science

The Spanish Journal of Soil Science is an international, peer-reviewed journal, launched by the Spanish Society of Soil Science and the Consejo Superior de Investigaciones Científicas. It is published quarterly by Universia, mainly in English, but Spanish and Portuguese manuscripts are also accepted. It is an open-access journal published under a Creative Commons license and free of charge for authors. The journal publishes original research papers of high scientific quality on all fields of soil science and related areas. The first issue of SJSS can already be accessed at: <http://sjss.universia.net>. Editor-In-Chief: Prof. Rosa M Poch.

### Soil Science Teaching Principles

From a recent article in *Geoderma*: The teaching of Soil Science requires principles that reflect the nature of soil and the practices of soil scientists. Because no discipline-specific teaching principles could be found for Soil Science in the literature, an iterative approach was used to develop them, which involved input from students, academics, employers, graduates in the workplace, as well as published generic teaching principles. The synthesis of these perspectives was achieved via a series of cycles that first involved student feedback on Soil Science teaching from five Australian universities, combined with academic reflections on learning and teaching. The outcome of this activity was subject to perspectives provided by employers of soil scientists and practising soil scientists in the workplace. Quantitative and qualitative analyses of these sources and published generic teaching materials were blended into a set of 11 teaching principles of Soil Science that reflect the unique nature of soil and the outcomes required of graduates who have majored in Soil Science. Further info contact Damien Field at [damien.field@sydney.edu.au](mailto:damien.field@sydney.edu.au)

### Conferences, Symposia, Meetings

#### Soils in Space and Time.

30 September – 4 October 2013, Ulm Danube, Germany. The programme is available from the conference website at <https://iuss-division1.uni-hohenheim.de/>. “Soils in Space and Time” is one of the key issues documenting the variability of the pedosphere. Soils are variable but all of us have a limited experience. Therefore it is of utmost importance to exchange knowledge from time to time and from place to place. As Division I was established by IUSS pedologists working in related fields of soil morphology, genesis, geography, classification are combined to join their efforts in order to improve and communicate their knowledge. Especially the dynamic commissions paleopedology and pedometrics can add new methods and findings to improve our work. This is especially also due to the working groups which feel related. This is the first divisional conference - Everybody should try to use the options given. Join us and make the new experience.

#### 7th International Conference of the Urban Soils Working Group, SUITMA, of the International



Union of Soil Sciences. Nicolaus Copernicus University of Torun, Poland. SUITMAs (Soils in Urban, Industrial, Traffic, Mining and Military Areas) are one of main components of urban ecosystem. They are very diverse and heterogeneous, and fulfill primary functions of utmost importance. SUITMA 7 is held in the UNESCO World Heritage city of Torun, famous for its gothic architecture. One-day pre-conference tour (Northern Poland red brick gothic castles), two-day mid-con-



ference field tour (18 & 19 September 2013) will be offered in the Kuyavian-Pomeranian Province and a post-conference tour (20 - 23 September 2013) will be organized in Poland and Czech Republic, with not only soils but also interesting social part (breweries visiting) included in the program and finish in Golden Prague, Czech capital, to address issues related to urban and industrial soils of Central Europe. We will be very pleased to invite you to participate in SUITMA 7 to share your ideas and experience for the benefit of urban communities and SUITMAs.

For more information visit conference website: [www.suitma7.umk.pl](http://www.suitma7.umk.pl) or email Przemyslaw CHARZYNSKI, Chairman of SUITMA 7: [suitma7@umk.pl](mailto:suitma7@umk.pl) You are also welcomed to join SUITMA 7 group on Facebook to be instantly informed on news and updates concerning the Conference.

**IUSS Global Soil C Conference**, 3-7 June 2013, Madison, USA. The IUSS Global Soil Carbon Conference is an IUSS Division, Commission and Working Group conference that focuses on soil C in space and time, soil C properties and processes, soil C in relation to soil use and management, and the role of soil C in sustaining society and the environment. All Divisions, Commissions and Working Groups will have a special symposium highlighting and summarizing what is known about soil C in their soil science subdiscipline. It aims to become a soil science intradisciplinary conference focusing on a highly topical issue: soil C. Each Commission and Working Group will have about 30 to 45 minutes to present their work. It will be done in plenary and no separate sessions are planned in order to exploit the full benefits of the intradisciplinary approach. An approximately planning is given on the IUSS website: [www.iuss.org](http://www.iuss.org)

See 'IUSS Global Soil C Workshop'.

More information soon.

**XVII Conference of the International Soil Conservation Organization (ISCO)** "Environmental Sustainability through Soil Conservation", 08 - 12 July 2013, Medellin, Colombia. ISCO (International Soil Conservation Organization) is an organization whose main aim is to promote the sustainable, productive and efficient use of soil and water resources around the world. With this objective, ISCO periodically organizes conferences every 2 to 3 years to analyze and exchange the latest information and research, addressed to find solutions to

the increasing degradation problems of the basic resources soil and water, on which the very sustainability of life on earth is based. To date, sixteen ISCO conferences have been held, covering regions and continents around the world, with different bio-physical, cultural, social and economic conditions. Deadlines: Reception of short abstract: 31 December 2012; Reception of extended abstract: 31 March 2013 (More details in further announcements).

More information:

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More information and web page soon.

### **6th International Nitrogen Conference (N2013)**

18-22 November 2013, Kampala, Uganda.

[www.N2013.org](http://www.N2013.org)

Theme: Just enough N: Perspectives on how to get there for "too much" and "too little" Regions. Contrasting access to reactive nitrogen (Nr) has led to either its excessive use in the production of food and energy, resulting in numerous negative ecological and human health consequences, or in inadequate access that consigns such regions to unsustainable agricultural production, land degradation, and food and nutritional insecurity. Scientific and socio-economic studies continue to be conducted in both scenarios so as to identify Nr issues and solutions, novel approaches and policy support for implementation of the solutions, and priorities for further research and development. N2013 will provide a platform for sharing the state of knowledge on the impact of too much or too little use of Nr on the nitrogen cycle, human health and ecosystems in the different regions of the world. It will declare its position on the use of external Nr sources in stimulating increase in food production and rural development, while taking into account prevention of its negative impacts for "too little" regions. Convener: Mateete Bekunda, African Nitrogen Centre ([mateeteb@yahoo.com](mailto:mateeteb@yahoo.com)). Host: National Agricultural Research Organisation, Uganda.

Contact: Crammer K. Kaizzi ([kckaizzi@gmail.com](mailto:kckaizzi@gmail.com))

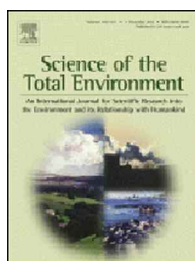
## News from the British Society of Soil Science

**Posters and Leaflets** - The British Society of Soil Science have developed 8 topical soil education posters and accompanying leaflets which are free to download from their website at [www.soils.org.uk/pages/education/education-downloads](http://www.soils.org.uk/pages/education/education-downloads)

**The 2012 annual meeting - Soil Science with respect to Global Food Security** will be hosted by the University of Nottingham. The meeting will focus on the required contributions and potential opportunities for soil science with respect to Global Food Security. The forecasted increasingly variable weather patterns will influence the environment and its ability to support sustainable food production. Major challenges include water scarcity, a decrease availability of key inputs to food production, managing carbon and differing local impacts of climate change. Soil science is at the heart of all these issues. The meeting will consist of two days with four sessions strongly related to the main theme and an un-themed session where presentations from any aspect of soil science are encouraged. We invite you to contribute oral and poster abstracts to this meeting, the deadline for submissions is the 1st May 2012.

For further information please see the website [www.soils.org.uk/events/event-88/](http://www.soils.org.uk/events/event-88/)

## Special Issue on Soil as a Source & Sink for Greenhouse Gases



**Science of the Total Environment**; Guest Editors: Nanthi Bolan, Mary Beth Kirkham and Surinder Saggar. In view of the interest in soils as a source and sink of greenhouse emission in relation to global climate change, the Editors of the Science of the Total

Environment have agreed to devote a thematic special issue to this topic. This Special Issue aims to gather all interested researchers in terrestrial ecosystems in which soil is used as a sink for carbon sequestration and to reduce greenhouse emissions in order to manage climate change. Confirmation of your contribution before 31st March 2012 including the title, the list of authors and potential reviewers (email to [Nanthi.Bolan@unisa.edu.au](mailto:Nanthi.Bolan@unisa.edu.au)). Submission is 31 September, 2012. Please closely follow the Guide to Authors which can be found on: [\[nals.elsevier.com/science-of-the-total-environment/\]\(http://nals.elsevier.com/science-of-the-total-environment/\) and indicate in your submission that your paper is for that special issue.](http://www.jour-</a></p></div><div data-bbox=)

## Classical ISSS Publications 1909 -1952

The first International Conference of Agrogeology was organized in Budapest in 1909. It was followed by several meetings and eventually resulted in the establishment of the International Society of Soil Science (ISSS) in 1924. All the proceedings of these early meetings as well as the ISSS newsletters (Internationalen Mitteilungen für Bodenkunde 1911-1924; Soil Research 1928-1944) have been scanned and are available as PDF on the IUSS website: [www.iuss.org](http://www.iuss.org) See 'IUSS Publications 1909-1952' to browse through these books and proceedings.

Some PDFs are rather large; use <Control F> to search through these PDFs – lots of classical papers and soil science information!

## Sports Meets Science Meets Arts

During a bike trip from Austria to Thailand Wolfgang Burtscher, the Innsbruck sportsman and artist is sampling dirt 'tripmarks' on laid paper, producing 365 daily pieces of art. These tripmarks raised the interest of Heribert Insam, University of Innsbruck soil microbiologist. Everything is everywhere? Does the microbiota collected in the tread of a bicycle tire change while biking around the globe, or works the bicycle tire as a vector of microorganisms? At the Institute of Microbiology the enthusiastic biker Johanna Mayerhofer is devoting her Master's Thesis to this project with an uncommon sampling strategy. To embark together on this journey have a look at the route and contact Wolfgang or Heribert [www.tripmarks.at](http://www.tripmarks.at) or [www.microbiology.uibk.ac.at](http://www.microbiology.uibk.ac.at)

## Advertisements

The IUSS offers possibilities for advertisements in the IUSS Alert, Website and Bulletin. This could include book or meeting announcements, job vacancies, or soil research and teaching equipment. The IUSS Alerts reach 12,000 soil scientists across the globe and are sent out by e-mail every month. For tariffs and advertisement possibilities, please contact the Secretary General at [hartemink@wisc.edu](mailto:hartemink@wisc.edu) or Treasurer at [Jim.Gauld@hutton.ac.uk](mailto:Jim.Gauld@hutton.ac.uk)



## Global Soil Science Education

The *Monitoring Soil Science* Project is a global soil science education project. It seeks to establish innovative and ongoing student-soil scientist partnerships. The project enables school students to receive training in scientific methodologies with support of a soil scientist as a mentor. The website has resources for teachers and students. An initial emphasis on soil fauna is used to attract the attention of students and the project can be expanded to include any aspect of soil science. <http://soils.uit.uwa.edu.au/index.php> The Monitoring Soil Science Project is an initiative of IUSS Division 4. For further information, contact Lyn Abbott (email [Lynette.Abbott@uwa.edu.au](mailto:Lynette.Abbott@uwa.edu.au))

# 5 questions to a soil scientist

## 5 questions to Daniela Sauer



**Position:** Substituting the currently unoccupied position of the Chair of Landscape Sciences and Geoecology (since May 2011), Present Chair of IUSS Commission 1.6 Palaeopedology

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**E-mail:** [daniela.sauer@uni-hohenheim.de](mailto:daniela.sauer@uni-hohenheim.de)

### 1. When did you decide to study soil science?

After finishing school I felt a strong wish to study something enabling me to do a job that would in some way be useful to society. I decided to study ecology. However, I then realized that I was unsatisfied by learning just a little of each discipline comprised in the ecology program. Hence, I set a time limit to myself: Until that date I had to choose one discipline to study more deeply. I think that it was the enthusiasm of my soil science teacher Wolfgang Burghardt and my geomorphology & sedimentology teacher Gerd Schellmann that infected me so that soon my choice was clear: Soil Science

### 2. Who has been your most influential teacher?

Two teachers that gave direction to my career very early have already been mentioned. Two others were my PhD supervisor Peter Felix-Henningsen (Chair of the German Palaeopedology Group at that time) and Karl Stahr with whom I have worked for almost nine years - and I have continuously been learning from him in each of these nine years. Be-

sides Karl's enormous experience and pedological knowledge, I am particularly impressed by the enthusiasm with which he is forwarding his knowledge to students and young scientists, and introducing soils also to school classes and to the public.

### 3. What do you find most exciting about soil science?

It is the complexity of soils and the very different aspects (pedogenetical, physical, biological, chemical, mineralogical...) that can be studied in soils and that have led to a variety of sub-disciplines within soil science. However, I feel that the more we specialize the more important becomes interaction between sub-disciplines. Otherwise we will achieve progress in the special aspects that each of us is investigating but we won't obtain an integral understanding of those complex systems. The most exciting thing for me personally is the "memory" of soils. I remember very well a field excursion with my geomorphology teacher where probably the seed for my later palaeopedological career was laid: We visited a gravel quarry, where glacial till, glacio-fluvial deposits with sand wedges, clayey sediments of an ice-dammed lake and alluvial sediments with paleosols were exposed. He left small groups of students at different sites along the quarry walls and told us: "When I come back you tell me your story of the development of this landscape." This seemed really exciting to me! I still feel that fascination each time I discover an instructive sediment-paleosol sequence.

### 4. How would you stimulate teenagers and young graduates to study soil science?

By SHOWING soils to them in the field. A few times I have shown soil profiles to school classes. The pupils usually had never seen a soil profile before and had of course never thought of soil as a four-dimensional body that develops over thousands of years, is home to an unimaginably large number of organisms and performs ecological services of fundamental importance. I have seen many students becoming fascinated by soils through studying them in a soil pit. I am convinced that a major problem is that in normal life soils are perceived as a two-dimensional area that may be more or less suitable for different types of use. When students discover the world under that area many of them start to understand.



### 5. How do you see the future of soil science?

I think that the future of soil science depends strongly on the awareness of politicians of the importance of soils....which I guess correlates negatively with the undamped speed by which the most fertile soils in the area where I live continue to be sealed. Because of the common 2D perception of soils it is much more difficult to draw the public's and politicians' attention to soils than to forests, drinking water, air quality etc.. The University where I graduated still has master programs in "Environmental Toxicology" and "Water Sciences" but they closed the Soil Science Department.... We need to work on this 2D problem in order to raise the politicians' awareness of the importance of soils. Otherwise, why should they support research in soil science in economically difficult times?

## 5 questions to Suk Young Hong



**Position:** Senior Researcher (since 2008, 1995~ : Researcher)

**Age:** 44

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150 Suin-ro, Gweonsun-gu, Suwon 441-707  
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**E-mail:** syhong67@korea.kr

### 1. When did you decide to study soil science?

In 1995, I joined a remote sensing job in Soil Management Division, National Academy of Agricultural Science (NAAS), RDA as a researcher. Since then I started to study soils in earnest. Actually I didn't decide to study soil science by myself but the given jobs made me study soils. I have worked on VIS/NIR spectroscopy for estimating soil properties and land use & land cover classification using satellite images in Korea. I have managed national soils database of Korea and operating information system and service

since 2004. I also do crop yield estimation based on remotely sensed data including optical and radar data.

### 2. Who has been your most influential teacher?

Since I studied just a couple of soil classes in university, crop physiology, remote sensing, and agricultural meteorology before I joined Soil Management Division, RDA, I don't have any influential teacher in soil science classes in university but in remote sensing and crop science parts. My colleagues working with me in my soils division are all teachers of mine. Budiman Minasny and Alex McBratney have been my most influential teachers in soil science since the first Global Workshop on Digital Soil Mapping which was held in Montpellier, France in 2004. They brought me to DSM community and I am learning from them and the community.

### 3. What do you find most exciting about soil science?

Mapping soil functions is the most exciting part to me. Mapping the capabilities of soils is important for various agricultural, environmental, and ecological applications and the soil maps can depict soil properties and specific soil functions.

### 4. How would you stimulate teenagers and young graduates to study soil science?

I would like to show them the movie 'Wall-E' and then to say that "you are the key persons to save the earth".

### 5. How do you see the future of soil science?

No life without soil and no soil without life, so soil equals life.

# Working Group Reports: Schools Monitoring Soils

*By Lynn Abbott, the University of Western Australia*

The *Monitoring Soil Science Project* is a global soil science education project seeking to establish innovative and ongoing student-soil scientist partnerships. It was designed for high school students, but has information suitable for students of all ages. The project takes soil scientists into the classroom as mentors to science teachers, to explore science initiatives with students that are focused on soil and introduce students to the concept of soil science, the importance of soils in the environment, and the relevance of soil to the climate change debate. On-going partnerships between schools and local farming organizations can form around this project.

School students:

- participate in 'real', meaningful science activities;
- follow scientific protocols to collect valid and reliable data;
- distinguish between the physical, chemical and biological aspects of the soil ecosystem;
- interpret patterns and trends in data, and compare their results with students at other schools who will have different soil types and land management practices, and
- develop their own soil science project.

Students can be trained in scientific methodologies, including sampling strategies, which they use to collect data related to the biological, chemical and physical as-



*Science teachers at a professional development day run by the SPICE program checking instructions for soil analysis during the pilot of the Monitoring Soil Science Project. Image: Lyn Abbott*

pects of soil. There will be an opportunity for students to upload their results onto a shared online database. The project is intended to be ongoing with expertise building according to science topics of local interest based on monitoring soil conditions. Once an area of land is identified near the school, it can be studied from year to year by different cohorts of students.

In the first year of the project the schools collect a minimum of two data sets. With the help of their local soil science expert as mentor, two plots of land are identified at or near the school. It's suggested that 4 m x 4 m plots become the school's permanent study sites, but additional sites could be included. The soil science mentor helps characterise the site, explain the soil type and demonstrate methods for collecting soil samples for analysis at a chemical laboratory.

The first discussion with the students involves how and where the soil samples should be taken. Sampling strategies and the concepts of replication and variability are introduced. Subsequently, the students set up experiments at the reference site by growing plants, adding compost or fertiliser etc.

A website has been established to support this global soil project for schools:

<http://soils.duit.uwa.edu.au/index.php>

The website includes fact sheets, general instructions, podcasts about the methods for soil sampling and extraction of soil fauna, information about soil fauna, information for teachers and for the soil science mentor collaborating with the science teacher. Participants may seek the support of a local chemical laboratory for soil analyses. Once a school is registered on the project, students can upload their results onto the website, which will be available to students and scientists across the world. With time, comparative information will become available and schools may communicate with each other about their findings – especially about how their soils differ. Initially this could include comparisons of the biodiversity of soil fauna in different parts of the globe or in relation to climate, soil type and land use.

In the first instance, students learn how to collect and quantify soil fauna. Additional resources will be added to the website from time to time, including links to related sites, and suggestions for student projects which range widely across the soil science disciplines. Suggestions for example modules which could be added are welcome.



*Warwick Mathews, science teacher from Shenton College, Perth examining soil fauna. Image: Lyn Abbott*

*The Monitoring Soil Science Project* was initiated through discussions with Professor Lyn Beazley, the Chief Scientist of Western Australia, who had the vision of schools participating in real science research that was related to climate change. Professor Lyn Abbott from The University of Western Australia's School of Earth and Environment defined the concept for the project and has overseen its development into a global school science initiative with the international soil science community.

School students participating in the Australian National PICSE program at The University of Western Australia played an important role in establishing the scope of the project. Subsequently, the project has evolved primarily with support from SPICE, a secondary teachers' enrichment program at The University of Western Australia. The resources developed in the SPICE project have been crucial for the *Monitoring Soil Science Project* because they were based on discussion with, and feedback from teachers who trialed the resources. So far there have been two pilots of the *Monitoring Soil Science Project* with schools in Western Australia (2009 and 2010).

The *Monitoring Soil Science Project* is an initiative of Division 4 (The Role of Soils in Sustaining Society and the Environment) of the International Union of Soil Sciences (IUSS). IUSS contributed financial assistance for website development.



# *GlobalSoilMap.net* – Data Model Task Group Report April 2012

*By Peter Wilson, CSIRO*

The Data Model Task Group has not been active as far as specific tasks related to *GlobalSoilMap.net* requirements. This is mainly due to the ongoing lack of dedicated resources for *GlobalSoilMap.net* which means activity must be related to other business of the participating agencies therefore limiting the specific prioritisation of *GlobalSoilMap.net*.

Since the last meeting in Ispra Italy, the DM Task Group has had limited communication and has not had opportunity to meet.

The nomination of active members from the GlobalSoilMap Nodes remains limited.

## **Related Activity**

Both Australia (CSIRO) and New Zealand (Landcare Research) have recently secured dedicated skills in information modeling and have individually made progress with activity related to the *GlobalSoilMap.net* needs over the last 3 months.

Australian activity has focused on developing a 'feature' based information model which can potentially cover all 'soil' related data and information and allow the transfer and collation of standardised soil and landscape data. The soil feature centric model, called OzSoilML (since it currently utilises Australian standardised terminology), may be considered for broader international application following further investigation of its suitability and wider agreement on concepts and vocabularies through the IUSS Working Group on Soil Information Standards. OzSoilML has been developed in consideration of other existing international standards initiatives, including EU Inspire (GS-soil), eSoTer, ISO Soil Quality, and FAO Harmonised World Soil Database, as well as the product specification needs of *GlobalSoilMap.net*.

The key advantage of the OzSoilML approach is in the real-world-feature centric viewpoint (Figure 1). It identifies three main soil related features of inter-

est, being the Landscape (the biophysical and anthropocentric context), the LandSurface (the physical form of the associated terrain) and the Soil (the actual complex biological material, including the profile, surface, layers and horizons that make up the soil). The Landscape feature may contain many elements (such as the biota, climate, hydrology, geology etc) many of which are (or should be) defined by other communities of practice. The LandSurface feature provides the physical surface expression of the terrain associated with particular soil associations. The Soil feature is the soil material itself, and is made up of SoilProfile, SoilSurface and SoilLayer (a specified depth slice, which may be specialised as a SoilHorizon if of pedogenic origin) features.

The OzSoilML conceptual model should allow transfer and collation of all soil data, including that related to location specific observations and analyses (site data), summarized and synthesised attribute data traditionally associated with soil map entities, and DSM derived estimates of soil properties for defined spatial entities (such as raster/grids as specified by the Australian TERN Soil and Landscape Facility and *GlobalSoilMap.net* specifications).

Work by the Informatics group of NZ Landcare Research has focussed on specialisation of the international standard 'Observation and Measurements' information model to the *GlobalSoilMap.net* Specifications. This is complimentary to the OzSoilML activity discussed above as it provides the specific content model for soil properties and spatial elements identified in the *GlobalSoilMap.net* Specifications. In this way the provision of data products compliant with *GlobalSoilMap.net* specifications can be seen as a 'use case' for the broader application of OzSoilML.

## **Future Progression**

The DM Working Group now proposes to progress the development and harmonisation of OzSoilML and the specific use case for *GlobalSoilMap.net*, at a meeting in NZ in August 2012 under the auspices



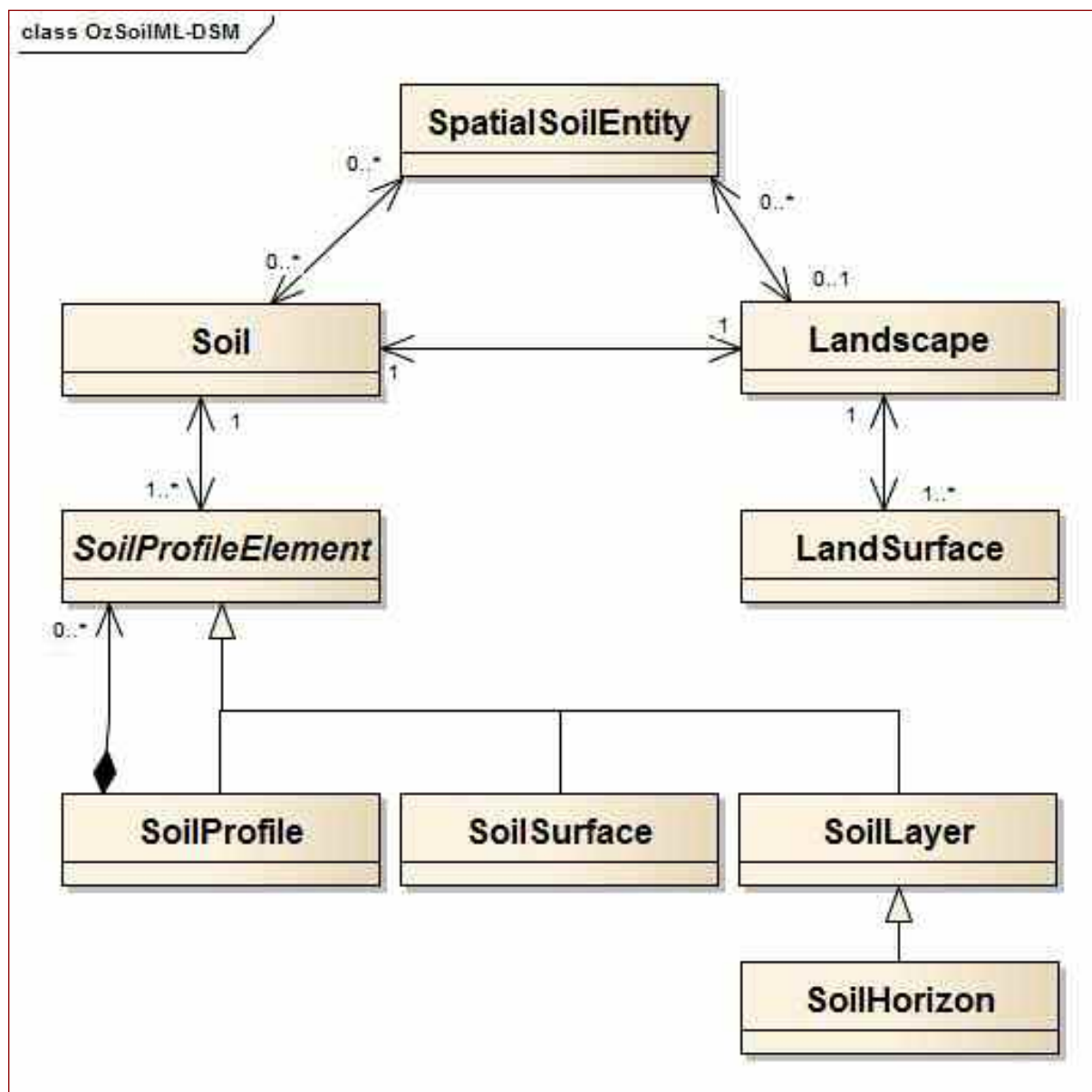


Figure 1. Central Feature of Interest concepts and relationships within the draft OzSoilML information model March 2012.

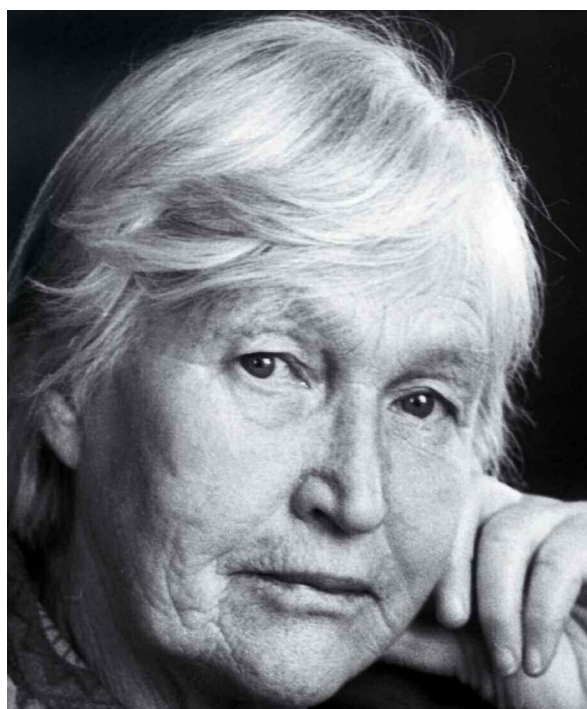
of the IUSS WG-SIS and in collaboration with related activities in the GeoSciML community. This meeting will also look at other 'use cases' for the development of specific 'profiles' of OzSoilML, such as requirements for SINFERS and to the extent possible, the other international initiatives noted above. In this way OzSoilML may be progressed as the core for an international standard SoilML.

Further development specific to *GlobalSoilMap.net* will require consideration of the outcomes of both the Specifications and CyberInfrastructure Task Groups. As an example is the current *GlobalSoilMap.net* specification of the property clay%, which has already been identified as requiring more explicit definition of the particle size fraction size

being reported due to international variation. From a generically applicable information modelling perspective it is likely that the 'property' would be better identified as {particle size fraction, size min, size max, unit of measure} so would be applicable to all fraction ranges and names currently defined by local, national and international schemes. Other 'properties' being estimated for *GlobalSoilMap.net* products may also need to be defined in such generic terms which more explicitly reflect the actual property being evaluated.

# Maria Glazovskaya is 100 Years Young!

## Jubilee Interview



Prof. Maria Alfredovna Glazovskaya got her 100 year jubilee on January 26, 2012. She is great pedologist widely known for her two-volume monograph "SOILS of the WORLD" (1983, 1984), the handbook (coauthor I.P.Gerasimov) "Fundamentals of Soil Science and Soil Geography" (1965) and many other books and papers. Together with her teacher Boris Polynov and her colleague Alexander Perelman she gave birth to the new discipline – Geochemistry of landscapes. Now this concept became the basis for environmental studies of contaminants migration in landscapes. M.Glazovskaya is famous for her studies on the soil formation and weathering in Antarctic and alpine landscapes, Australia, Norway, the development of catena concept, geochemistry of natural and man-induced landscapes, cycles of carbon in deep soil and under-soil horizons (pedolithogenesis), global and continental soil mapping and many other fields. During her long career Maria Glazovskaya has been a Vice-president of the All-Union (Soviet) Society of Soil Science, a member of the International Commission on land use, a member of the advisory

committee of the FAO-UNESCO, National Committee of SCOPE, for many years she has been active in international organizations.

M.A.Glazovskaya was born in Saint-Petersburg, graduated from the Leningrad University. Then she was a post-graduate student in this university and after getting her doctor degree moved to Kazakhstan (1939-1952), have been working in the Institute of Soil Science, Kazakh Academy of sciences. In 1952 she was invited to the Moscow State University. In the years 1959-1987 Maria Glazovskaya has been the Head, and from 1987 until the present time she is a consulting professor of the Chair of Geochemistry of landscapes and Soil Geography, Department of Geography, Moscow State University. She is the Distinguished Professor of Moscow State University, an honorary member of the Russian Geographical Society and the Dokuchaev Soil Science Society.

We managed to visit Prof. Maria Glazovskaya in days of her 100-years jubilee and after a lot of congratulations took a short interview.

### *Where did you study?*

I began my study in the Leningrad (previous name of Saint-Petersburg) Agricultural Institute. It was because my mother was a school teacher but only children of peasants and workers had right to study in a university at that beginning of Stalin epoch (1929). This institute was located in the same place where the great poet Alexander Pushkin was educated in the Lyceum in 1810s and I was living in the same building. It was really impressive. I saw myself as a specialist in plant selection but this specialty was cancelled at the second year of my student life. With the help of my friend's father I managed to get into the Leningrad University, soil-geological-geographical department. It was really my alma-mater and I appreciated very much that great scientists were teaching me.



*Maria Glazovskaya (sitting right) with her former students and colleagues Victor Targulian (staying left), Sergey Goryachkin (staying right) and Nina Karavaeva (sitting left) on the day of 100 years*

***Who was your supervisor?***

A person whom I really recognize as my supervisor was Prof. Boris Polynov. At that time the Dokuchaev Soil Science Institute was in Leningrad, and Polynov was working there. I also met Victor Kovda at that time. Being a student and then a post-graduate student I was working with him in Caspian region.

***What was your thesis about?***

You know that in Russia, as well as in many European countries we have two scientific degrees. The first thesis for the degree equal to Ph.D. was named in old-fashion style "Materials on the study of soil complex of Law Volga region". It was done in 1936. And the thesis was about dry-steppe and semi-desert landscapes and arid soils of Caspian terraces. My second thesis was done when I was working in Kazakhstan. It has a title "Inner Tian Shan as a mountainous territory of Central Asia". This thesis was result of my long-term studies of soil formation, weathering and geography of soils and landscapes in Tian

Shan. At that time the usual transport for my studies were horses. I was a really good rider spending many-many hours in the saddle.


***How did you get into soil science?***

Being a girl raised in St. Petersburg I did not know a lot about the soil science. I decided to be a medical doctor and was passing exams to the Medical institute. Unexpectedly, besides professional questions, they showed me several portraits of different Bolshevik leaders – I failed to recognize most of them. At that time my professional knowledge was not enough and I failed my exam to the Medical institute. I started my education in the Agricultural Institute and continued in the Leningrad University as I told before. Needing money I went to summer expeditions of the Dokuchaev Soil Science Institute. There I had my first experience in soil science.

***Who inspired you into soil science?***

I think that Victor Kovda was this person. Afterwards he became a famous soil scientist, the President of





the International Society of Soil Science (1968-1974) but at that time he was a young and very bright specialist in soil science. Coming into the group of Boris Polynov I realized that soil science would be the occupation of all my life.

#### *How did your career develop?*

After graduating from the Leningrad University I became a post-graduate student working in the arid Caspian region. Then I married young philologist who was born in the Caucasus region and did not like the rainy and cool climate of Leningrad. He asked me to choose the place in the south where we would live after my post-graduate time. We have chosen Kazakhstan and Almaty city. I was working there as a soil scientist and geographer for 13 years. In 1952 Konstantin Markov, the famous paleogeographer, who was a Dean of the Department of Geography invited me to the Lomonossov Moscow State University. In 1957-59 I was the Head of the Chair of Physical Geography of the USSR and afterwards I became the Head of the Chair of the Geochemistry of Landscapes and Soil Geography. It was the longest period of my career. Until 1987 I headed this Chair of the Department of Geography, Moscow University.

#### *Did you travel?*

Living in the Soviet Union and never being the member of the Communist party it was not easy to travel abroad. So, most of my travel covers the area of Russia and other republics of the USSR. Besides Kazakhstan and other regions of Central Asia I was working in Ural region, European Russia, Baltic republics, Kama region, Far East, Caucasus and many other places. I also managed to visit Australia, Norway, Sweden, UK, China and had several publications on relevant soils. Usually, I got my abroad experience during the trips to scientific conferences and congresses and field excursions.

#### **How did you write the SOILS OF THE WORLD books?**

I did not consider these books to be something very important in my scientific activity. First of all, they are handbooks. Being invited to the Moscow University I was in charge to prepare the special course for soils of the world and continents. I analyzed a lot of soil maps and books and papers in different languages. Then I suggested the systematic of soils of the World and some general trends of their distribution. I have a special experience dealing with soils of Australia and even publish a book on it. Being in Australia I met Prof. J.A.Prescott. He made me a compli-

ment that I had understood the general trends of soil geography of Australia very well and asked me when I had been to this continent. He was very surprised that I was for the first time during the congress and had written the book only on the basis of the literature analysis. So, the volumes *Soils of the World* are mostly handbooks, but I happy that they had some popularity in the world. I wish my last book published in 2010 “*Pedolithogenesis and Continental Cycles of Carbon*” did have a small part of this popularity.

**Hope it will be not your last book and we'll see the new one soon. On behalf of the world soil science community our best wishes on occasion of your Great Jubilee!**

*Sergey Goryachkin*



# Professor Igor Krupenikov

## The Centennial Jubilee of the Famous Soil Scientist in Moldova/Russia



On 10 April, 10, 2012, Professor Igor Krupenikov has celebrated his 100<sup>th</sup> birthday.

Krupenikov is well known to soil scientists in Moldova, where he was a leader of soil research during at least half a century; at all the Post-Soviet space he is recognized as a leading expert on chernozems and a unique historian of soil science.

Krupenikov was born in St. Petersburg. His father, engineer in viticulture, participated in the First World War; his mother was a philologist. After graduating the Soil-biological faculty of Moscow Lomonosov University, Krupenikov worked in a Naurzum steppe natural reserve (Kazakhstan), then in Tashkent and Yalta, where he started writing biographies of great scientists – Dokuchaev and Kostychev. In 1948, he was invited to Chisinau by Nikolay Dima, who organized the Soil institute there; since

those times, all his activities are closely related to Moldova, its nature, people, soils and their conservation.

Three “red lines” may be traced in the scientific work of Krupenikov: *regional*, namely, soil surveys and resources including the soil cover patterns, soil genesis; *chernozems* – his love and great concern, and *history* of soil science (his book analyzing the evolution of soil knowledge since Antiquity to nowadays was translated into English in 1992-1993) and biographies of more than 30 well-known pedologists, geographers, travelers. Krupenikov has many publications on Moldavian soils and, particularly, chernozems starting with his Dr.Sc. thesis in 1966 – “Chernozems of Moldavia” and also maps, popular environmentally-oriented booklets. The title of his main book of 2008 on chernozems is quite unusual, exhaustive, and needs no comments: “Chernozems. Emergence, perfection, tragedy of degradation, ways of protection and renaissance”. This wonderful book was slightly reduced to an English version “The Black earth (ecological principles for sustainable agriculture on Chernozem Soils)”, Springer, 2011, which Krupenikov prepared with his colleague Boris Boincean and Editor David Dent.

We wish Professor Krupenikov good health and many friendly contacts in the beginning of his new century.

*Maria Gerasimova,  
Professor, D.Sc., Soil Geography Department,  
Geography Faculty, Lomonosov Moscow  
State University*

# IUSS Humanitarian Soil Scientist

At the 17<sup>th</sup> World Congress of Soil Science held in Bangkok in 2002, Council decided to recognise December 5<sup>th</sup> as World Soil Day. This particular day was chosen because it is the birthday of His Majesty King Bhumibol Adulyadej, King of Thailand. The King had given considerable support in the development of the 17<sup>th</sup> World Congress and one of the key exhibits at the Congress illustrated the considerable efforts undertaken by the King and the programmes he has supported to promote sustainable soil management in Thailand. The focus of these efforts are to inform and educate the small holder farmer in appropriate soil management practices. Following the Congress I together with Irb Kheoruenromne (IUSS Vice President 1998-2002) and colleagues in the Soils and Fertiliser Society of Thailand were involved in discussions with representatives of the King about obtaining Royal approval for our World Soil Day proposal. At the 19<sup>th</sup> World Congress held in Brisbane, Council approved a proposal to recognize the continued efforts of the King of Thailand in promoting sustainable soil management by recognizing him as IUSS Humanitarian Soil Scientist. One of my last acts as Secretary General was to inform the Palace in Thailand of this award.

In early April 2012 I received from the Royal Palace in Thailand an invitation to an audience with His Royal Highness. My predecessor as Secretary General, Winfried Blum, was also invited as this process had begun when he was Secretary General at the 17<sup>th</sup> World Congress. The date for the audience was eventually fixed at April 16<sup>th</sup> in the early evening. Winfried Blum and I attended together with Irb Kheoruenromne, S. Theerawong (IUSS President 1998-2002), representatives of the Soils and Fertiliser Society of Thailand and Bob Gilkes representing the IUSS Membership. The opening part of the audience was formal, involving introductions and a formal citation to the King given by me. I presented the King with the IUSS Humanitarian Soil Scientist medal. He thanked me and IUSS for the award, after which he asked me to sit by him to chat. We chatted for almost 50 minutes, principally about soils and



soil management, ranging across subjects such as preventing soil erosion and managing acid sulphate soils (he had spent some considerable time in the field with Moorman investigating acid sulphate soils). We also discussed the possibility of Thailand taking our proposal to the United Nations that December 5<sup>th</sup> be internationally recognized as World Soil Day.

The presentation and meeting was an outstanding success. It was a real pleasure to have such a wide ranging discussion with the King about soils and soil management. Our meeting was the first public appearance of the King for some time; consequently it was considered a major national event. Because of this IUSS and the award were the first item on the evening TV news bulletins and a front page item on the daily newspapers. Later in the week, Winfried Blum, Bob Gilkes and I were interviewed as part of a documentary being prepared on the King and Sustainable Soil Management.

This was the culmination of numerous letters and emails over a number of years, but it was certainly a most memorable occasion which I am convinced will ensure greater public awareness of the importance of soils and sustainable soil management in Thailand and beyond.

*Stephen Nortcliff, Reading*

## In Memoriam

# John Mortvedt

1932 - 2012



Dr. John Jacob Mortvedt joined his Lord and Savior on March 13, 2012, in Fort Collins, Colorado, after suffering a stroke. He was 80 years old. John was born on January 25, 1932, to Ernst and Clara Mortvedt of Dell Rapids, South Dakota, where he spent his childhood on their farm. He earned his B.S. degree in agronomy from South Dakota State University in 1953. And Married Marlene nee Fodness in Rapid City, South Dakota on January 23, 1955. After serving as an aviator with the Army for three years and farming for one year, He earned the M.S. degree in soil science from SDSU in 1959 and the Ph.D. in soil chemistry from the University of Wisconsin in 1962.


Dr. Mortvedt's professional career was with the Tennessee Valley Authority in Muscle Shoals, Alabama, as a soil chemist in the Agricultural Research Department until 1987 when he earned the TVA Bronze Honor Awarded, then as a senior scientist until 1992. He transferred to Fort Collins, Colorado, as a regional

manager serving the Rocky Mountain area in the TVA Field Programs Department, retiring on July 9, 1993. He served as an Extension Specialist at Colorado State University through 1996 and was a Professor Emeritus.

Dr. Mortvedt's major research programs were concerned with factors affecting soil reactions and plant availability of micronutrients and micronutrient fertilizers. He evaluated numerous commercial fertilizers as well as potential products. Results of his research were published in 65 technical papers, 11 book chapters, and over 35 nontechnical papers in trade journals and symposia proceedings. His studies of reactions of heavy metals in soils have been used by the EPA and other agencies, and he is credited as inventor on two patents. At Colorado State University, John revised or supervised the revision of the fertilizer suggestions for all major crops in Colorado.

In 1979 Dr. Mortvedt was awarded the title of Fellow in the American Society of Agronomy and the Soil Science Society of America, then ten years later in the American Association for the Advancement of Science. The SSSA awarded him its Professional Service Award in 1991 and Distinguished Service Award in 1996. His successful nomination for the Agronomic Service Award notes that "even today he remains the foremost authority on micronutrient fertilizer technology and the recommended methods of application". The SSSA elevated John to its Presidency in 1989, and he served on its Board of Directors from 1981 - 1990, Executive Committee from 1987-1990, and as editor in chief from 1982-1987. Colleagues around the nation write that John's "has been an exemplary career of dedicated service that would be difficult, if not impossible, to match" and that he serves well as a role model for young scientists.

John has visited over 30 countries, many as a consultant and lecturer, and was a frequent speaker around the United States at soil fertility and fertil-



izer meetings. He is the senior author of the books *Fertilizer Technology and Application* and *Farm Chemicals Handbook* which are widely used in agriculture. He is also co-editor of the internationally popular reference and textbook *Micronutrients in Agriculture*, and the Iron Research Work Group he helped found in 1974 produced symposium series around the world. He is an honorary member of the Columbian Soil Science Society (South America). John served as President of the Exchange Club of Florence, Alabama, sang in church choirs and served in congressional leadership for many years, and was President of the Florence Toastmasters. He loved golfing and football, handyman and outdoor projects visiting with friends and traveling around the world. God and his family were John's greatest joys. He was a loving husband, father grandfather, grandfather, and friends to many. His humble, sincere, and friendly demeanor will be deeply missed.

He is survived by his wife Marlene daughters Sheryl (David) Jarratt, Lori (Gary) Klopff, and Julie (Chris) Stride, and grandchildren : Daniel (Andrea) Michael and Andrew Jarratt; Marcia and Brian Klopff; Jack, Britta, and Brooke Stride. He is also survived by his sister Lucille (Phill) Ramstad and Audrey (Duane) Mortensen, brother Robert (Becky), sisters Marilyn Terwilliger Jeanne (Ken) Steinarter, brother-in-law Elmer Petersen and many nieces and nephews. John is preceded in death by his parents and his sister Carole Petersen. Dr. John Jacob Mordvedt will be buried at Stordahl Cemetery near Dell Rapids, South Dakota.



# Reports of meetings

## Responding to the Global Soil Crisis - UN Rio+20 Side Event

24 April 2012 United Nations, New York

Three IUSS members recently addressed a meeting at the United Nations in New York.

Global soil degradation is increasingly being recognised as a threat to food security, biodiversity and fresh water security. Scientists, alarmed that the rate of topsoil loss is now exceeding the rate of soil formation, are determining the environmental sustainability thresholds for soil erosion and calculating the timescales at which the world runs out of topsoil. At the same time, the fundamental role of soil in the delivery of ecosystem services including food and fibre production, fresh water regulation and support of biodiversity, has largely been ignored in international policy. Given projected increases in global population this issue now has critical significance.

To bring further attention to the issue of global soil degradation, and to build support for the issue to be addressed at Rio+20, the Australian Government hosted a side event to the negotiations for Rio+20 at the United Nations in New York on Tuesday 24th April. *The Hon Robert Hill*, former Australian Ambassador to the UN, chaired the event, which was opened by the current Australian ambassador Mr Gary Quinlan. Speakers included members of the Soil Carbon Initiative international coalition of soil scientists, IUSS von Liebig medallist *Professor Rattan Lal* from Ohio State University, and IUSS Deputy Secretary General *Professor Alex McBratney* from the University of Sydney. Dr Neil McKenzie, Chief of Land and Water CSIRO and former vice-chair of IUSS Division 1, represented the Australian Government. The UN Convention on the prevention of Desertification and Drought (UNCCD) was represented by Dr Nandhini Iya Krishna, from the UNCCD New York Liaison Office.

The Benin Ambassador to the UN and representatives from the UN Food and Agriculture Organisation (FAO), the European Commission, the Ghana Mission to the UN, the Institute for Advanced Sustainability Studies in Potsdam, Germany, the United States Department of Agriculture and the Savory Institute responded to the presentations.



*H.E. Ambassador Gary Quinlan, Australian Ambassador to the UN welcoming the delegates*



*Dr Neil McKenzie, CSIRO*



*Professor Alex McBratney, IUSS and University of Sydney*

For more information, contact *Andrea Koch*, Program Leader, Soil Carbon Initiative at:

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and see: <http://ussc.edu.au/events/past/UN-Rio20-Side-Event-Responding-to-the-Global-Soil-Crisis>

## Communique of the 36<sup>th</sup> Annual Conference of the Soil Science Society of Nigeria

held at the University of Nigeria Nsukka, Enugu State from 12<sup>th</sup> to 16<sup>th</sup> March, 2012

The 36<sup>th</sup> Annual Conference of the Soil Science Society of Nigeria was held at the University of Nigeria, Nsukka, Enugu State, from 12 – 16 March 2012. The theme of the Conference was **“Climate Change, Soil Management Alternatives and Sustainable Food Production”**. The opening ceremony was chaired by the Vice Chancellor, University of Nigeria Nsukka, Professor Bartho Okolo, who was represented by the Deputy Vice Chancellor Academic, Professor I. U. Asuzu, who presented the Vice-Chancellor’s welcome address. The keynote address at the opening ceremony was given by the Honourable Minister of Agriculture and Rural Development, Dr Akinwumi Adesina who subsequently declared the Conference open.

Notable among the dignitaries that attended the Conference were the Chairman, Senate committee on agriculture, Distinguished Senator Emmanuel Bwasha, who was represented by Distinguished Senator Kaka and Professor Pedro Sanchez of the Earth Institute at Columbia University, Washington DC, USA. Invited papers were presented by Dr. David N. Sasseville of AgriGuardian, Professor Uche Amalu of University of Calabar, Professor Carol C. Mba of the University of Nigeria, Nsukka and Professor Pedro Sanchez of the Earth Institute at Columbia University.



Over four hundred soil scientists and other environmentalists, farmers, policy makers, and students attended the Conference. Participants brainstormed on current challenges of Climate Change vis-a-vis soil management strategies to promote sustainable food production and Food Security. Over 250 papers in the areas of soil survey, classification, evaluation and land use; soil fertility, chemistry and microbiology; soil physics, land degradation, soil and water resources management were presented. A field trip was undertaken to Songhai Farms at Adani with a stop over at a sand quarry site at Nkpologu, both in Uzo-Uwani LGA of Enugu State.

Arising from the deliberations at the plenary and technical sessions of the conference, as well as the field trip, the following observations were made:

1. The impacts of Climate Change on soil resources and crop yields remain a serious threat to food security in Nigeria. The devastating impact of gully erosion and desert encroachment on human settlements and farm lands are clear evidences of the dangers ahead. There is an urgent need for mitigation and adaptation measures to the negative impacts of Climate Change. Soil Science Society of Nigeria commends Federal Government’s initiative in establishing Climate Change desks in the Ministries.
2. The Agricultural Transformation Agenda of the Federal Government has potentials of repositioning Nigerian agriculture to meet the challenges of Food Security which demands the active participation of Soil Scientists in evolving soil management strategies.
3. The inadequacy of geo-referenced soil information constitutes a serious impediment to effective and sustainable land use management.
4. Nigeria’s soil resources are currently under severe stress being intensively cultivated without adequate conservation and nutrient replacement measures, resulting in soil physical, chemical and biological degradation; a situation likely to worsen by the phenomenon of Climate Change.

5. There is national and global concern on soil environmental health due to non recognition of the potentials of beneficial soil inhabiting organisms and non protection of biodiversity in the ecological system.
6. Crop production in Nigeria is very far from being sustainable and yields are far below their potentials due mainly to intensive cropping on infertile fragile soils, micronutrient depletion, inappropriate soil management techniques and weak input delivery system.
7. The Soil Science Society of Nigeria commends the Honourable Minister of Agriculture and Rural Development for recognizing the critical roles of soil scientists in developing appropriate soil maps and soil management strategies that will drive the agricultural transformation agenda of the Federal Government of Nigeria.
8. The existing soil map of Nigeria produced at a reconnaissance (small) scale, has limitations for sustainable agricultural development and agro-technology transfer. The realization of the Transformation Agenda necessarily requires the inputs of soil scientists to achieve the set goals. The Soil Science Society of Nigeria also commends the Federal Ministry of Agriculture and Rural Development for involving the Society in the implementation of the National Soil Survey Project.

The Soil Science Society of Nigeria therefore resolves as follows:

1. To promote soil management and agro-technology transfer that will successfully drive the agricultural transformation agenda, Government is requested to expedite action on the actualization of the proposed Nigerian Soil Information System (NSIS) as a component part of the African Soil Information System (AFSIS).
2. Urgent action is needed to arrest the enormous destruction of land resources resulting from Climate Change related land degradation such as gully erosion and desertification.
3. Government should consider as a matter of urgency the critical need to upgrade soil research laboratories in Research Institutes and Universities with state-of-the art equipment to facilitate research and capacity building for soil improvement.
4. Government should urgently consider the approval of the Nigerian Soil Science Institute bill to holistically address the soil resources management problems of the country as well as manage its soil data base.

5. There is the need for pro-active actions on carbon sequestration and trading through research and development which can be achieved through appropriate use of soil organic matter and promotion of soil building organisms.
6. There is the need for timely and adequate provision of relevant inputs such as organic and inorganic fertilizers, especially micronutrients, to ensure increased crop yields and sustainable soil productivity.
7. The society reiterates her call on Government to increase funding for research and outreaches on Climate Change issues and facilitate collaboration between Government agencies like Federal Ministry of Environment, Nigerian Meteorological Agency (NIMET), Universities, Research and Extension Institutes and National and International NGOs.

The Society immensely appreciates the support of the University of Nigeria, Nsukka, Federal Ministry of Agriculture and Rural Development, Universities and Research Institutes, National Program on Food Security and Government Agencies and Private Organizations for their contributions towards the successful hosting of the 36<sup>th</sup> Annual Conference. Dated this 15<sup>th</sup> day of March, 2012.

*Professor V.O. Chude, FSSSN, President*

*Professor J. A. Adediran, Secretary*

## **28<sup>th</sup> Congress of the Polish Society of Soil Science (PSSS)**

**Held from 5-10 September 2011 at the Nicolaus Copernicus University in Toruń.**

During the opening ceremony hosted by the Rector of the University the Honorary Member of the Polish Society of Soil Science was made to Prof. Nicola Senesi, Prof. Jerzy Marcinek and Prof. Jan Gliński. After the opening ceremony plenary session lectures were presented by Prof. Nicola Senesi - President of the European Confederation of Soil Science Societies, Prof. Stephen Nortcliff – Past Secretary General of IUSS, Prof. Winfried Blum – Past President of the European Confederation of Soil Science Societies, Prof. Donald Gabriels, Prof. Jerzy Marcinek and Prof. Jan Łabętowicz.

*Some 170 soil scientists from Poland and 20 from foreign countries participated in the Congress with the theme “Soils – Human – Environment”. Main topics of the conference were: soil genesis, classification and cartography, soil chemistry and physics, soil biology,*





*degradation, conservation and reclamation of soils, use and management of soils. The Congress one-day three scientific field excursions were held; one to examine chosen soils of the Vistula Valley and the Chełmno Morainic Plateau, second to examine soils of the Toruń Basin and the Inowrocław Plain and last concerned soils under the intensive agricultural use of the Cuiavia and Pałuki regions. Also was organized two-day post-congress field excursion to examine young glacial soil and landscapes in the Brodnica region.*

At the General Assembly of the Polish Society of Soil Science delegates elected the new Board for the period 2011-2015:

President	- Prof. Zbigniew Zagórski
Vice-President	- Prof. Andrzej Mocek
Vice-President	- Associate Prof. Cezary Kabała
Secretary	- Prof. Halina Smal
Secretary for International Relations	- Prof. Józef Chojnicki
Treasurer	- Prof. Wojciech Owczarzak

*Józef Chojnicki*  
*Secretary of PSSS for International Relations*

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## News From The Brazilian Soil Science Society

[www.sbcs.org.br](http://www.sbcs.org.br)

The Brazilian Soil Science Society (SBSCS) is one of the oldest scientific societies in Brazil: it was established in 1947. In 2011, during the Brazilian Congress of Soil Science, a new Board of Directors (known as the Council) was elected. Since then the Society is setting up a modernization process in its structures and external relations through a renewed statute and new by-laws. The Council, composed by 20 members, has met recently to discuss the agenda and planning for 2012 and beyond. In the meeting it was decided and reinforced that the Society should aim to: (a) become more influent in Brazilian environmental public policies, (b) reach leadership in public soil awareness in a continental-sized country like Brazil and (c) interact with other scientific societies due to the transdisciplinary nature of Soil Science.

Similarly to the IUSS, the SBSCS scientific activities are undertaken through four Divisions and their related Commissions. The administration is performed by the Council, composed by a President, two Vice-Presidents, a Secretary-General, a Deputy-Secretary-General and a Treasurer, as well as by the directors of the divisions and regional/state branches and two Past-Presidents. Currently, Mr. G. S. de Farias, a soil scientist from the Agronomic Institute of Paraná State, is the President and Professors R. Cantarutti, R. Fernandes and E. Matiello (all of them from the Federal University of Viçosa, Minas Gerais State) are





*Participants of the Brazilian Soil Science Society Council meeting realized in February/March 2012.*

Secretary-General, Deputy-Secretary-General and Treasurer, respectively.

Two of the long-lasting and important activities of the Society are (1) the promotion of various scientific events throughout the country (namely, the Brazilian Congress of Soil Science, the Symposium on Soil Education, the Soil Fertility and Biology Meeting, the Soil and Water Management and Conservation Meeting, the Soil Classification and Correlation Meeting; all of them take place every two years) and (2) the publication of the Brazilian Journal of Soil Science. At present, another important issue under work is the organization of the 21<sup>st</sup> World Congress of Soil Science (Rio 2018), whose first arrangements will be presented in the IUSS Inter-Congress Meeting next June in Jeju, Korea.

*Gonçalo S. de Farias and Cristine C. Muggler*

## **Report From The 5th Global Workshop On Digital Soil Mapping**

**Sydney, 10-13 April 2012**

I have the privilege to attend the 5<sup>th</sup> Global Workshop on Digital Soil Mapping (DSM) held 10-13 April 2012 in Sydney. The workshop started with Prof. Alex McBratney as an MC to welcome us at the Univer-

sity of Sydney, followed by opening speeches from Prof. Jae Yang (President of IUSS), Prof. Alfred Hartemink (Secretary General of IUSS), Prof. Janis Boettinger (Chair of digital soil mapping working group), Prof. Budiman Minasny (Chair of the Workshop). An opening speech by Prof. Robert Hill highlighted the importance of soil information in relation to global initiatives and issues. The keynote by Lee Belbin discussed *Environmental data: a perspective from the Atlas of living Australia*, Dr. Jeff walker presented *High resolution soil moisture mapping* using various sensors from ground-based to satellite-based. In total there were 25 papers presented in the first day. The day's activities were finalised with an Aussie BBQ.

For me, the first day workshop is really impressive. Every presenter must deliver his/her presentation in just 5 minutes. Every 5 minutes, we saw new topic, each presenter has a different way of presentation. It was really a dynamic, and lively workshop. The objective is to deliver only the essence of their work, while the details can be found in the accompanied paper.

The second day, 24 papers were presented in 5 sessions: *Digital soil modelling*, *Digital mapping of soil classes*, *Sampling and monitoring in DSM*, and *Cyber infrastructure & expert system*. The second day was also enriched by kenote presentation by Prof. Garry






*It's different down under*

Willgoose (*The potential role of pedogenesis modeling in digital soil mapping*), Dr. David Clifford (*The effect of preferential sampling on sampling variance*), and Bruce Simons (*OneGeology: improving Access to GeoScience Globally*). It was very enlightened to see presentations from outside of the regular DSM crowd. The second day we had a gala dinner at the beautiful L'Aqua in Darling Harbour with entertainment by swing jazz musicians and also Alex.

The third day was a field excursion. Two busses arrived early at 6.30 am but not much people came yet. Perhaps, last night's dinner made people having good sleep. Somehow, all must weak up earlier. Hunter valley is area that we are going to visit. The area is one of the major wine production areas in Australia. Dr. Damien Field, introduced us to the Australian landscape and soil. I really enjoyed travelling while comparing the Australian landscape with my home town. We arrived in Hunter Valley after 2.5 hour drive. We were informed about the history, soil variability and wine quality before we visit field to see selected soil profiles. As usual, hot discussions and comments arose when soil scientists see a soil profile. Nevertheless, the debate is ended when everybody were asked to test the wine. After that, everybody enjoyed their rest returning to Sydney.

At the last day of conference, 22 papers were presented in 3 sessions: *Operational DSM*, *Proximal, remote sensing and spectroscopy of soil*, and *GlobalSoiMap.net*. Three keynote speeches were delivered, Prof. Janis Boettinger presented *The future is now: operational digital soil mapping*; Dr. Ian C. Lau presented *Mapping surface mineralogy and soil properties using hyperspectral imagery*, and Dr. Neil McKenzie presented the *GlobalSoilMap.net* project. After the last session, Janis as chair of the DSM working group led a meeting to select the new vice-chair, and the next 6<sup>th</sup> DSM workshop. In that meeting, Mogens Greve was appointed as the new vice-chair. There were 5 countries who proposed to host the next DSM workshop including Wageningen (the Netherlands), Quebec (Canada), Seoul (South Korea), Nanjing (China), and Bali (Indonesia). Each proponent was asked to present their proposal in 3 minutes and the workshop attendance vote for their favourites. The final votes tallied by the President and the Secretary General of IUSS showed that Nanjing in China was selected for the next global digital soil mapping workshop in 2014. During this session, there are also several awards given. Budiman Minasny was voted for the Peter Burrough award for the best idea in DSM for his paper entitled *Mapping the occurrence and thickness of soil horizon within*



*soil profile*. The best poster was awarded to *Implementing DSM in the Thai soil survey* by Monjoon, Rossiter, Jetten and Udomsri. The best oral presentation by student was awarded to Jenette Goodman from Purdue University, US for her paper *Application predicting soil organic carbon using mixed conceptual and geostatistical models in glaciated landscapes*. The best oral presentation was awarded to Julian Caudeville from INERIS, France for *Spatial modelling of human exposure to soil contamination*.

For me, this workshop is a dynamic, and lively full of productive discussions. As a new comer in DSM, and as the first Indonesian research who involve in practicing, it provides me with new ideas and new knowledge on how to apply this new technology to promote farmer's prosperity for providing enough food, feed, fibre, and fuel while securing our soil resources. This workshop provided me with lots of opportunities to meet, and talk to other world researchers, it enabled me to exchange ideas and pursue further collaboration by networking and partnership. Thanks to the organizing committee in Sydney for providing a wonderful workshop.

*Yiyi Sulaeman*

## The XIX Venezuelan Congress of Soil Science

**Calabozo, 21-25 November 2011**

Between the 21 and 25 of last November the Venezuelan Soil Science Society celebrated its **XIX National Soil Congress** at the city of Calabozo, in the middle of our central alluvial plains. We were able to gather 160 attendants, with an important group representing the new generation of Soil Scientist. During those days 110 papers were presented, mostly as cartels, covering a range of subjects, but dominated by properties and processes and use and management. Special emphasis was given to new biofertilizers, conservation tillage and the need for more integral indicators to evaluate management practices on the soil properties. In addition we had a Forum including local farmers and researchers, one Symposium to analyze the status of soil inventory, the existing soil laboratories and the production of fertilizers. Finally we had two Conferences, one by an expert from Embrapa, Brazil, relating their experiences on the use and management of savannahs,

and the other on the Potential use of fosfogypsum for our acid soils. An interesting field trip concluded the Congress including the experiences on the use of Vertisols for 50 years under irrigated rice.

Several Conclusions and Recommendations are being sent to all our associates and to Governmental Institutions with the hope to decide on actions to overcome our deficiencies.

**Juan Comerma**

*President SVCS*

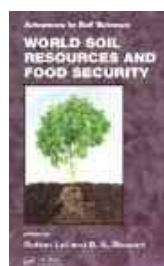
# New Publications

**Handbuch des Bodenschutzes – Bodenökologie und Bodenbelastung, Vorbeugende und abwehrende Schutzmaßnahmen.** Edited by Hans-Peter Blume, Rainer Horn and Sören Thiele-Bruhn. Wiley-VCH, Hardcover, 757p., 2011  
ISBN 978-3-527-32297-8.

This book has long been and still is a standard reference dealing with all aspects of soil use and soil protection. The fourth completely revised edition is subdivided into five sections. The first section deals with natural soil properties and functions in the light of soil conservation and protection for sustaining future society needs. In section two the various types of stresses imposed on soils and their impacts are discussed beginning with physical threats like sealing, compaction, erosion, irrigation and drainage followed by chemical aspects related to fertilization and contamination and finally problems particularly associated with urbanization (waste deposits, gas contamination, modification of soil temperature).

A brief chapter at the end of this section specifically treats effects of global warming on soils. Section three introduces the use of soil inventories (geographical information systems, thematic maps, etc.) as a basis for soil protection and to develop sustainable site specific management systems. Protection strategies encountering the various soil threats through technical solutions, laws and regulations are focused on in section four. Particularly the *German Federal Soil Protection Act* but also regulations and guidelines applied in Switzerland, Austria and on the European level are outlined. Tools for thorough planning to ensure sustainable soil use and to prevent irreversible negative impacts are explained in detail specifically for each soil threat.

Finally, the fifth and last section discusses possibilities to restore natural soil functions by recultivation, remediation, and renaturation of sealed, degraded, contaminated and drained soils. This book is a very comprehensive reference on virtually any soil protection aspect and highly recommended not only for soil scientists but every professional and non professional involved with soils in one or the other way.



**World Soil Resources and Food Security** Edited by Rattan Lal, B.A. Stewart. Published September 13th 2011 by CRC Press – 574 pages. Series: Advances in Soil Science.  
ISBN-13: 978-1439844502.

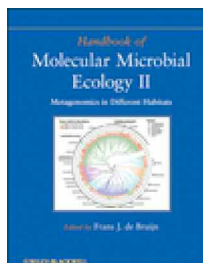
*World Soil Resources* and Food Security takes an in-depth look at the availability and status of soil resources in the context of the growing demands of an increasing world population and rising expectations of living standards. This timely reference presents current information on the soil resources available for food production. Presenting innovative strategies for soil and water management, it discusses how to maintain or improve the world's soil resources in order to increase food production. With the majority of the world's 1.02 billion food-insecure people concentrated in South Asia and sub-Saharan Africa, several chapters focus on soil resources in these regions. Contributions from renowned scientists deal with topics including: global food situations, world soil resources, soil resources of humid Asia and their acidification, soil resources of South Asia, properties and management of vertisols, use of radioisotopic techniques in soil management, the potential of rain-fed agriculture in the semiarid tropics, the status of land degradation, and nutrient balance in sub-Saharan Africa. This volume is a useful resource for those interested in the state of the soils of the world in relation to food security and environmental quality.

**Best Management Practices for Saline and Sodic Turfgrass Soils Assessment and Reclamation.** By Robert N. Carrow, Ronny R. Duncan. Published September 12th 2011 by CRC Press – 480 pages.  
ISBN-13: 978-1439814741.

A comprehensive, science-based approach to understanding the various salinity stresses on turfgrass, landscape plants, and soils, this book covers the causes, problems, and characteristics of saline and sodic sites. It discusses site assessments for each type of salinity stress, including laboratory and field methods, and soil and water quality report interpretations. Presenting options for the development and implementation of best management practice



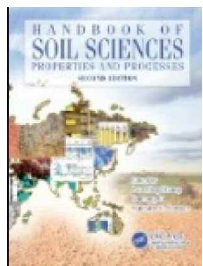
(BMPs), it considers whole ecosystem site assessment for environmental issues such as soil quality/sustainability, salt disposal, and potential to affect surface and ground waters.



**Handbook of Molecular Microbial Ecology II: Metagenomics in Different Habitats**, By Frans J. de Bruijn.

ISBN: 978-0-470-64719-6. Hardcover. 640 pages. September 2011, Wiley-Blackwell. Other Available Formats: E-Book.

The *Handbook of Molecular Microbial Ecology* is the first comprehensive two-volume reference to cover unculturable microorganisms in a large variety of habitats, which could not previously have been analyzed without metagenomic methodology. It features review articles as well as a large number of case studies, based largely on original publications and written by international experts. This second volume, *Metagenomics in Different Habitats*, covers such topics as: viral genomes, metagenomics studies in a variety of habitats (including marine environments and lakes, soil, and human and animal digestive tracts, other habitats, including those involving microbiome diversity in human saliva and functional intestinal metagenomics; diversity of archaea in terrestrial hot springs; and microbial communities living at the surface of building stones), biodegradation, biocatalysts and natural products. A special feature of this book is the highlighting of the databases and computer programs used in each study; they are listed along with their sites in order to facilitate the computer-assisted analysis of the vast amount of data generated by metagenomic studies. Such studies in a variety of habitats are described here, which present a large number of different system-dependent approaches in greatly differing habitats.



**Handbook of Soil Sciences Resource Management and Environmental Impacts, Second Edition** Edited by Pan Ming Huang, Yuncong Li, Malcolm E. Sumner. CRC Press, 2011. 830 pages.

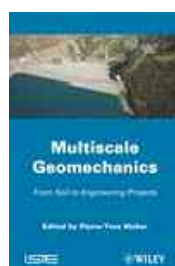
ISBN-13: 978-1439803073.

*Handbook of Soil Sciences: Resource Management and Environmental Impacts, Second Edition* is the second of two volumes that form a comprehensive reference on the discipline of soil science. Com-

pletely revised and updated to reflect the current state of knowledge, this volume covers interfacial interactions between the physical, chemical, and biological regimes within the soil; the factors that control the availability of plant nutrients and microelements; interdisciplinary aspects of soil science, including salinity, sodicity, and soil erosion; and soil databases for assessing worldwide soil resources. Critical elements addressed in each section include: descriptions of concepts and theories, definitions, approaches, methodologies, procedures, data in tabular and figure format, and extensive references.

**Handy Dictionary of Soil Science English-Polish & Polish-English.** Charzynski P, Switoniak M. 2011.

Nicolaus Copernicus University Press, Torun. ISBN 978-83-231-2690-4. This dictionary is intended to appeal to a wide audience, not only to scientists working in the field of soil science and related disciplines, but also to students of environmental and agriculture sciences. A rapid increase in knowledge has brought many new terms and concepts to soil science. International cooperation and exchange of scientific ideas require precise and unambiguous communication in English. The authors have devoted themselves to compiling as complete a set of terms and phrases as possible, which complemented the professional language as a result of soil science development within over 30 years from the date of the previous similar dictionary in Polish. For details: [www.wydawnictwoumk.pl/autor.php?autor=Charzy%F1ski+Przemys%B3aw](http://www.wydawnictwoumk.pl/autor.php?autor=Charzy%F1ski+Przemys%B3aw)



**Multiscales Geomechanics: From Soil to Engineering Projects.** By Pierre-Yves Hicher. January, 2012. Wiley-ISTE.

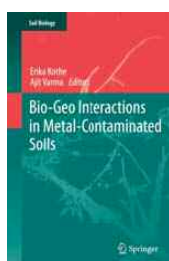
ISBN: 978-1-84821-246-6.

Hardcover. Price \$195.00.

This book addresses the latest issues in multiscale geomechanics.

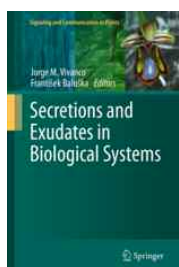
Written by leading experts in the field as a tribute to Jean Biarez (1927-2006), it can be of great use and interest to researchers and engineers alike. A brief introduction describes how a major school of soil mechanics came into being through the exemplary teaching by one man. Biarez's life-long work consisted of explaining the elementary mechanisms governing soil constituents in order to enhance understanding of the underlying scientific laws which control the behavior of constructible sites and to incorporate these scientific advancements into engi-

neering practices. He innovated a multiscale approach of passing from the discontinuous medium formed by individual grains to an equivalent continuous medium. The first part of the book examines the behavior of soils at the level of their different constituents and at the level of their interaction. Behavior is then treated at the scale of the soil sample. The second part deals with soil mechanics from the vantage point of the construction project. It highlights Biarez's insightful adoption of the Finite Element Codes and illustrates, through numerous construction examples, his methodology and approach based on the general framework he constructed for soil behavior, constantly enriched by comparing in situ measurements with calculated responses of geostuctures.



**Bio-Geo Interactions in Metal-Contaminated Soils.** Series: Soil Biology, Vol. 31. Kothe, Erika and Varma, Ajit (Eds). 2012, 2012, IX. Springer. ISBN: 978-3-642-23326-5. Hardcover, 423 pages. Price \$209.00.

Metal contamination is an increasing ecological and eco-toxicological risk. Understanding the processes involved in metal mobilization, sorption and mineralization in soils are key features for soil bioremediation. Following an introduction to the physical, chemical and biological components of contaminated soils, various chapters address the interactions of soil, microorganisms, plants and the water phase necessary to transfer metals into biological systems. These include topics such as potential hazards at mining sites; rare earth elements in biotic and abiotic acidic systems; manganese redox reactions; biomineralisation, uranium in seepage water; metal-resistant streptomycetes; mycorrhiza in re-forestation; metal (hyper)accumulation in plants; microbial metal uptake; and their potential for bioremediation.



**Secretions and Exudates in Biological Systems.** Series: Signaling and Communication in Plants, Vol. 12. Vivanco, Jorge M. and Baluška, František (Eds.). 2012, 2012, VII. Springer. ISBN: 978-3-642-23046-2. Hardcover, 283 pages. Price \$189.00. Secretions and emissions

in biological systems play important signaling roles within the organism but also in its communications

with the surrounding environment. This volume brings together state-of-the-art information on the role of secretions and emissions in different organs and organisms ranging from flowers and roots of plants to nematodes and human organs. The plant chapters relate information regarding the biochemistry of flower volatiles and root exudates, and their role in attracting pollinators and soil microbial communities respectively. Microbial chapters explain the biochemistry and ecology of quorum sensing and how microbial communities highly co-adapted to plants can aid in bio-energy applications by degrading ligno-cellulosic materials. Other chapters explain the biology of secretions by nematodes, algae and humans, among other organisms. This volume will be a welcome addition to the literature, as no other book covers aspects related to biological secretion in such a holistic and integrative manner.



**Sols et Environnement.** Edited by MC Girard, C. Walter, JC Remy, J. Berthelin J. and J.L. Morel. DUNOD-F. Sciences Sup., Hardcover, 2nd Ed., 896 p., 36 chap. ISBN 978-2100549009.

This manual is designed for French speaking students involved in Masters and Schools of Engineering (Environmental Sciences, Agricultural Sciences, Earth Sciences). It will also be helpful for professionals involved with soils as a reference for up-to-date knowledge on soil processes and policies. This fully revised second edition integrates contributions from nearly 80 specialists, carefully edited to ensure facility of comprehension and homogeneous presentation. All aspects of the environmental challenges of tomorrow are considered as soils are a key element of the environment: waste recycling, pollution by toxic substances, water resource, greenhouse gas fluxes, carbon sequestration, soil biodiversity. Soils have also a societal role and this edition integrates new contributions on viewpoints from sociology, law and economics on the integration of the soil resource in public decision. The book is divided into 36 chapters within 6 sections: I. The soil as core element of the biosphere; II. Soils and human activities; III. Soil functions; IV. Soils and land management; V. Soil: threats, prevention and rehabilitation; VI. Soil and social sciences. At the end of each chapter classroom-tested exercises are provided and supplements are available online.

**Geografía de suelos de México (Soil Geography of Mexico).** Vol. I / P. Krasilnikov, F.J. Jiménez-Nava, T. Reyna-Trujillo, N.E. García-Calderón (eds.).

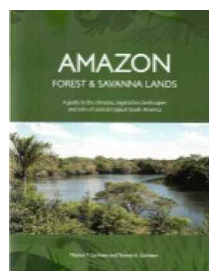
Mexico: UNAM, Facultad de Ciencias, 2011. xvi+462 p. + 1 CD-ROM (12 cm). (In Spanish) ISBN: 978-607-02-2704-2.

This book represents an extensive work on soil geography of Mexico. The first volume includes two major parts: an introduction to soil geography and the soil characteristics of 7 of the 17 physiographic regions of the country, the rest will be described in a second volume. This study is a joint effort of specialists from the National Autonomous University of Mexico (UNAM), National Institute of Statistics and Geography (INEGI), Postgraduate College and some other Mexican and foreign universities and institutions, with totally 35 contributors to the book. The publication is the first textbook and a desk reference edition on soil geography in Spanish. Thus, it is recommended not only for specialists from Mexico and neighboring countries, but for all the Spanish-speaking pedologists interested in the rules of spatial distribution of soils on the terrestrial surface. The contents of the 1st volume are the following: 1) Spatial distribution of soils and factors that determine it, 2) Parent material as a geographical factor of distribution of soils, 3) Climatic factor of soil distribution in Mexico, 4) Relief as a factor of soil distribution in Mexico, 5) Time as a factor of variation and geographical distribution of soils, 6) ecosystems as a factor of geographical distribution of soils, 7) Changes in soil cover due to anthropogenic influence: a focus on tropical regions, 8) Methodology of soil geography, 9) Pedodiversity: concept, evaluation and its use for global analysis of soils, 10) Mapping soil degradation in Mexico: evolution and perspectives, 11) Soil mapping and soil maps of Mexico, 12) Regional soil geography: Baja California's peninsula, 13) Regional soil geography: Sonora's flatland, 14) Regional soil geography: Sierra Madre Occidental, 15) Regional soil geography: the Great Planes of North America, 16) Regional soil geography: Yucatan's peninsula, 17) Regional soil geography: Chiapas and Guatemala's ridges, 18) Regional soil geography: Cordillera Centro Americana.

For ordering information please contact: Rosanela Alvarez and Mercedes Perelló, Coordinación de Servicios Editoriales de la Facultad de Ciencias, UNAM:

[editoriales@ciencias.unam.mx](mailto:editoriales@ciencias.unam.mx)

Price: 30 USD



**Amazon Forest and Savanna Lands. -A guide to the climates, vegetation, landscapes and soils of central Tropical South America.** Thomas T. Cochrane and Thomas A. Cochrane. 2011. AMAZON.

ISBN: 1452866376,

EAN13: 9781452866376. Full Colour, 190 pages.

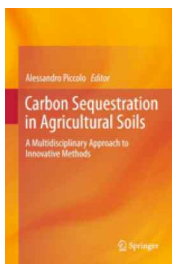
Price \$49.

This book provides an overview of the land resources of the Amazon in terms of its complex of climates, landscapes, vegetation and soils. The main text is subdivided into 3 sections supported by "References to Studies" available free from the authors' web site: <http://www.agteca.org>.

Section 1 is an updated sequel to the pioneering digital Land Systems study of the region carried by the senior author and published by CIAT-EMBRAPA-CPAC in 1985 (ISBN 84-89206-39-2). The authors have re-digitized that study as a Personal Computer Version with Database. Section 2 summarizes 3 larger-scale land resource studies of critical areas of Amazonia; "The Geo-economic Region of Brasilia", "The Northern Amazon Region of Bolivia" and "The Western Amazon State of Rondonia, Brazil".

It starts with a discussion on the methodology developed for those studies which was subsequently refined and adopted by the ISSS (now IUSS) in developing the SOTER methodology. Section 3 summarizes a series of novel findings from the studies. The main text is supported with 44 pages of appendices covering a series of practical technologies, including references to the authors' equation to correct Al toxicity in mineral soils, their differential equation to estimate fertilizer needs, and their new osmotic potential equation that has helped elucidate "solution flow through the soil-plant continuum" and "K deficiency in plants". In synthesis, the book in addition to providing an insight into the soils and ecological complex of forest and savanna lands throughout Amazonia, summarizes a series of technologies of importance to the study of tropical lands and agriculture in general. It is considered that it would be a valuable reference source for many soil, agronomic, plant and ecological scientists.

The book is available from [amazon.com](http://amazon.com)



**Carbon Sequestration in Agricultural Soils. A Multidisciplinary Approach to Innovative Methods.** Piccolo, Alessandro (Ed.). 2012, 2012, XIII. Springer. ISBN: 978-3-642-23384-5. Hardcover, 307 pages. Price \$129.00.

This compilation of techniques, methodologies and scientific data arises from a four-year Italian research project, which took place at university research stations in Turin, Piacenza, Naples and Potenza. Soil Organic Matter (SOM) represents an active and essential *pool* of the total organic carbon on the planet. Consequently, even small changes in this SOM carbon pool may have a significant impact on the concentration of atmospheric CO<sub>2</sub>. Recent new understanding of the chemical nature of SOM indicates that innovative and sustainable technologies may be applied to sequester carbon in agricultural soils. Overall results of the project have been applied to develop an innovative model for the prediction and description, both quantitatively and qualitatively, of carbon sequestration in agricultural soils. This book provides experts in different areas of soil science with a complete picture of the effects of new soil management methods and their potentials for practical application in farm management.



**Developments in Palygorskite-Sepiolite Research. A New Outlook on these Nanomaterials.** Edited by Arieh Singer, Seagram Center for Soil & Water Research, Hebrew University of Jerusalem, Rehovot, Israel, and Emilio Galan, Department of Crystallography, Mineralogy and Agriculture Chemistry, Faculty of Chemistry, University of Seville, Seville, Spain. July, 2011. Elsevier. ISBN: 978-0-444-53607-5. Hardcover, 520 pages. Price \$165.00.

The aim of this comprehensive book is to present the most important results achieved in the research of the clay minerals palygorskite and sepiolite. Palygorskite and sepiolite have found to be useful in a huge variety of industrial and medical applications. As a result, research on these clays has been intensified during the last two decades, and important advances in their characterization have been made. The book contains contributions from distinguished scientists in the field.

**The State of the World's Land and Water Resources for Food and Agriculture. Managing Systems at Risk.** by FAO, 2011. Routledge, Taylor and Francis Group. ISBN: 978-1-84971-326-9. Hardcover, 294 pages. Price \$160.00. ISBN: 978-1-84971-327-6.

The State of Land and Water Resources (SOLAW) is FAO's first flagship publication on the global status of land and water resources. It is an 'advocacy' report, to be published every three to five years, and targeted at senior level decision makers in agriculture as well as in other sectors. SOLAW is aimed at sensitizing its target audience on the status of land resources at global and regional levels and FAO's viewpoint on appropriate recommendations for policy formulation. SOLAW focuses on these key dimensions of analysis: (i) quantity, quality of land and water resources, (ii) the rate of use and sustainable management of these resources in the context of relevant socio-economic driving factors and concerns, including food security and poverty, and climate change. This is the first time that a global, baseline status report on land and water resources has been made. It is based on several global spatial databases (e.g. land suitability for agriculture, land use and management, land and water degradation and depletion) for which FAO is the world-recognized data source. Topical and emerging issues on land and water are dealt with in an integrated rather than sectoral manner. The implications of the status and trends are used to advocate remedial interventions which are tailored to major farming systems within different geographic regions.



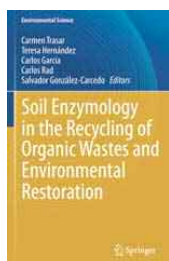
**Mechanical Behaviour of Soils Under Environmentally-Induced Cyclic Loads.** Series: CISM International Centre for Mechanical Sciences, Vol. 534. di Prisco, Claudio Giulio and Muir Wood, David. 2012, 2012, X. SpringerWien New York. ISBN: 978-3-7091-1067-6.

Hardcover, 574 pages. Price \$249.00.

The book gives a comprehensive description of the mechanical response of soils (granular and cohesive materials) under cyclic loading. It provides the geotechnical engineer with the theoretical and analytical tools necessary for the evaluation of settlements developing with time under cyclic, environmentally induced loads (such as wave motion, wind actions, water table level variation) and their consequences for the serviceability and durability of structures such as the shallow or deep foundations used in off-



shore engineering, caisson breakwaters, ballast and airport pavements and also to interpret monitoring data, obtained from both natural and artificial slopes and earth embankments, for the purposes of risk assessment and mitigation.



**Soil Enzymology in the Recycling of Organic Wastes and Environmental Restoration.** Series: Environmental Science and Engineering. Subseries: Environmental Science. Trasar-Cepeda, C.; Hernández, T.; García, C.; Rad, C.; González-Carcedo, S. (Eds.). 2012, XX. Springer. ISBN: 978-3-642-21161-4. Hardcover, 350 pages. Price \$179.00.

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



**Explorations into a Dynamic Process-Oriented Soil Science.** By Douglas Frink, Worcester State University, MA, USA. June, 2011. Elsevier. ISBN: 978-0-12-387821-2. Hardcover, 126 pages. Price \$140.00.

The paradigm and models of traditional soil science lack the ability to adequately address issues of soil dynamics, environmental integration, and change. Unexplainable research results obtained from traditional soil studies applied to non-traditional soil phenomena in physical geography, archaeology and ecology speak to the current need for soil science to move beyond description and classification and into a dynamic process-oriented soil science capable of providing explanations. Soils do not behave as static inert geologic detritus affected by climate, organisms, relief, and parent material through time, but instead soils behave as self-organizing systems dynamically interrelating with their environment. Recognition of this dynamic

behaviour required a re-examination of how scientists in general think and in how modern soil science specifically evolved its basic paradigms and models. This book examines the dynamics of soil organic carbon and demonstrates the self-organizing nature of soil through time as soil responds to a wide range of environmental and human perturbations.



**Formation and Properties of Clay-Polymer Complexes.** By B.K.G. Theng, Landcare Research, Palmerston North, New Zealand. April, 2012. Elsevier. ISBN: 978-0-444-53354-8. Hardcover, 440 pages. Price \$170.00.

This book provides a comprehensive account of the reactions between clay minerals and organic polymers. The book opens with a discussion of the structures of common clay minerals, clays colloid chemistry, and the behaviour of organic polymers at clay surfaces. This is followed by a systematic treatment of complex formation between clay minerals and various classes of synthetic and naturally occurring polymers, a description of the properties of the resulting complexes and, wherever appropriate, their practical applications. The book will have a new separate chapter on clay-polymer nanocomposites. Each chapter is written as a self-contained review paper, giving a list of reference to the original literature.



**Soil-Subsurface Change: Chemical Pollutant Impacts.** By Bruno Yaron, Ishai Dror, Brian Berkowitz. Weizmann Institute of Science, Rehovot, Israel. April 2012. Springer. ISBN: 978-3-642-24386-8. Hard cover 366 pages. Price \$209.00.

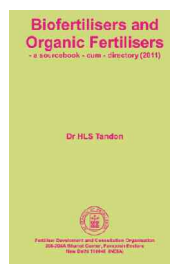
While the soil-subsurface system has in many cases been affected by human impact, the effects of chemical contaminants on the actual matrix and properties have been largely neglected. The major focus of the book is on changes to the soil-subsurface matrix and properties caused by chemical pollution. By integrating results available in the literature, we observe that chemical pollutants may lead to the irreversible formation of a new soil-subsurface regime characterized by a matrix and properties different than those of the natural regime. In contrast to the geological time scales dictating natural changes to the matrix and properties of the

soil-subsurface system, the time scale associated with chemical pollutant-induced changes is far shorter and extends over a “human lifetime scale.” The numerous examples presented in the book confirm that chemical contamination should be considered as an additional factor in the formation of a contemporary soil-subsurface regime that is different than that of the natural system. This book combines soil science, earth science, and environmental geochemistry, providing comprehensive background information for specialists interested in chemical-induced changes in the soil-subsurface system.



**Upper Permian Paleosols: Features, Processes, Environment,** by S.A. Inozemtsev, V.O. Targulian. Moscow – 2010. GEOS.

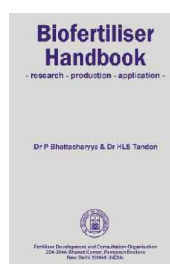
The Upper Permian paleosols compiling three pedocomplexes were described and studied in geological outcrops of red-colored Late Permian sedimentary rocks in the river Sukhona valley (Russian Plain). All individual paleosols were assessed as monogenetic and repeatedly reproduced soil bodies within the pedocomplexes. They were formed due to regular alternation of cycles of sedimentation and hydro-morphic pedogenesis on the low alluvial plain. The detail macro-meso-micro- and submicro-morphological as well as chemical and particle size analyses were implemented for each profile of paleosols in pedocomplexes. On this empirical base the reconstruction of paleopedogenesis for each paleosols as well as for the whole pedocomplexes were implemented. The monogenetic profiles of paleosols were horizonated by similar combinations of the main specific pedogenic processes: stagnation, eluviation-illuviation of iron, carbonates and sometimes clays, structural transformation of cambic horizons, sometimes slickenside and humus formation. The whole paleopedocomplexes were formed according to fluvial accretion model of pedogenesis. The paleogeographic reconstruction produced from these paleopedological data is the low alluvial plain with savanna-like vegetation and alternation of semiarid and semihumid hot climate. The book is addressed to scientists in soil science, paleopedology, paleogeography, paleontology and geology.



**Biofertilisers and Organic Fertilisers** — a sourcebook-cum-directory. By **HLS Tandon** 2011. pp. 156. ISBN: 81-85116- 63-6. Fertiliser Development and Consultation Organisation, 204-204A Bhanot Corner, 1-2 Pamposh Enclave New Delhi 110 048 (India), Price/ copy

US\$ 60 (inclusive of airmail delivery). [www.tandon-tech.net](http://www.tandon-tech.net), Contact: [fdco@airtelmail.in](mailto:fdco@airtelmail.in).

Biofertilisers and organic fertilizers are two of the most important components of integrated nutrient management (INM). Biofertilisers mainly consist of living microbial inoculants which either make net additions to the nutrient supplies (as in case of N fixation) or as solubiliser/mobilize of the nutrients already present in the soil (as in case of P/K-solubilisers, mycorrhiza etc). The aim of this publication is (i) to create greater awareness about these vital farm inputs which are now key components of INM(ii) to provide the contact details of producers and products available to the end users farmers and (iii) to stress that biofertilisers and organic fertilizers have a role to play in the entire land under agriculture/horticulture and their use is by no means confined to organic farming/production systems. Apart from an overview chapter, this book deals with the (ii) status of production of biofertilisers and organic fertilizers (ii)quality standards (iii) a directly of producers and technology providers of producers followed by a listing of research and development resources, addresses of certification agencies for organic production, a detailed index followed by a short functional glossary of common terminology.



**Biofertiliser Handbook : research-production-application.** By **P. Bhattacharyya and HLS Tandon** 2012. pp. 190 + x. ISBN: 81-85116- 64-4. Fertiliser Development and Consultation Organisation, 204-204A Bhanot Corner, 1-2 Pamposh Enclave New Delhi 110 048 (India),

Price/ copy US\$ 60 (inclusive of airmail delivery). [www.tandontech.net](http://www.tandontech.net), Contact: [fdco@airtelmail.in](mailto:fdco@airtelmail.in).

This Handbook provides a research-based, practically useful account of biofertilisers (nutrient related bio-inoculants) from production to practical application. This handbook covers all major N-fixers (Rhizobium, Azotobacter, Azospirillum, Acetobacter, Blue green algae, Azolla), P-solubilising biofertilisers and nutrient mobilisers such as Mycorrhiza. Some aspects

of the versatile fungus *Trichoderma* are also covered. The various aspects dealt with in this handbook are: Biofertilisers – their classification, characteristics, role and mode of action; product characteristics, crop specificity, advantage and limitations; impact of biofertilisers on crops, soils and economics; biofertiliser production technology; packaging, labelling, handling and storage of biofertilisers; biofertiliser production and consumption; biofertiliser promotion and marketing; biofertiliser application and practical recommendations; quality standards and methods of analysis; R&D efforts and resources; references and additional reading material; and finally a test by which the readers can test their biofertiliser knowledge (self test). The text is supported by a number of tables, diagrams, pictures and appendices. This handbook written in simple English will meet the needs of a diverse readership including the producers of biofertilisers, entrepreneurs planning to enter these fields, microbiologists, students and teachers in colleges, those practicing organic farming, R&D centers, persons interested in environmental aspects and eco-friendly technologies, technology transfer centers, independent consultants/farm advisors, and biofertiliser quality assessment laboratories.



**Soil Engineering.** Series: Soil Biology, Vol. 20. Dedousis, Athanasios P.; Bartzanas, Thomas (Eds.). 1st Edition., 2010, XI. Springer. ISBN: 978-3-642-03680-4. Hardcover, 230 pages. Price \$199.00.

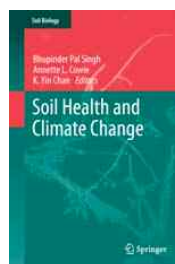
This *Soil Biology* volume will update readers on several cutting-edge aspects of sustainable soil engineering including topics such as: soil compaction, soil density increases, soil disturbance and soil fragmentation; soil tillage machineries and optimization of tillage tools; soil traffic and traction, effects of heavy agricultural machines, the use of robotics in agriculture and controlled traffic farming; mechanical weed control, the characterization of soil variability and the recycling of compost and biosolids in agricultural soils.



**Endospore-forming Soil Bacteria.** Series: Soil Biology, Vol. 27. Logan, Niall A.; De Vos, Paul (Eds.). 1st Edition., 2011, XV. Springer. ISBN: 978-3-642-19576-1. Hardcover, 347 pages. Price \$209.00.

Aerobic endospore-forming bacteria are found in soils of all kinds,

ranging from acid to alkaline, hot to cold, and fertile to desert. It is well known that endospores confer special properties upon their owners and play dominant parts in their life cycles and dispersal, and much has been written about the spores, genetics, and economic importance of these organisms. Much has also been written about soil ecology, but there is a relative dearth of literature that brings together different aspects of the behaviour and characters of endospore-formers with their contributions to soil ecosystems. This *Soil Biology* volume fills that gap. Following chapters that describe the current classification of these organisms, that review methods for their detection and for studying their life cycles in soils, and that examine their dispersal, other chapters show that they are active and dynamic members of soil floras that interact widely with other soil inhabitants, with roles in nitrogen fixation, denitrification, and soil remediation.



**Soil Health and Climate Change.**

Series: Soil Biology, Vol. 29. Singh, Bhupinder Pal; Cowie, Annette L.; Chan, K. Yin (Eds.). 1st Edition., 2011, X. Springer. ISBN: 978-3-642-20255-1. Hardcover, 403 pages. Price \$209.00.

*Soil Health and Climate Change* presents a comprehensive overview of the concept of soil health, including the significance of key soil attributes and management of soil health in conventional and emerging land use systems in the context of climate change. Starting with a review of the physical, chemical and biological indicators of soil health and their significance for monitoring the impacts of climate change, this book then focuses on describing the role of soil structure, pH, organic matter, nitrogen, respiration and biota in sustaining the basic functions of soil ecosystems, and their anticipated responses to climate change. Further topics include the management of cropping, pastoral, and forestry systems, and rehabilitated mine sites, with a focus on mitigation of and adaptation to climate change impacts. Finally, the opportunities and potential risks of organic farming, biochar and bioenergy systems, and their ability to sustain and even enhance soil health, are discussed.



### **Organic Farming, Pest Control and Remediation of Soil Pollutants.**

Series: Sustainable Agriculture Reviews. Lichtfouse, Eric (Ed.). 2010, X. Springer. ISBN: 978-1-4020-9653-2. Hardcover, 418 pages. Price \$199.00. Sustainable agriculture is a rapidly growing field aiming at producing

food and energy in a sustainable way for humans and their children. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control, and biodiversity depletion. Novel, environmentally-friendly solutions are proposed based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economy, and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. Because most actual society issues are now intertwined, global, and fast-developing, sustainable agriculture will bring solutions to build a safer world. This book series gathers review articles that analyze current agricultural issues and knowledge, then propose alternative solutions. It will therefore help all scientists, decision-makers, professors, farmers and politicians who wish to build a safe agriculture, energy and food system for future generations.



### **Lessons learned from Long-term Soil Fertility Management Experiments in Africa.**

Bationo, A.; Waswa, B.; Kihara, J.; Adolwa, I.; Vanlauwe, B.; Saidou, K. (Eds.). 2012, 2012, VI. Springer. ISBN: 978-94-007-2937-7. Hardcover, 210 pages. Price \$189.00.

This book elucidates the importance of long-term experiments in revealing evidence of soil fertility decline in Africa. An evaluation of experiences from on-going long-term experiments is given in broad detail. The first chapter explains the paradigm shift in soil fertil-

ity management then provides justification for long-term experiments before illuminating experiences from long-term experiments in East, West and Southern Africa. The second, sixth, eighth and ninth chapters give an in-depth account of crop management practices and soil fertility interventions in long-term trials within specific agro-ecological zones in West Africa. The rest of the chapters (chapter three, four, five and seven) address crop management, tillage practices and, organic and inorganic fertilizer applications in the context of long-term experiments in specific agro-ecological zones in East Africa.

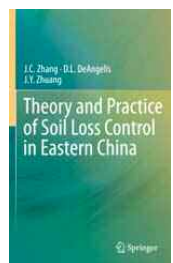


### **Improving Soil Fertility Recommendations in Africa using the Decision Support System for Agrotechnology Transfer (DSSAT).**

Kihara, J.; Fa-tonndji, D.; Jones, J.W.; Hoogenboom, G.; Tabo, R.; Bationo, A. (Eds.). 2012, 2012, VI. Springer. ISBN: 978-94-007-2959-9. Hardcover, 184 pages.

Price \$209.00.

The book gives a detailed description of the application of DSSAT in simulating crop and soil processes within various Agro-ecological zones in Africa. The book, an output of a series of 3 workshops, provides examples of the application of DSSAT models to simulate nitrogen applications, soil and water conservation practices including effects of zai technology, phosphorus and maize productivity, generation of genetic coefficients, long-term soil fertility management technologies in the drylands, microdosing, optimization of nitrogen x germplasms x water, spatial analysis of water and nutrient use efficiencies and, tradeoff analysis. The minimum dataset requirements for DSSAT is discussed. This book arises from attempts to address the limited use of models in decision support by African agricultural (both soil scientist and agronomists) scientists.



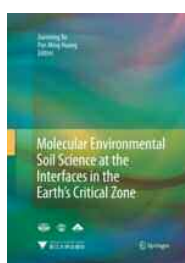
### **Theory and Practice of Soil Loss Control in Eastern China.**

Zhang, J.C., DeAngelis, D.L., Zhuang, J.Y. 1st Edition., 2011, XIV. Springer. ISBN: 978-1-4419-9678-7. Hardcover, 294 pages. Price \$179.00.

In recent decades in eastern China there has been great progress towards ecological restoration through reforestation of bare lands and steeply sloping cultivated land suffering from serious erosion. This book introduces several soil loss control models suitable for land use strategies along with many techniques of reforestation with a

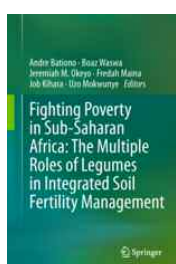


focus on improving the living standards of farmers. These strategies include “local recycling,” which combines the use of trees (fruit trees, herb, bamboo), crops for feeding livestock, use of animal wastes for biogas and fertilizer, fish production, and a “large scale recycling,” fostering the interaction between the countryside of the mountainous areas and the urban areas in the lower elevations. The “local recycling” can alleviate poverty for farmers and provide fuel material that replaces dependence on twigs and tree litter, which in turn protects the reforested young trees from being harmed. The “large scale recycling” creates a more harmonious society and promotes the common health and wealth of the countryside and the city. This book presents the most comprehensive and successful models of reforestation in eastern China.



**Molecular Environmental Soil Science at the Interfaces in the Earth's Critical Zone.** Xu, Jian-Ming; Huang, Pan Ming (Eds.). Jointly published with Zhejiang University Press. 1st Edition., 2010. Springer. ISBN: 978-3-642-05296-5. Hardcover, 364 pages. Price \$409.00.

“Molecular Environmental Soil Science at the Interfaces in the Earth's Critical Zone” presents contributions from the 1st International Symposium of Molecular Environmental Soil Science at the Interfaces in the Earth's Critical Zone held in Hangzhou, China. It introduces new ideas, findings, methods, and experience on above new and emerging subject areas. A broad range of topics are covered: the role of mineral colloids in carbon turnover and sequestration and the impact on climate change, biogeochemical interfacial reactions and dynamics of vital and toxic elements, ecotoxicology of anthropogenic organics, environmental nanoparticles and their impacts, and ecosystem health. The book will be a valuable reference for researchers in soil chemistry, environmental chemistry, mineralogy, microbiology, ecology, ecotoxicology, and physics.



**Fighting Poverty in Sub-Saharan Africa: The Multiple Roles of Legumes in Integrated Soil Fertility Management.** Bationo, A.; Waswa, B.; Okeyo, J.M.; Maina, F.; Kihara, J.; Mokwunye, U. (Eds.). 1st Edition., 2011, VIII. Springer. ISBN: 978-94-007-1535-6. Hardcover, 246 pages.

Price \$209.00.

Inclusion of legumes in cropping systems can play an increasingly important role to maintain soil fertility and sustain crop production. Legumes are an important source of nutrition to both humans and livestock by providing the much needed protein, minerals, fiber and vitamins. The sale of legumes seed, leaves and fiber generates income for the marginalized communities especially women in the dry-land areas. Cultivation of legumes is essential for the regeneration of nutrient-deficient soils. Legumes can be incorporated into cropping systems as green manure, intercropped or rotated with cereals and as leguminous shrubs in improved fallow systems. By biologically fixing nitrogen (BNF) in the soil, legumes provide a relatively low-cost method of replacing otherwise expensive inorganic nitrogen in the soil. Legumes also improve other soil physical properties, provide ground cover and reduce soil erosion, increase soil organic matter, cation exchange capacity, microbial activity and lowers soil temperature and suppress weeds and pests. All these beneficial effects result in enhanced soil fertility and boosts subsequent cereal crop yields. Legumes therefore play an important role of improving the livelihoods of smallholder farmers around the world.

Despite the above benefits, production of legumes in SSA is hampered by a number of constraints. Most soils in SSA are deficient in key nutrients especially phosphorus that is essential for proper legume establishment. Other limitations include low soil pH, high salinity, drought and flooding. Legume production is also hindered by new diseases, pests, and weeds, which farmers need to learn how to control if the full benefits of legumes are to be gained. Beyond the abiotic factors are issues of access to inputs (improved seed and fertilizers), markets and access to relevant production information. This book presents a synthesis of research work on legumes and draws attention to the importance of legumes in integrated soil fertility management (ISFM) and poverty alleviation in SSA.



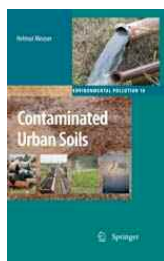
**Biomangement of Metal-Contaminated Soils.** Series: Environmental Pollution, Vol. 20. Khan, M.S.; Zaidi, A.; Goel, R.; Musarrat, J. (Eds.). 1st Edition., 2011, XVIII. Springer. ISBN: 978-94-007-1913-2. Hardcover, 515 pages. Price \$179.00.

Heavy-metal contamination is one of the world's major environmental problems, posing significant risks to agro-ecosystems. However, conven-

tional technologies for metal-contaminated soil remediation have often been expensive and disruptive.

This book provides comprehensive, state-of-the-art coverage of the natural, sustainable alternatives that use a wide range of biological materials in the removal/detoxification of heavy metals, consequently leading to the improvement of crops in these soils. Novel, environmentally friendly and inexpensive solutions are presented based on a sound understanding of metal contamination and the roles of plants and microbes in the management of these toxic soils.

Written by more than forty worldwide experts drawing on their wealth of experience in this field, the book provides not only the necessary scientific background but also addresses the challenging questions that require special attention in order to better understand metal toxicity in soils and its management through bioremediation.

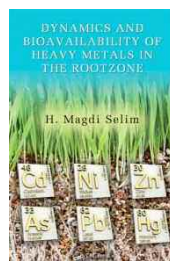


**Contaminated Urban Soils.** Series: Environmental Pollution, Vol. 18. **Meuser, Helmut.** 1st Edition., 2010, XIX. Springer. ISBN: 978-90-481-9327-1. Hardcover, 318 pages. Price \$129.00.

This book gives a current overview of all facets of urban soils. Different

urban land-use types in a number of examples worldwide are introduced. Many examples in different countries are provided in order to illustrate the situation in detail. The contaminant sources of urban soils (e.g., dust deposition, contamination along roadsides, contamination of floodplains, application of wastewater, anthropogenic deposits) are comprehensively presented. For practical application purposes a key with which to identify technogenic materials during field work is presented. Features like reductomorphic conditions in landfill soils, acidification of coal mining heaps and the impact of physical characteristics such as sealing are taken into consideration in the context of the contamination problem. The mobility of contaminants in the soils under consideration is introduced and discussed. The content of the book, however, is not limited to the description of contaminated urban soils. Different methods of assessment (classification, functional assessment, assessment focused on pathways with reference to standardized exposure scenarios) are introduced. Finally, quality standards for contaminated land in a number of countries are listed, compared and discussed. The book links up the contamination problem of urban soils with geographical aspects such as

the historical development of city growth, the process of urbanization and the urban-to-rural gradients. Accordingly, the reader will be able to understand the specific problems of contaminated urban soils and will find sensible approaches to assessment.



**Dynamics and Bioavailability of Heavy Metals in the Rootzone.** H. Magdi Selim (Ed.). Published by CRC Press. Taylor and Francis. ISBN: 978-1-43-982622-5. Hardcover, 313 pages. Price \$129.95.

Concerns regarding heavy metal contamination in terrestrial ecosystems

have prompted increasing efforts on limiting their bioavailability in the root zone. The complexity of the hydrologic system gives rise to the need for understanding the fate and transport of trace elements in the soil-water-plant environment. **"Dynamics and Bioavailability of Heavy Metals in the Rootzone"** provides a multidisciplinary approach with emphasis on geohydrology, plant and soil science, and environmental chemistry. The primary focus of this book is on different approaches that describe the dynamics of heavy metals in the soil system. These approaches are key to providing direct information on the concentration of heavy metals and hence on their transport, toxicity, and bioavailability. The book includes chapters covering equilibrium and kinetic models of heavy metal interactions as well as non-equilibrium transport models. It also discusses chemical processes controlling soil solution concentrations and modeling of heavy metals adsorption. Addressing the biological component of heavy metal dynamics, this work examines rhizosphere microorganisms and phytoremediation. Colloid-associated transport, which can result in groundwater contamination, is discussed in relation to reclaimed mine sites. The authors also present an overview of recent advancements in the biogeochemistry of trace elements and their environmental implications. Additional chapters include examination of various natural environments including runoff waters at the watershed scale, heavy metal transformation in wetlands, dynamics of trace metals in frequently flooded soils, and effects on crops in biosolid-amended soils. Reliable assessment of potential risks resulting from the transport of trace elements in the soil environment requires the examination of complex chemical and biological interactions due to the heterogeneous nature of soils. This text describes the current state of the art in this field and explores innovative experimental and theoretical/modeling ap-

proaches that will enhance this knowledge. The book provides a coherent presentation of recent advances in techniques, modeling, and dynamics and bioavailability of heavy metals in the root zone.



**Clean Soil and Safe Water.** Series: NATO Science for Peace and Security. Series C: Environmental Security. Quercia, Francesca F.; Vidojevic, Dragana (Eds.). 2012, 2012, XVII. Springer. ISBN: 978-94-007-2239-2. Hardcover, 299 pages. Price \$229.00. ISBN: 978-94-007-2242-2. Softcover, 299 pages. Price \$119.00.

This book addresses questions of relevance to governments and industry in many countries around the world, in particular concerning the link between contaminated-land-management programs and the protection of drinking water resources and the potential effects of climate changes on the availability of these same resources. On the “problem” side, it reports and analyzes methodologies and experiences in monitoring and characterization of drinking water resources (at basin, country and continental scales), pollution prevention, assessment of background quality and of impacts on safety and public health from land and water contamination and impacts of climate change. On the “solution” side, the book presents results from national cleanup programs, recent advances in research into groundwater and soil remediation techniques, treatment technologies, research needs and information sources, land and wastewater management approaches aimed at the protection of drinking water.



**Organic Fertilisation, Soil Quality and Human Health.** Series: Sustainable Agriculture Reviews, Vol. 9. Lichtfouse, Eric (Ed.). 2012, 2012, XII. Springer. ISBN: 978-94-007-4112-6. Hardcover, 372 pages. Price \$209.00.

Sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans and their children. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control, and biodiversity depletion. Novel, environmentally-friendly solutions are proposed based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry,

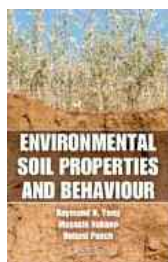
toxicology, ecology, economy, and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. Because most actual society issues are now intertwined, global, and fast-developing, sustainable agriculture will bring solutions to build a safer world. This book series gathers review articles that analyze current agricultural issues and knowledge, then propose alternative solutions. It will therefore help all scientists, decision-makers, professors, farmers and politicians who wish to build a safe agriculture, energy and food system for future generations.



**Genetic Engineering, Biofertilisation, Soil Quality and Organic Farming.** Series: Sustainable Agriculture Reviews. Lichtfouse, Eric (Ed.). 1st Edition, 2010, VI. Springer. ISBN: 978-90-481-8740-9. Hardcover, 390 pages. Price \$209.00.

Sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans and their children. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control, and biodiversity depletion. Novel, environmentally-friendly solutions are proposed based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economy, and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. Because most actual society issues are

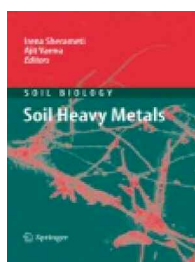
now intertwined, global, and fast-developing, sustainable agriculture will bring solutions to build a safer world. This book series gathers review articles that analyze current agricultural issues and knowledge, then propose alternative solutions. It will therefore help all scientists, decision-makers, professors, farmers and politicians who wish to build a safe agriculture, energy and food system for future generations.



**Environmental Soil Properties and Behaviour.** By **Raymond N. Yong, Masashi Nakano, Roland Pusch.** Published by CRC Press. Taylor and Francis. ISBN: 978-1-43-984529-5.

Hardcover, 455 pages. Price \$119.95.

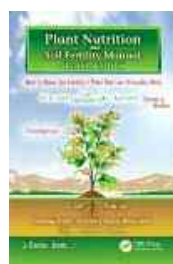
**Environmental Soil Properties and Behaviour** examines changes in soil properties and behaviour caused by short- and long-term stresses from anthropogenic activities and environmental forces. Introducing new concepts of soil behaviour, soil maturation, and soil functionality, it integrates soil physics, soil chemistry, and soil mechanics as vital factors in soil engineering. The book focuses on environmental soil behaviour, with particular attention to two main inter-related groups of soil–environment issues. The first is the use of soil as an environmental tool for management and containment of toxic and hazardous waste materials. The second is the impact of ageing and weathering processes and soil contamination on the properties and behaviour of soils, especially those used in geotechnical and geoenvironmental engineering projects. To determine short- and long-term soil quality and soil functionality, the authors emphasize the need to be aware of the nature of the stressors involved as well as the kinds of soil-changing processes that are evoked. This book takes a first step toward a much-needed transdisciplinary effort to develop a broader and deeper understanding of what happens to soil and how we can determine and quantify the effect of biogeochemical processes. It offers a timely resource for the study of soil properties and behaviours, effects of environmental changes, and remediation of contaminated soil.



**Soil Heavy Metals.** Series: Soil Biology, Vol. 19. Sherameti, Irena; Varma, Ajit (Eds.). 1st Edition, 2010, XVIII. Springer. ISBN: 978-3-642-02435-1. Hardcover, 492 pages. Price \$229.00.

Human activities have dramatically changed the composition

and organisation of soils. Industrial and urban wastes, agricultural application and also mining activities resulted in an increased concentration of heavy metals in soils. How plants and soil microorganisms cope with this situation and the sophisticated techniques developed for survival in contaminated soils is discussed in this volume. The topics presented include: the general role of heavy metals in biological soil systems; the relation of inorganic and organic pollutions; heavy metal, salt tolerance and combined effects with salinity; effects on arbuscular mycorrhizal and on saprophytic soil fungi; heavy metal resistance by streptomycetes; trace element determination of environmental samples; the use of microbiological communities as indicators; phytostabilization of lead polluted sites by native plants; effects of soil earthworms on removal of heavy metals and the remediation of heavy metal contaminated tropical land.



**Plant Nutrition and Soil Fertility Manual. Second Edition.** By **J. Benton Jones, Jr.** Published by CRC Press. Taylor and Francis. ISBN: 978-1-43-981609-7. Softcover, 304 pages. Price \$79.95.

As soil and crop management procedures have become more complex, County Agricultural Agents, farm advisors, consultants, and fertilizer and chemical dealers have had to specialize in some aspect of soil fertility and crop nutrition management procedures, limiting their ability to provide a range of advice and services. Most farmers and growers can no longer turn to just one source for the information and instruction needed to achieve their production goals. With over 70 percent new material, the second edition of the **Plant Nutrition and Soil Fertility Manual** discusses the principles determining how plants grow and the elements essential for successful crop production, with a focus on the principles of soil fertility and plant nutrition. The book covers physical and chemical properties of soil, chemical and organic fertilizers, soil acidity and alkalinity, liming and liming materials, and micronutrients essential to plant growth. It also describes elements toxic to plants, soil testing, and plant analysis.



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