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International Union of Soil Sciences (IUSS)

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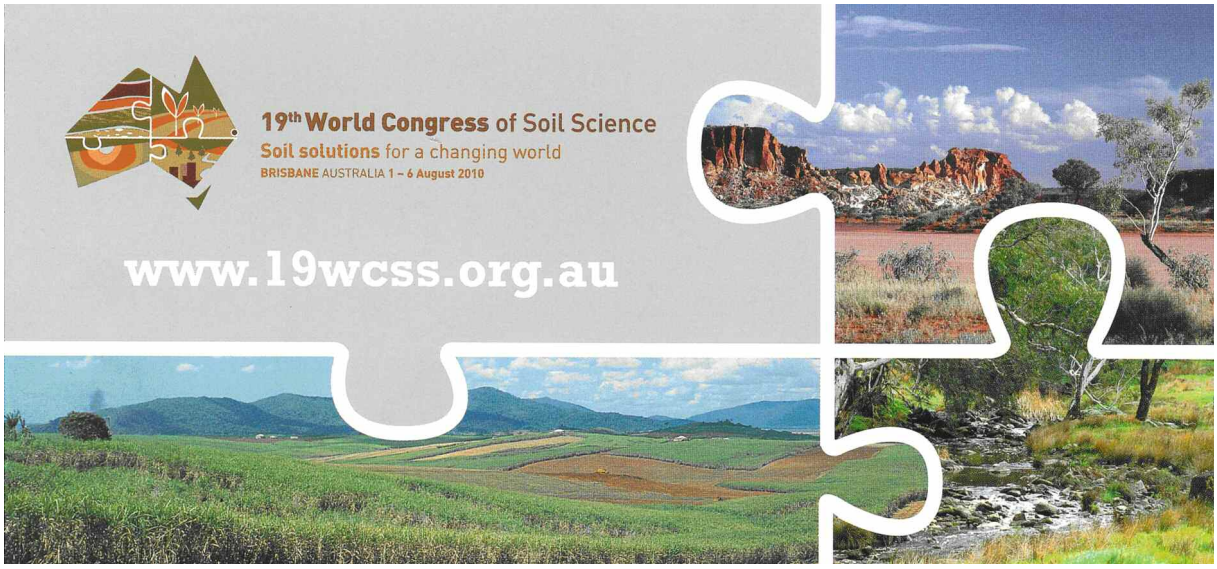

With only 3 months to go the 19th World Congress of Soil Science the Organising Committee is thrilled to release some very impressive statistics concerning the Congress. The Early Bird Registration discount available to 30 April 2010 has brought an avalanche of registrations in the past two weeks. The Organising Committee are delighted to report the following (as at 29 April 2010):

- Registered delegates – 1106 (and climbing by the hour)
- Number of delegates participating in the Congress Excursions – 193
- Number of delegates participating in the Congress Tours (field trips) - 75
- Total number of papers received – 2573
- Total number of papers accepted for Oral Presentation - 351
- Total number of papers accepted for Poster Presentation - 2110

Papers were received from all over the world, the top 10 country submitting papers for the Congress are:

- Australia – 359
- USA – 171
- India – 165
- Brazil – 145
- China - 140
- Iran – 119
- Japan - 108
- Russia - 92
- Germany – 84
- New Zealand – 66

Confirmed Keynote Speakers

Dr Luc M Maene

Luc Maene is the Director-General of an International Fertiliser Industry Association (IFA) and Vice-Chairman of the Board of the International Fertiliser Development Centre (IFDC). He is a Belgian national who graduated in agricultural engineering (Gent 1970) and worked on overseas projects in Malaysia and Tunisia for several years. Since 1982, he has been involved in all aspects of fertilisers, first in the UN, then IFA for many years and he is a world expert in this area. He has an Honorary Doctorate from the University of Putra Malaysia.

Professor Bruce James

Bruce James, Department of Environmental Science & Technology, University of Maryland, specialises in oxidation/reduction processes in soils and water. He is particularly interested in environmental issues and the productive interaction between landscapes, soils and people, and has lectured and published widely on these topics.

Dr Neil McKenzie

Neil McKenzie is the Chief of CSIRO Land & Water. He obtained his BS, MS and PhD degrees at University of New England, Australia, in the area of Natural Resources and has developed a specialist interest in soil classification and monitoring. He has formulated national standards for soil measurement & monitoring as well as soil survey & land assessment with new methods for digital soil mapping. He has made substantial contributions to the book 'Australian Soils and Landscapes' and to the establishment of the comprehensive Australian Soil Resources Information System (ASRIS).

Dr Pedro Sanchez

Pedro Sanchez is Director of the Tropical Agriculture and the Rural Environment Program, Senior Research Scholar and Director of the Millennium Villages Project at the Earth Institute, Columbia University. He directs the African Soils Information Service (AfSIS) to develop the digital soils map of the world. Dr Sanchez is Professor Emeritus of Soil Science & Forestry, North Carolina State University, and served as Director-General of the World Agroforestry Centre (ICRAF) from 1991-2001. He received his BS, MS and PhD degrees in soil science from Cornell University. His professional career is dedicated to help eliminate world hunger and absolute rural poverty while protecting and enhancing the tropical environment. He is author of 'Properties & Management of Soils of the Tropics'. He serves on the Board of Agriculture and Natural Resources of the US National Academy of Sciences. Pedro Sanchez is the 2002 World Food Prize laureate and a 2004 MacArthur Fellow.

Professor Robert Zeigler

Robert Zeigler is Director-General of the International Rice Research Institute (IRRI), Philippines since 2005 where he previously worked during the 1990s. He received his BS from the University of Illinois (1972), his MS from Oregon State University (1978), and his PhD in plant pathology from Cornell University (1982). Robert has extensive international experience, particularly in Africa and Latin America. He worked in Burundi from 1982 for 3 years as technical adviser to the nation's maize program, then at CIAT as the Institute's senior plant pathologist until 1992, and then to IRRI for six years as the leader of the Rainfed Lowland Rice Research Program. Robert then became Professor and Head of the Department of Plant Pathology and Director of the Plant Biotechnology Centre at Kansas State University. He subsequently became Director of the Mexico-based Generation Challenge Program Consultative Group on International Agricultural Research. Through these and other activities he has now accumulated more than 30 years of knowledge and experience in international agricultural research and related matters.

Dr Colin Chartres

Colin Chartres took up his current position as Director-General of the International Water Management Institute (IWMI) in October 2007. Dr Chartres has 30 years experience in research and policy reform in Australia and overseas, across the area of natural resources management, with a focus on water and soils. He holds a PhD in Pedology from the University of Reading, U. K. and a BSc. in Geography from the University of Bristol. U. K. Colin has spent a considerable part of his career working on international development issues with organizations such as CSIRO and the Australian Geological Survey Organization (AGSO). He was a Chief Scientist of the Bureau of Rural Sciences and a Past Chair of the Global Research Alliance Water Action Council and of Australia's National Radio-active Waste Repository Advisory Committee. Prior to joining IWMI he was Chief Science Advisor to Australia's National Water Commission and also worked as Chief of Division of Geo-hazards, at AGSO, leading research on earthquake risks and groundwater resources. Colin supervised projects for the National Land and Water Resources Audit in Australia and was a member of the Steering Committee of the CGIAR Challenge Program on Water and Food. Colin has published over 120 papers, book chapters and reports on soil, water and agricultural management issues. He believes that most of today's water issues cannot be solved without a truly integrated triple bottom line approach, involving environmental, social and economic inputs.

Professor Will Steffen

Will Steffen is the Executive Director of the Climate Change Institute at the Australian National University. Professor Steffen has a BSc from the University of Missouri and MSc and PhD degrees from the University of Florida, USA. Will Steffen has a long history in international global change research, serving from 1998 to 2004 as Executive Director of the International Geosphere-Biosphere Programme (IGBP), based in Stockholm, Sweden, and before that as Executive Officer of IGBP's Global Change and Terrestrial Ecosystems project. Prior to taking up the Directorship of the Climate

Change Institute in 2008, Steffen was the inaugural director of ANU Fenner School of Environment and Society. From 2004 he has served as science adviser to the Australian Government's Department of Climate Change. Steffen's research interests span a broad range within the field of sustainability and Earth System science, with an emphasis on the science of climate change, approaches to climate change adaptation in land systems, incorporation of human processes in Earth System modelling and analysis; and the history and future of the relationship between humans and the rest of nature.

Divisional Reports

Division I

With all the Commissions and working groups, Division I was quite active in 2009 in all over the world. In many cases, meetings were interdisciplinary to highlight the importance of basic soil science for human survival and global soil change in short, medium, and long terms. Division I specifically aimed to focus on a global discussion of carbon budgets and climate change, particularly as soils and soil carbon are now widely recognized having a key role in these contexts.

Commission 1. 1
Soil Morphology and Micromorphology

After the 13th International Meeting on Soil Micromorphology in Chengdu, Sichuan Province, China, Sept. 11-16, 2008, a special issue of the selected papers was published in 2009 by the local organizing Committee in the Journal of Mountain Science. $ 2500 grant from Division I was provided to participants coming from 2nd and 3rd group of countries.

As a result of the earlier meetings on Soil Micromorpholoy a book entitled '*New trends in Soil Micromorphology*' was also published by Springer (S. Kapur, A. Mermut, and G. Stoops, 2008). The book contains state of the art new research results in micromorphology as well as other related disciplines of soil science.

The 3rd Intensive Training Course on Soil Micromorphology has taken place in Barcelona Spain, June 8-19, 2009 by Drs. Rosa Poch, Àngels Canals, and Georges Stoops.

The workshop 'Micromorphology for paleopedological and geoarchaeological research' was organized in November 25-29, Institute of Geology, UNAM, Mexico City, Mexico by Dr. Sergey Sedov.

The 7th International Workshop on the Micromorphology of Glacial Sediments will be held in Queen Mary University of London - London, United Kingdom between May 17-21/2010.

Commission 1. 2
Soil Geography

The international congress '*Soil Geography; New Horizons*' was held in Huatulco (Oaxaca, Mexico) from the 16th to the 20th November 2009, organized by UNAM (Universidad National Autonoma del Mexico) and by INEGI (Instituto National de Estadistica y Geografia del Mexico), sponsored by IUSS (International Union for Soil Science), SLCS (Latin American Society for Soil Science), SMCS (Mexican Society for Soil Science), ECSSS (European Confederation for Soil Science Societies), and IES (Institute for Environment and Sustainability of the Joint Research Center of the European Union). More than 200 scientists from 50 countries attended the congress and presented various research works. IUSS has provided $1500 support to this congress. The scientific program considered the following sections:

- theory and methods of soil geography;
- pedometrics, digital soil mapping, and soil geography;
- landscape dynamics, soil geomorphology, and hydropedology;
- soil classification and soil mapping units: theory and application;
- driving forces of soil diversity: lithogenic versus climatic factors;
- paleosols in the present and past soilscapes;
- pedodiversity and soil geography;
- mountainous tropical soilscapes.

Commission 1. 3
Soil Genesis

9th International Meeting on Soils with Mediterranean Type of Climate. He meeting was held in Beirut, Lebanon, June 22-26 2009. It was jointly organized by the International Union of Soil Science and national Council for Scientific Research-Center of Remote Sensing (CNRS-CRS. The meeting was attended by 45 experts. A field trip was organized on Wednesday 25 June 2009to present the Lebanese soils with a visit to the Cedar mountain forest at Falougha and Baalback Roman Temples.

5th International Conference on *Land Degradation* which was held in Valenzano, Bari, Italy 18-22 September 2008 at the Mediterranean Agronomic Institute of Bari, Italy has produced the Proceeding is in the process of publication in 2009.

The V International Conference on Cryopedology was organized together with The Cryosol Working Group of the IUSS and International Permafrost Association (IPA) was organized on September 14-20 2009 in Ulan-Ude, Buryatia, Russian Federation. The co-organizers of the conference were Institute of Geography, Russian Aca-

demy of Sciences, Moscow and Dokuchaev Soil Science Institute, Russian Academy of Agricultural Sciences, Moscow. There were several groups active in the organization and sponsoring of the conference - Cryosol Working group of IUSS and IPA; Commission of Genesis of IUSS; Commission of Palepedology of IUSS and INQUA; Dokuchaev Soil Science Society; Institute of Physico-Chemical and Biological Problems of Soil Science, Pushchino, Russia; Russian Foundation for Basic Research; Presidium of Russian Academy of Sciences. Over 110 participants attended the meeting representing many different areas of soil science.

Commission 1. 4
Soil Classifications

An international scientific-practical conference was organized on *'Problems of Soils Classification and Diagnostics'* September 25-28 2008 in Yuri Fedkovych Chernivtsi national university. The meeting features 3 symposia:

1. Soils classification: state, approaches and applied aspects.
2. Principles and methods of soils diagnostics.
3. Correlation of national (local) soils classifications with WRB.

Activities on WRB are continuing.

Commission 1. 5
Pedometrics

Biennial Meeting of the Commission took place in the International Conference Centre - China Agricultural University Beijing, China, August 26-28, 2009. This conference highlighted the advances, trends and cross-disciplinary pedometrical applications. The conference was designed to bring together leading international scientists involved in pedometrics and those who are interested to improve our understanding of soil-landscapes. Emerging global soil mapping concepts and quantitative methods that could shape the next generation of soil-landscape models was critically discussed.

Commission 1. 6
Paleopedology

In 2009 the Commission has collaborated with other Commissions of Division I including the International Paleopedology Commission of IUSS/INQUA. In 2010, Paleopedology will collaborate with the International Summer School on Geochronology that will be organized by the University of Zurich, Suisse. For the year 2011 an international workshop is planned in Germany.

Working Groups

Proximal Soil Sensors

Recently established Working Group has started to be functional. They will have a session at the 19th WCSS and they are now planning the first meeting in 2011. This working group have also started to develop a website (www.proximalsoilsensing.org) but it is still incomplete.

Soil Global Change

Objectives of this new Working Group are:

1. Monitor and model the interactions of soils and environmental change and evaluate how to adapt soil systems and management to these on-going changes,
2. The effects of deforestation/reforestation on soil properties; or soil implications of intermittent flooding in lowlands,
3. Cooperate with and advise international and regional organizations on the central role played by soil in global environmental change.

The close interactions of global climate and global soil change are highly significant to the future role of IUSS and its relations not only with a wide array of other disciplines, from natural to social sciences, but with humanity itself. Total 3 Global Soil Change symposia organized by Dan Richter had attracted a lot of attention. An international journal on the same topic is now considered by the working group

Cryosols

Cryosol Working Group developed the diagnostics and taxonomy of permafrost-affected soils for the World Reference Base for Soil Resources and for the US Soil Taxonomy. The last meeting was held in September 14-20, 2009 in Baikal region, Ulan-Ude city, in Russian Federation.

Digital Soil Mapping

The Working Group have been instrumental in developing new technologies for measuring and predicting soil properties They are now working on a new digital soil map of the world using state-of-the-art and emerging technologies for soil mapping and predicting soil properties with fine resolution. This new soil map will be supplemented by interpretations that assist decisions for food production and hunger eradication, climate change, and environmental degradation. **4th Global Workshop on Digital Soil Mapping will take place in May 24-26/2010 in Rome, Italy to discuss the use of Digital Soil Mapping for Digital Soil Assessment. The Workshop will be identifying the key gaps from fields to continents.**

World Reference Base

A WRB database (in MS-ACCESS format) is being compiled that contains field descriptions and analytical data from the international database of USDA, the ISIS database of ISRIC, WRB excursions, and data from selected literature. The Working Group was also involved in the Cryosol meeting which was held in September 14-20, 2009 in Baikal region, Ulan-Ude city, in Russian Federation.

Soil Monitoring

This Working Group is in a planning stage and not yet established. Details will be discussed during the World Congress in Brisbane. Soil monitoring is a pressing requirement, and an area where policy makers are looking to soil scientists to provide solutions. It is the interdisciplinary problem *par excellence*, requiring contributions from pedometricians and those soil scientists with specialist knowledge of key properties and processes and analytical methods. The IUSS should be playing a key role in promoting such interdisciplinary work to ensure that the results are fit-for-purpose. This working group is proposed as a mechanism for this.

Divisional Budget 2009

$ 173. 55 Pedometric Commission for Webster Medal

$ 1500 Soil Geography Commission to support participants

$ 982 Red Mediterranean Soil Meeting

$ 1805. 70 Soil Geography meeting in Huatulco Mexico

Division 2

The division and commission chairs and co-chairs of Division 2 were actively involved in the planning and organization of the scientific sessions to be held at the 19th World Congress of Soil Science in Brisbane, August 1-6, 2010. In total, more than 500 papers for oral and poster presentations were submitted for the sessions proposed by Division 2, and we can look forward to an exciting conference with a rich diversity of topics to be discussed. Additionally, the five commissions within Division 2 were actively involved in the organization of various symposia, workshops, and conferences held in 2009, of which only some are mentioned in this report.

Commission 2. 1 (Soil Physics) helped organize two international meetings in 2009. *Biohydrology 2009* (Brastislava, Slovakia) was attended by over 100 scientists and stakeholders from all over the globe, including an IUSS-sponsored speaker from India. It was a truly multidisciplinary scientific conference with research expertise including hydrology, forestry, agriculture, soil science, plant science, meteorology, geography and geochemistry. *MicroSoil* (Dundee, UK) attracted about 80 participants and investigated novel advances in understanding, characterizing and imaging microscale processes in soil. IUSS sponsored attendance by an invited speaker. The commission co-chair, Dr Laj Ahuja, organized numerous symposia at the ASA/SSSA/CSSA annual meeting in Pittsburgh, ranging from numerical modeling in agriculture systems research to interactions between plant roots and soil. Activities this year have focused on the World Congress. Almost 120 papers were submitted to the two soil physics sessions, in addition to many other relevant contributions to the open sessions.

Commission 2. 2 (Soil Chemistry) supported the organization of the 2nd DFG-IUSS Symposium on *Advances of Molecular Modeling of Biogeochemical Interfaces – Perspectives for Soil Research*, held on October 6-7, 2009, in Dornburg near Jena, Germany. Close to 50 participants from all over the world contributed to the symposium, consisting of 19 lectures and numerous posters. Several distinguished invited speakers, including Don Sparks, Jim Kubicki, Gabi Schaumann, Neal Skipper, Hans Lischka, Sylvio Canuto, M. A. C. Nascimento, and A. G. Kalinichev, reviewed the present status of molecular analytical and modeling methods. In comparison to the first symposium, which was held 4 years ago in Vienna, it became clear that molecular methods have developed significantly and numerous examples of contributions of molecular modeling to elucidate principle processes in soils could be shown. A special issue in *Geoderma* containing the outcome of the symposium is being organized. Further activities concerned the preparation of two symposia during the World Congress in Brisbane.

Commission 2. 3 (Soil Biology) was active in the organization of the session *SSS30 Microbial Functioning of Rhizosphere and Management of Trace Elements Contaminated Soils* (Conveners: P. Nannipieri, M. Schloter and G. Renella) at the EGU in Vienna, April 18-24, 2009. Six oral presentations and fifteen posters were presented. The Commission's Chair, Dr Nannipieri, has been also involved in editing with Paul Eldor the Section D '*Soil Biology and Biochemistry*' of the *Handbook Soil Science* pub-

lished by the American Society of Agronomy and in preparing with Dr Senesi Nicola, Chairman of the Italian Society of Soil Science, and Dr Pagliai Marcello, Past Chairman of the Italian Society of Soil Science, the proposal about hosting the World Congress of Soil Science in Italy in 2018. The proposal will be presented at the Council Meeting World Congress of Soil Science August 2010.

Commission 2. 4 (Soil Mineralogy) organized a symposium on applications of soil mineralogy that attracted 20 oral and 18 poster papers presented at the XIVth International Clay Conference, held under the auspices of AIPEA (the Association Internationale pour l'Etude des Argiles) in Castellenata Marina in southern Italy, June 14-20, 2009. The topics ranged from the application of soil minerals to forensic cases, landslides, soil structure, salt effects on soil, geophysics and geotechnical problems and pollution, as well as quantitative XRD, and the characterization and properties of particular mineral types, including oxides and palygorskites. The keynote address by Dr Rob Fitzpatrick of CSIRO in Australia covered a wide range of applications of soil mineralogy. The only negative aspect was the 'no-shows' by some oral presenters. Soil mineralogy was also pursued within an equally popular session on processes of formation and transformation of minerals in soils. Dr Eleanora Bonifacio from the University of Turin deserves our congratulations for putting together a good symposium that was described in the conference program as 'The Evergreen' topic, but which still presents many unsolved problems and attracts great interest. There is a large number of papers submitted to the upcoming World Congress of Soil Science on these topics, albeit that the Commission 2. 4 symposia there are on 1) the role of minerals in soil associations and 2) control of pollutants by soil minerals. It is essential that Commission 2. 4 continues its involvement in the 4-yearly WCSS.

Commission 2. 5 (Soil chemical, physical and biological interfacial reactions) has participated in and contributed to international symposia in many ways: scientific committees, organization, keynote presentations, sponsorship, posters and talks These meetings have included the following international events:

- '19th International Symposium on Environmental Biogeochemistry' Hamburg, Germany, September 14-18, 2009; particularly two major sessions concerning the soil as biogeochemical interface and soil–plant–microorganisms interactions.
- 'International Symposium of Molecular Environmental Soil Science at the Interfaces of the Earth's Critical Zone, Hangzhou, China, 10-14 October, 2009.

The commission has prepared two symposia for the 19th World Congress of Soil Science to be held in Brisbane, Australia, 1-6 August 2010. The commission is also involved in the preparation of the '6th International Symposium of Interactions of Soil Minerals with Organic Components and Microorganisms' (6th ISMOM) to be held in 2011 in Montpellier, France. ISMOM is one of the major scientific meetings concerning the interfacial processes including biology, chemistry, physics in soil and environmental sciences. It is also closely involved in organizing the '4th International Enzymes in the Environment' conference to be held in Bad Nauheim, Germany in July 2011.

Division 3

For the period 2010 to 2014 new IUSS officers were in 2008 elected. The efforts to keep and enlarge the world wide representation of soil science also by the officers of division 3 have been successful. It is not easy to achieve this. Particularly for the vice-chair positions there is often a lack of candidates.
From Kenia, Africa, will come Patrick Gicheru as chair of commission 3. 5-Soil Degradation Control, Remedation and Reclamation. Alvaro Garcia-Ocampo from Columbia, South America, will take over the chair of commission 3. 3-Soil Fertility and Soil Productivity. John Kim Key-Hoon from Korea will stay in his position of chair of commission 3. 4. -Soil Engineering and Technology. Stephan Mantel and Erich Cammeraat, both from the Netherlands, Europe will chair the commissions 3. 1-Soil Evaluation and Land Use Planning, and 3. 2-Soil and Water Conservation. Vice chairs of the commissions will be from Hungary, Germany, India and Japan. The division chair will be taken over by Rainer Horn, Germany.
To achieve continuity of work of IUSS officers over more than one election period it is desirable that current and upcoming resp. past chairs will meet. The problem is lack of travel funds. The by the division chair organized and by the German Science Association support International Conference on Soil

fertility and Soil Productivity in Berlin, Germany, from 17-20. March 2010, gave the opportunity for intense contact of current and future officers of commission 3. 3-Soil Fertility and Soil Productivity.

19th WCSS in Brisbane, Australia

The contribution of symposia from the division 3 to the 19WCSS are 2 from the division, 10 from the commissions, 5 from working groups and 2 congress symposia.

Conference organization

The International Conference of Soil Fertility and Soil Productivity was organized together with the departments of soil science and agronomy of the Humboldt Universitaet zu Berlin, Berlin, Germany from March 17 to 20, 2010. The Humboldt Universitaet zu Berlin celebrates this year its 200 years anniversary.

Representation of IUSS and visit of meetings

The current commission 3. 3. -Soil Fertility and Soil Productivity did exist before the transformation of the International Soil Science Society to IUSS as working group of IUSS. The working group still exists. It is with two meetings in each year extremely active. It has concentrated its activity on long term field trials and operates under the name WG Long Term Experiments. The summer meeting from 18. -20. 6. 2009 in Bad Lauchstaedt, Germany was visited.
The European Commission is on the way to establish an European soil legislation. To highlight this the European Society for Soil Conservation performed an International Conference on Protection of the Ecological and Productivity Functions of Soil in a PAN European Context in Pruhonice, Czechia from 23. -25. 6. 2009.
The IUSS WG Urban Soils (SUITMA) had its 5th conference from 20. -25. 9. 2009 in New York, USA.
The 9th International Conference of the East and Southeast Asia Federation of Soil Science Societies (ESAFS9) from October 27 – 30, 2009, with the thematic Soils as a Convergent Technology in Tandem with Human and Ecosystem Health, included 3 events of IUSS division 3:

- Symposium of IUSS Com. 3. 4-Soil Engineering and Technology for Human and Ecosystem Health, organized by Kim Key-Hoon Kim, Korea, and M. S. Brar, India.
- Symposium of IUSS Com. 3. 5-Challenges to Soil Degradation Towards Sustain Life and Environment, organized by Tokashi Kosaki, Japan, and
- Symposium of IUSS WG Paddy Soils: Better Performances for Human and Ecosystem Health, organized by Ho Ando, Japan.

The African Soil Science Society had its 5th International Conference from November 22-28, 2009 in Yaounde, Cameroon.

Activity of commissions and working groups

The commission and working group chairs and vice chairs selected and prepared the symposia themes of the 19th WCSS, organized conveners and speakers, and revised papers.
Beside this commission 3. 3-Soil Fertility and Soil Productivity was engaged in the preparation of the International Conference on Soil Fertility and Soil Productivity in March 2010 in Berlin.
Commission 3. 4 and 3. 5, and WG Paddy Soils organized symposia on the 9th ESAFS conference in Seoul, Korea in October 2009 as reported already above.
WG Urban Soils/SUITMA had its 5th conference in New York, USA from 20-25 September 2009.

Division 4

Division 4 supports the objectives of IUSS by providing soil science input in policy-related topics addressing environmental and social concerns, by contributing soil science input in decision-making processes and by addressing special issues in relation to human and socio-economic use of the soils. The five Commissions within Division 4 address issues related to (i) Soils and the Environment (Commission 4. 1); Soils, Food Security and Human Health (Commission 4. 2); Soils and Land Use Change (Commission 4. 3); Soil Education and Public Awareness (Commission 4. 4) and History, Philosophy and Sociology of Soil Science (Commission 4. 5).

Commission 4. 1

In June of 2009, Brent Clothier (Chair of Commission 4. 1) was an invited participant in the OECD Workshop on 'Sustaining Soil Productivity in Response to Global Climate Change - Science, Policy and Ethics', held at The Pyle Center, University of Wisconsin-Madison. The proceedings of this workshop will be published by Wiley-Blackwell, including Brent Clothier's chapter on 'Soil Ecosystem Services: Sustaining Returns on Investment into Natural Capital. '. The meeting focused on soil's natural capital and ecosystem services. This provided the impetus for the choice of the two Symposia selected for Commission 4. 1 at the 19th World Congress of Soil Science in

Brisbane, Australia. Commission 4. 1 Chair (Brent Clothier) established Symposium 4. 1. 1 on 'Valuing the soil's natural capital', and Deputy Chair (Iris Vogeler) set-up Symposium 4. 1. 2 on 'Soil management and the protection of receiving environments'. Both symposia have attracted a large number of submissions.

Commission 4. 5

Commission 4. 5 continues to produce the very valuable *History, Philosophy, and Sociology of Soil Science* newsletter. The editor, Eric Brevik, released Newsletter (No. 16) in January 2009. This issue, as well as the 2010 issue (No. 17) and back issues are available at the IUSS web site.

An important milestone for Commission 4. 5 was the completion of the book 'Soil and Culture' edited by Edward Landa and Christian Feller. This was the capstone project of their 4-year term. Planning begun at the 18th WCSS in Philadelphia in 2006. The book examines human interactions with soil and depictions of soil in art, literature and film. It was published in January 2010 by Springer. Details of the contents can be found at www.springer.com/life+sci/agriculture/book/978-90-481-2959-1.

Manuscript preparation for a special issue of the Elsevier journal *Physics and Chemistry of the Earth* was begun in 2009. These papers came from the Commission 4. 5 co-sponsored oral session on historical Links between soil science and geology at the joint Geological Society of America-Soil Science Society of America annual meeting in Houston in 2008. Edward Landa and environmental historian Ben Cohen are serving as guest editors. Edward Landa, Christian Feller, and Jock Churchman are among the contributing authors. Publication is planned for 2010. Updates about the Smithsonian soil exhibit 'Dig it, The Secrets of Soil' are available at the following website: www.newswise.com/articles/soil-exhibition-inspires. This inspiring exhibition ran for 18 months until 10th January 2010, and had about 2 million visitors. Many lessons have been learned, and Pat Drohan (Vice Chair, Commission 4. 4) has contributed to two papers on the exhibit's impact, and the future role of SSSA and the IUSS which will be published in SSSAJ in 2010.

Pam Hazelton attended the International Institute of Women in Engineering (IIWE) Short Course in Sceaux, France on behalf of IUSS Division 4. Since 2001, IIWE at EPF, Ecole d,ingenieurs generaliste, in conjunction with University Paris X1 has conducted a three week short course for culturally and discipline diverse, recently graduated and/or final year, predominantly engineering students. Pam Hazelton was invited to present a lecture on Risk Assessment of Problem Soils for Engineers which was also attended by members of UNESCO. The aim of this course is to introduce participants, through inter-cultural learning, to broad global concepts and issues relating to their future professional practice. The curriculum of the course has continued to change and diversify. In 2009, the participants were invited to lectures at UNESCO Paris by the Head of Engineering, Dr Tony Marjoram. The course now has UNESCO endorsement. The curriculum has also developed to a stage where in 2010 EPF will absorb some of the content into the subjects which have formerly been purely technical engineering.

As a prelude to an international soil science initiative for school children, the *Monitoring Soil Science* project was established and trialed in 6 high schools in Western Australia in 2009. Members of the Australian Society of Soil Science (ASSSI) are mentors to the science teachers. The project received IUSS support to develop the website for participation internationally. The project is designed to facilitate innovative student-scientist partnerships through ongoing soil-based research. Initially, school students are instructed on how to collect mites and springtails from two permanent soil plots (4x4m) near their school. The soil science mentors then support projects on any aspect of soil as part of the science curriculum. The *Monitoring Soil Science* project started with support from SPICE, a secondary teacher's enrichment program which is a partnership between the Western Australian Department of Education and Training and The University of Western Australia. If you are interested in participating, please contact Lyn Abbott (labbott@cyllene.uwa.edu.au). The website will be launched prior to the 19th WCSS in Brisbane for international participation.

Commission 4. 5 co-sponsored a full-day session on Human Ecology and Organic Farming Systems at the 2009 annual meeting of the Soil Science Society of America. The following presentations were made by Feller and Landa in 2009 on behalf of Commission 4. 5 activities:

- Feller C and Landa E. *The representation of soil in Western art: Everyone with his own 'horizon'*. 10th National Conference of French Soil Science Society; Strasbourg, France; 11-15 May 2009 (also at 'Earth of the Centre, Centre of the Earth'; Noirlac Abbey, France; 12 September 2009)

- Landa E and Feller C. *More than dirt a new view of 'Soil and Culture'*. Association for Environmental Studies and Sciences; Madison, Wisconsin, USA; 8-11 October 2009.
- Feller C, Chen Y, Brossard M, Trichet J and Landa E. *The International Humic Substances Society (IHSS) and research on natural organic matter (NOM): A historical perspective*. IHSS-French Chapter; Montpellier, France; 24-25 November 2009

Division 4 Chairs and Vice-chairs organized the following eleven symposia for the 19th WCSS in Brisbane, Australia:

- D4. 1 Why treat soils like dirt?
- D4. 2 Soils and human health
- C4. 1. 1 Valuing the soil's natural capital
- C4. 1. 2 Management and protection of receiving environments (Joint with D4. 3. 1.)
- C4. 2. 1 Soil, energy and food security
- C4. 2. 2 Soil and water – global change
- C4. 3. 1 Impacts of land use change in unsustainable ecosystems
- C4. 4. 1 Delivering soils information to non- agriculture users
- C4. 4. 2 Attracting (young) people to a soils career
- C4. 5. 1 The 'bio' of soil science: history philosophy and sociology
- C4. 5. 2 Soil and human culture

Pedogeographogenetic and Pedomorphogenetic Concepts in Soil Surveys

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The early concepts of soil occurred in the first half of the 19th century. They were based on ideas of the 'balance-sheet' theory of plant nutrition developed by Justin von Liebig, soil being considered a more or less static bin for plant nutrients. Subsequently, they have been modified and refined by agricultural scientists who worked on samples of soil in laboratories, greenhouses, and on small field plots, rarely examining the soil below the layer turned in regular tillage. The early geologists used to describe soil as a disintegrated rock of various sorts and to apply the balance-sheet theory of plant nutrition within the framework of their own discipline.

In Russia, under these circumstances, beginning in 1870, the Russian scholars, under the leadership of Dokuchaiev and Sibirtsev, carried out soil surveys on rather small- and very small-scale maps, in the draught-affected regions (the Zemstvo of Nizhni-Novgorod), covering large areas, with a view to identify the areas suitable for agricultural development, to establish a natural classification of soils, and somewhere to improve the basis for assessment and equalization of land taxes (grading of soils according to their agricultural potential). Their works led to a revolutionary concept, establishing that soils are natural bodies which owe their properties to the five factors of soil formation (climate, living matter, parent material, relief and time). Thus, the foundations of a new scientific field – Soil Science, were set up. In fact, the Dokuchaiev's monograph on Russian Chernozems (1883), constituted the birth of this science. To arrange the soil groups into a higher category, they introduced the concept of zonality as an expression of a predominant influence of the environmental factors, establishing the zonal soil type as the highest systematic, fundamental, reference and taxonomic category reflecting its parallelism with climatic and vegetation zones. To emphasize the predominant influence of one or more soil forming factors, intrazonal and azonal soil types were introduced, too (Yarilov, 1927, cited by Simonson, 1989). The particular circumstances specific to soil surveys at small- and very small-scales, based mostly on the theory of soil genesis, determined the use of an approach with predominantly specific to the deductive method (the process of deriving consequences from admitted or established *premises*, that is, working from the more general to the more particular, more specific). As a result, this adapted approach led to a new particularly concept suitable especially for the small-scale soil survey and soil classification that can be called the pedogeographogenetic concept. But, while, it initially led to some important scientific contributions, especially at small scales, it did not fully meet, however, the newer and newer needs of assistance of soil surveys at large-scales, including the interpretations and statements of the significance of the soil map units. At the same time, it should be mentioned that, if the zonal theory worked reasonable well in the large Russian Empire (Soviet Union later) because of the direct relation between climate and vegetation, on the contrary, this theory more or less failed elsewhere in the USA. Much more, this concept induced a somehow ideatic conservatism generating some new and serious concerns among the soil scientists in many countries facing the challenges of the newly occurred soil problems.

In 1899, the USA, under the same conditions of the above mentioned early concepts of soil, without knowing the work already done in Russia, launched the first soil survey program (Whitney, 1899, cited by Smith W., 1998). At the outset, the most interest of soil surveys consisted in mapping at large scales to obtain results applicable to the direct solutions of concrete, local and national socio-economic problems, as well as to spatially group the results of observations, experiments and practices (predictions and statements included), at detailed level, regarding the soil behavior under different new conditions generated by nature or human activity, special at-

tention being paid to show on maps the kinds of soils that differed in crop response, especially crop yields (Mausbach, 1998). As a matter of fact, the first congressional authorization and appropriation for soil surveys was for the mapping of 'tobacco lands'. Although the soil scientists were taught in many classrooms until the late 1920's, neither theory actually worked well in the field as a basis for reliable predictions to farmers. All sorts of special little concepts that were formed broke down in contradiction when were applied to the great continental area like the USA. Thus, shortly after field work began, it became obvious that many important soil characteristics were not definitely related to either broad land form or rock type.

After 1930, an enormous change have been operated under the leadership of Marbut, as a result of the publication in 1914 of K. D. Klinka's book in German, and especially through its translation into English by C. F. Marbut, in 1927. While the Dokuchaiev's concept became generally available to Americans and was more and more broadened and adapted to conditions in the United States, however, the unsatisfied results occurred. For several decades, neither system, largely influenced by the pedogeographogenetic concept initiated by Russian soil scientists, definitely linked the classes of the higher categories to the soil series and their subdivisions that were used in soil mapping in United States. The tried systems reflected the concepts and theories of soil genesis, themselves being predominantly qualitative in character. In addition, many of the older descriptions of soils had not been quantitatively enough and the units of classification were too heterogeneous for making the yield and management predictions needed for planning the management of individual farms or fields.

All these determined a serious reconsideration of concepts and principles and, therefore, several important modifications had to be undertaken. Marbut emphasized strongly that the classification of soils should be based on morphology instead of on theories of soil genesis, because theories are both ephemeral and dynamic. He tried to make clear that the examination of the soils themselves was essential in developing a system of soil classification and in making usable soil maps. The morphology of a soil came to be described by ranges of properties deviating from a central concept instead of by a single 'typical' profile. The development of techniques for mineralogical studies of clays also emphasized the need for laboratory studies. Clarification and broadening of the concept of a soil science also grew out the emphasis on detailed soil mapping. Concepts changed as emphasis on predicting crop yields for each kind of soil shown on the maps increased.

Modification of the 1938 system carried out in 1949 corrected some of its deficiencies but still illustrated the need for a strong reappraisal of concepts and principles. These modifications emphasized the fact that the best taxonomy or classification should be one that permits the greatest number of the most important statements about the objects that should be classified. The work led for more than 15 years by Guy Smith, under the coordination of Charles Kellogg, and the strongly undertaken reappraisal of concepts and principles culminated in a new soil classification system - Soil Taxonomy, whose philosophy, in contrast with the current Russian ideas (where genesis of soils is considered the proper basis for their classification), is based on the statement that a soil should be classified on its own properties and not on those that are presumed to have existed at some time in the past, and not on the properties of the adjacent soils, a statement that is also assumed in World reference base for soil resources and Guidelines for soil description – FAO. As a mater of fact, in the development of Soil Taxonomy most assumptions about the genesis of various diagnostic properties used in classifying the soil have been carefully hid in order to prevent the freezing of taxonomy into a sterile system based on some genetic assumptions that might be or might not be correct. As a result, these specific research circumstances induced the tendency to carry out the soil surveys by applying an approach mostly based on the inductive method (working by moving from specific observations to broader generalizations and theories). This particular approach mostly based on soil morphology instead of soil genesis theories led to a new concept on soil surveys and soil classification system that can be called pedomorphogenetic concept. Within the framework of this concept, the most homogenous, reference, taxonomic category was and remained the soil series, which, in contrast with the zonal soil type ranked at the highest taxonomic level in the pedogeographogenetic classification, it is ranked at the lowest level of taxonomic system, being, however, provided with a particular and well defined control section and playing particular roles in soil taxonomy system.

As a matter of fact, the great chance of progress soil survey and classification, both scientific and applicative, in the USA, was that, from the beginning, the

investigation approach was based on a common sense eclectism and without prejudices, remaining continuously open to innovation and amendments. The following few words give a good evidence of this statement. For instance, during the first years of soil survey program (1899-1902), each soil body recognized and shown on maps was called soil type, for most part, and each kind of soil was a separate soil type, having some features such as the same kind of parent rock. After having for a very short time only one soil category (the soil type), the soil surveys had two categories – the series and the types, the soil series being firstly introduced in the classification and mapping of soils in 1903. There was no arrangement of the series into any higher categories of any sort. But, in time, the soil series got more and more importance. Thus, Rice (1929, cited by Simonson, 1989) has discussed the concept of soil series and its place in soil classification. The primary use of soil series in the classification system is to relate the map units represented on detailed soil maps to the taxa and to the interpretations that may follow. In addition, it is intended to permit the most precise quantitative interpretations that current knowledge permits. Much more, soil series and its subdivisions – soil types, as well as soil phases (subdivisions of soil type) are also the basic for the published soil surveys, and they have a good deal of actual testing in the field. In fact, for the precise quantitative interpretation, one must get the phase of soil series and of soil types, respectively.

The newer and newer challenges of this century for soil science, especially those of precise agriculture, under the globalization conditions, emphasize the necessity of the world-wide unitary soil taxonomy. Therefore, if the adequate adaptations of Soil Taxonomy at national levels will be developed, and if the soils all over the world will be studied enough detailed under the pedomorphogenetic concept to enable them to be adequately placed in this adapted system, an *international soil taxonomy system* could be developed and set up as a global system able to accommodate the soils all over the world, and, among other, to permit to transfer to or (from) anywhere in the world the soil information, knowledge and interpretations. The problem is to establish as better as possible the kind and features of such an international soil taxonomy system able to meet new challenges for soils as one of the essential natural resources of sustainable development of society. Of course, at present, according to the above mentioned statements, it may say that it clear that there are two fundamentally differentiated concepts for making soil surveys and soil classification reflecting the two practical philosophies of soil science: one based mostly on the theories of soil genesis (Russian and soviet school), that is, *the pedogeographogenetic concept* and the other based mostly on the soil morphology and interpretations of data permitting as much as possible, to evaluate or predict suitabilities, limitations, or potentials of soils for a variety of uses as long as a soil survey is in use (American school), that is, *the pedomorphogenetic concept,* which are proposed for discussion and comments.

Implications of the Knowledge Paradox for Soil Science

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Research results that could potentially provide a major contribution to innovation and sustainable development are often not accepted by and implemented in society. This, in short, is the knowledge paradox which is also highly relevant for soil science. The need for research to operate in a more interactive mode towards stakeholders and policy makers, following a transdisciplinary approach, has been widely recognized in literature, becomes ever more urgent in our Knowledge Democracy and is embraced by funding agencies. There appears, however, to be an embarrasing gap between the extensive literature on interdisciplinary research on the one hand and what really happens in everyday practice on the other. True transdisciplinarity is very difficult to realize and attempts by scientists to operate in so-called Communities of Practice (CoP) often turn out to be confusing and demotivating because of conflicting jargon and varying economic, social and environmental considerations of a wide range of participants. Any discipline should therefore ask basic questions about its core values to define its identity to others (and to themselves) and allow more effective contributions to CoP's. In this context, some recommendations are discussed for soil science research:

1. Focusing on unique niches for the profession, defined here in terms of seven basic soil functions. Attention is needed for soil-root interactions and water extraction patterns when studying **Function 1**: *biomass production*. Simulation models for plant growth often contain simple soil modules assuming soil homogeneity and isotropy, perfect and complete contact between roots and soil and the 'tipping bucket' concept of water availability. Such assumptions do not adequately represent natural soil conditions as has been shown in a limited number of field studies. More field monitoring is needed to document water extraction patterns in undisturbed field soils, using an array of available new techniques. Also, simple modules require little expertise and are easily pre-empted by other disciplines, making soil expertise redundant. **Function 2** defines *storage, filtering and transformation of compounds*, which is not only a function of the CEC but also of the flow regime, particularly in structured soils. Every type of soil has a characteristic relationship between fluxes and features of function 2 including characteristic tipping- points. These are as yet unexplored and need to be identified; **Function 3,** *Providing habitat and gene pool* becomes increasingly important because soils form the most complex ecosystems of the world and molecular biology has already shown that organic matter can be the source of new products, among them new antibiotics; **Functions 4 and 7** define *the physical and cultural environment and archeological heritage* that is a function of the occurrence of soils in a landscape context as studied since the beginning of soil science, particularly in soil survey. Initially, local soil conditions were crucial when establishing settlements. Technological developments, such as chemical fertilization and drainage, have allowed humanity to expand beyond natural limitations. However, this expansion often came at a price that has only recently been acknowledged. **Function 5** describes soils as *sources of raw materials.* Soil patterns in landscapes often define the location of such sources and knowing dynamic soil processes in a landscape context is often essential to develop environmentally friendly excavation and restoration techniques. **Function 6** defines *soils as a carbon pool*, e. g. soils acting as a C-sink in the context of climate change but also C in organic matter increasing water availability in soils and its workability and stability.

2. Considering the policy cycle as a point of reference when planning soil research on societal issues. This involves signalling, designing, deciding, implementing and evaluating, each requiring a specific approach by researchers interacting with

[1] This is an extended abstract of a paper in Advances in Agronomy 106: 143-171. Academic Press, Burlington. USA. (D.L.Sparks, Ed.)

stakeholders and policy makers. As is, research is often exclusively focused on the design part of the cycle. Broadening attention to the entire cycle is likely to improve the effectivity of research and may help to diminish the knowledge paradox.

3. Focusing on deriving a series of options (each one with economic, social and environmental tradeoffs) rather than on single solutions of 'wicked' problems related to sustainable development. As is, the public image of research is rather static: there is a problem to be solved and research presents 'the' solution and that's it. The real world is much more complicated and there is no single, magic 'solution' to wicked problems. By defining alternative options, scientists may stimulate, feed and take part in the policy debate while keeping their independence, thereby obtaining a position as an independent and respected knowledge-broker.

4. Taking the entire knowledge chain into consideration from tacit to cutting-edge knowledge when doing research, rediscovering the benefits of soil field research in earlier times when contacts with land users was intense and productive. As is, too much emphasis is given in soil research to isolated basic research in subdisciplines without integration: many pieces of the puzzle, but no puzzle. However, basic science is absolutely essential for the future of the profession. The point being made here is that it is most effective when somehow connected to a knowledge chain, starting with tacit knowledge.

5. Additional attention is suggested for communication and public relations in terms of: (a) defining soil quality in a manner that truly conveys the importance of soils; (b) adopting the ecological footprint concept, because its expression in terms of areas of land corresponds with a key aspect of soil science, and (c) present storylines for major soil types. As is, soils are often presented in a generic fashion while their diversity and the associated dynamic properties and potentials of individual soils are their most striking and promising features.

6. As stated, Transdisciplinarity requires working in CoP's but the soil science profession would be well advised to first improve internal cohesion and cooperation by combatting current atomization of the profession into subdisciplines and by defining mutual responsibilities in 'Communities of Scientific Practice' (CSP's) within soil science with special attention for quality control, communication, business generation, education and basic research, the latter vital for the future of the soil science profession. This will require a broad range of capabilities that can only be mobilized when the reward structures in the profession are shifted from exclusive emphasis on publication of papers in international journals to other activities as well.

Comments on Soil Memory and Paleo-Environmental Reconstruction for Soil Evolution

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Pedology and soil science are exceptionally complicated topics. Like in all such cases complication in terminology frequently occur. Soil classification is probably the best example, where a general agreement for a global taxonomy or nomenclature of soil diversity is still a hotly discussed topic. We were lucky that terms like SOIL PROFILE and SOIL HORIZON introduced by the early pioneers in the 19th century were generally accepted and became universally used, even though if you look up any dictionary or thesaurus for the terms *'profile'* or *'horizon'* - they have no real connection to soils. But things are not always like that.

When Targulian and Goryachkin, past and present heads of Department of Soils in the Institute of Geography of the Russian Academy of Sciences, published in 2008 their thick edited volume of 23 chapters on SOIL MEMORY with contributions by nearly 40 Russian authors it became obvious that the 'soil memory' term, first used by Targulian and Sokolov some three decades ago, has become well accepted by Russian writers. The book has already been highly praised by two distinguished reviewers in *Pochvovedenie* (Russian) and *Eurasian Soil Science* (English) in 2009 and rightly so. However none of these mention that the actual content of the chapters is essentially equivalent to the topic of PALEO-ENVIRONMENTAL RECONSTRUCTION OF SOIL GENESIS that are used by many soil scientists and paleopedologists in most other countries (see below). That the long-used term *environmental reconstruction* is now called *'soil memory'* in Russia, but is not mentioned.

For example, compare the content of Chapter 15 (pp. 619 to 652) of the excellent textbook by Schaetzl and Anderson (2005, Soils: Genesis and Geomorphology) titled Soils, Paleosols and Environmental Reconstruction or the Catena Special Issue 34 (1998, Reconstruction and Climatic Implication of Paleosols) and their many citations with the actual content of the chapters in the Targulian/Goryachkin book (see below). They deal with the same topic of reconstruction but don't call it memory. The introductory theory dominated chapters are a laudable attempt to explain what the 'soil memory' story means. Actually the most correct term for this kind of soil examination promoted is the Greek-origin word PALIMPSEST, meaning 'overprint', as mentioned by Schaetzl/Anderson and also duly used by Targulian in his early papers - but it is an awkward term to use. So this is additional good evidence that they deal with the same soil topic. A special issue of Catena on Environmental Reconstruction published a few years ago is an additional example.

This is not the place to cite the many other past publications which mention ENVIRONMENTAL RECONSTRUCTION for similar interactions (see below), even years before Victor Targulian began to lecture and use this theory of SOIL MEMORY or to discuss the theoretical presentations on *soil memory* presented in the first part of the book. Some four decades ago I wrote that the recognition that detailed examination of soil profiles and paleosols represent and enable the reconstruction of their evolutionary history is the greatest advance in pedology since Dokuchaev and his early colleagues, when pedology was established as an independent natural science entity with soil features governed by soil forming factors and processes. I still stand by it and wish to repeat it.

Buried paleosols were recognized and reported as early as two centuries ago, even before Dokuchaev, as features indicating changing environmental processes or climate. But environmental and evolutionary interpretation of specific non-buried (and also buried) soil profiles only developed gradually later, during the last century, as knowledge of the significance and timing of specific soil features was established using modern research methods.

Since *environmental reconstruction* is the term generally used for this kind of recognition of 'soil mem-

ory' already for a long time, especially for paleosols - and some claim that actually *all soils are a kind of non-buried paleosol* because of continuous overprinting and changing interactions. I am not against the use of the term '*soil memory',* there is no good reason for not using it. It is an excellent term though some find it strange. Identifying in soil profiles features of past soil processes, i. e. memory, is the source of environmental interpretation and reconstruction. It is '*soil memory*' which enables us to apply environmental reconstruction of soil evolution and change. I strongly urge users of *soil memory* and *environmental reconstruction* to mention the equivalent terms and relevant references in whatever language they use. We should not propagate a new language dissonance.

Further reading

Targulian V. O. and Goryachkin S. V. (eds), 2008. *Soil Memory: Soil as a Memory of Biosphere-Geosphere-Anthroposphere Interactions.* 692 pp. Institute of Geography, Russian Academy of Sciences, Moscow.

This Russian book of 23 chapters in 4 main sections and has a several pages long English Introduction and Summary but no abstracts of the chapters. It was announced in IUSS Alerts of March 2009 where further details of its content can be found. The first chapter's largely theoretical discussion was published in English as *Soil memory: Types of record carriers, hierarchy and diversity* in Revista Mexicana Ciencias Geologicas 21/1: 1-8, 2004.

Schaetzl R. J. and Anderson S., 2005. Soils, Paleosols and Environmental Reconstruction. Chapter 15 (pp. 619 to 652) of *Soils: Genesis and Geomorphology*, Cambridge.

This chapter of the extensive textbook contains numerous citations to worldwide publication on environmental reconstruction of soil profiles using its various features.

Catt J. and Bronger A. (eds), 1998. *Reconstruction and climatic implications of paleosols*, Catena 34, nos 1-2.

This special issue of the Catena journal contains an editorial preface and 12 wide-ranging papers dealing with the topic of reconstructing past climatic soil processes using paleosols as examples. Other journals, like Quaternary International, have also published similar papers or special issues.

Trends in soil degradation publications

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Research on soil degradation became a popular in the 1990s. A keyword search in the scientific literature reveals that this field of soil and environmental science peaks in the late 1990s followed by a decrease in the early 2000s and a significant increase since then. Figure 1 shows the results of a literature search in Scopus (1960-2009) on *soil degradation* or *land degradation* in the publication title, abstract and keywords. The number of publications were indexed (1990 = 100). As soil degradation and land degradation often have the same meaning (Lal et al., 1989), they are both used in this text.

Since 1960, the world population has more than doubled from roughly 3 to almost 7 billion. This increases the demand on agricultural production and the concern about degrading soil fertility. As early as the 18th and 19th centuries, a foreseen discordance between exponential population growth and linear increase in food production was described (Malthus, 1826). In 1968, the book *The population bomb* carried out the same message and sketched dark scenarios of what would happen (Ehrlich, 1968) and, around the same time, *Limits to growth* argues that the human ecological footprint would soon surpass Earth's carrying capacity (Meadows et al., 1972). After the golden ages of soil science during the *green revolution* in the 1950s and 1960s, when its contribution to agricultural productivity was a key factor in banishing global famine (Bradfield, 1960), another facet of soil science and agriculture emerged by means of soil degradation. Projections of global population increase and the resources needed to feed all these people are highlighted in publications like *Land degradation: effects on food and energy resources* (Pimentel et al., 1976). Others argue that the relationship between population growth and land degradation is more complicated and state that stronger population growth results in faster developments in agricultural productivity (Clay et al., 1994).

Early publications on soil degradation date from before World War II, when soil fertility conditions – mainly in western colonies – were assessed (Hall, 1936). In Scopus, earliest publications date from the 1970s (Figure 1), with one of the first – *Human population and the global environment* (Holdren and Ehrlich, 1974) – identifying human influences on several ecosystems in the world and emphasizing the

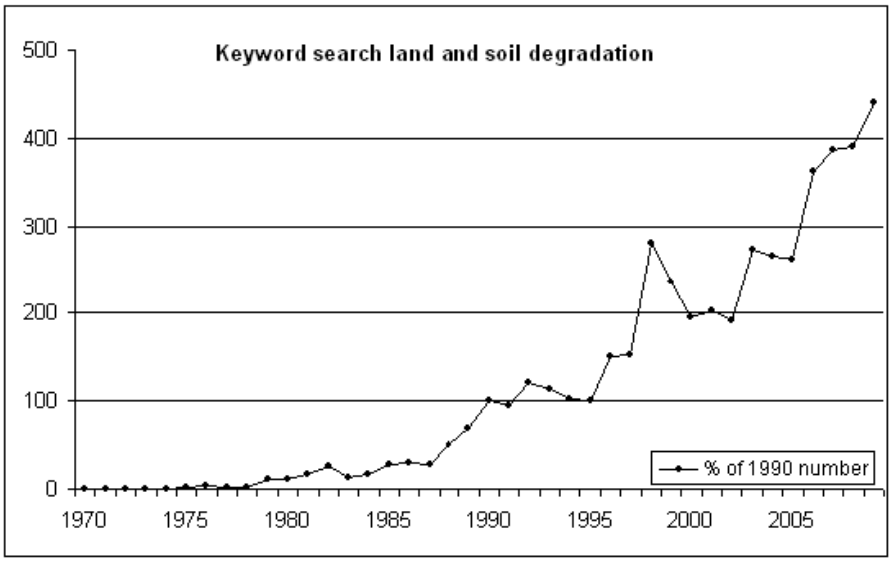

Figure 1. Results from a keyword search ('soil degradation' or 'land degradation') in Scopus. The number of papers were indexed with respect to 1990 (100% equals 109 results).

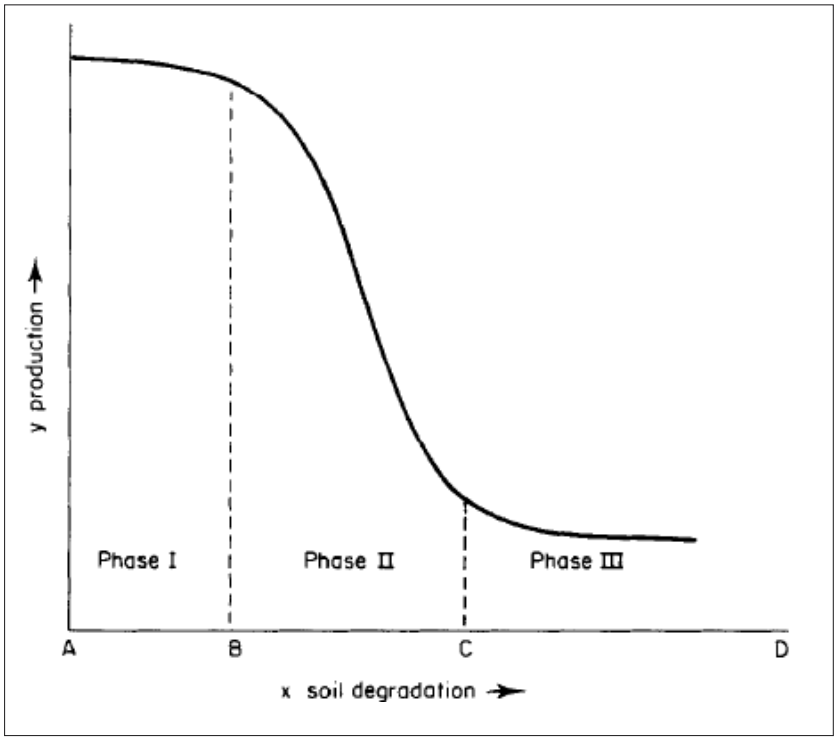

Figure 2. Stages of degradation in relation to crop productivity. The range of critical limits B and C differ among soils (Lal et al., 1989).

interactions between land degradation and agriculture. This interaction is visualized by (Lal et al., 1989), who divided the effect of soil degradation on crop productivity in three phases (Figure 2) and described the final phase as not restorable for crop production.

In the early 1980s, many initiatives were dedicated on aid for developing countries, including famine relief, mainly focusing on Africa. This is also visible in research: the focus of many publications shifts from fundamental studies on physical and chemical soil processes towards assessments of soil degradation, mainly in sub-Saharan Africa. At that time, land degradation was regarded as primarily human-induced and *land management* became a popular term: it appeared in over 25% of all publications of the 1980s (within title, keywords, abstract) and increased to about 70% in the 2000s. This emphasized the importance of the spatial component as the assessments are carried out at broader scales, varying from regional to supranational. Remote sensing was introduced as a revolutionary new tool for collecting data at these scales. Aerial photography was the first source of imagery and its application for degradation studies is mentioned in *remote sensing as a monitoring tool* (PAT Report, 1976). Around the same time, satellite imagery became available by means of the well-known Landsat record. Early 1980s it was tested for land degradation studies (Hellden and Stern, 1980) and afterwards it was consistently used in tens of publications throughout the 1980s.

The number of publications remained stable with on average 20 each year during the first half of the 1980s, but increased to about 100 per year from the 1990s onwards. The focus remained on the societal impacts of land degradation (Blaikie and Brookfield, 1987) and remote sensing was explored into more detail for measuring soil properties (Baumgardner et al., 1985). Also, other types of imagery became available, including radar for forest observations (Werle, 1989) and time-series of advanced very high resolution radiometer (AVHRR) data for broad-scale land degradation monitoring (Graetz, 1987). These technological advances have greatly supported degradation studies, but the first global inventory was still based on expert opinion (Oldeman et al., 1990). This Global Assessment of Human-Induced Soil Degradation (GLASOD) has limitations with regard to repeatability and complex classification methods, but is valuable information for many studies throughout the 1990s.

A new boost was provided by the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit or Rio Conference, organized in Rio de Janeiro in 1992. Global environmental degradation was identified as major issue and participating countries have ac-

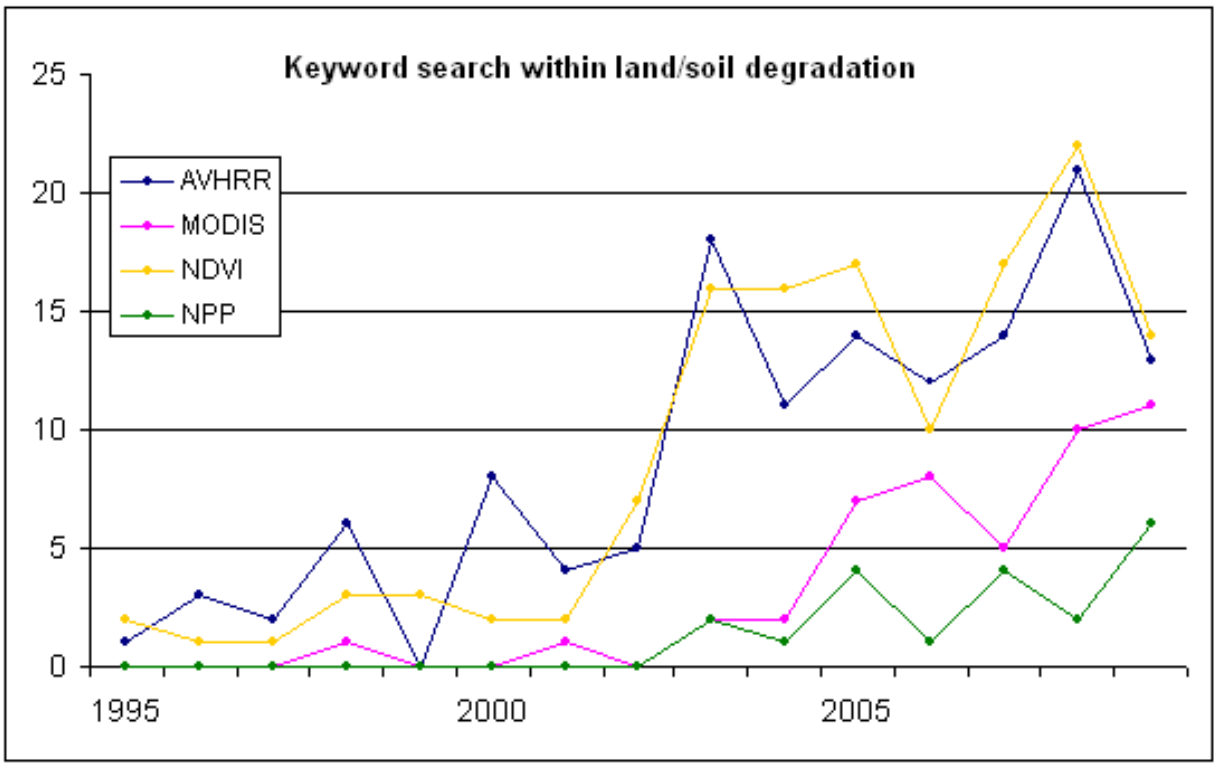

Figure 3. Number of publications resulting from keyword searches AVHRR, MODIS, NDVI, NPP within ('soil degradation' or 'land degradation') in Scopus (title, keywords, abstract).

knowledged their responsibility in an international pursuit of a sustainable development. The keyword *sustainability* increased in popularity from around 10% before 1992 to over 40% afterwards. The total number of publications had almost tripled within the five years after the conference, with a peak of over 300 publications in 1998. A minor decline occurred towards the end of the 1990s and the number of publications leveled at 200 per year.

After this policy-driven boost, the early 2000s upturn was technology-driven by means of the introduction of advanced satellite imagery and *digital soil mapping*. First attempts date from the 1990s, but the first generic framework has been proposed in 2003 (McBratney et al., 2003). Local and detailed studies of soil properties and the link with degradation using *imaging spectroscopy* became increasingly important, for instance for mapping of salinization (Metternicht and Zinck, 2003). Monitoring of land degradation at broad scale using series of satellite images became also feasible using sensors with a low spatial, but a very high temporal resolution. The AVHRR record, available since 1981, has a spatial resolution of 1km and provides daily vegetation images with global coverage. The newer MODIS sensor was launched in 1999 and provides similar data at 250m resolution. From 2002 onwards, the doubled number of publications are, in part, explained by this data (Figure 3). Despite the enhancements of MODIS, the AVHRR data is more popular due to its longer time-span. The peak is observed in 2008 when the first quantitative *Proxy global assessment of land degradation* (GLADA) was published (Bai et al., 2008). If the steady increase in popularity of MODIS holds on, it will soon surpass AVHRR.

With the application of remote sensing and digital soil mapping, the term *quantification* has become standard. From no results in the 1970s and few (< 1%) in the 1980s, it is mentioned in almost 300 publications (10%) after 2000. Soil degradation cannot be identified directly from satellite imagery, especially not without visual interpretation. Indicators are therefore introduced to quantify degradation. A popular indicator or proxy is the status of vegetation cover, which can be derived from satellite imagery relatively easy and correlates to crop productivity (Rasmussen, 1997). The traditional method uses vegetation indices, of which the normalized difference vegetation index (NDVI) is most famous (Tucker, 1979). Until recently it was not possible to derive physical measures, like net primary productivity (NPP) or carbon storage, directly from satellite imagery. Coupling of imagery

with ecosystem models has shown the relationship between reflectance and NPP (Running and Nemani, 1988), resulting in readily available NPP datasets from MODIS. This new data source has been explored for degradation studies (Prince et al., 2009), but remains to date less popular than vegetation indices (Figure 3). However, it opens new doors for *carbon sequestration* studies, as photosynthetic carbon fixation comprises a major component of the global carbon cycle. In combination with high resolution imagery, this emerged as key issue in degradation studies and in the link with climate change (Asner et al., 2004). No longer is degradation regarded only as a human activity, but it can also be climate-induced. The most recent IPCC report lists land degradation and desertification as serious threats in drought-affected areas (IPCC, 2007).

Soil degradation research started out focussing on driving processes. The re-focus on topical subjects like sustainability of the 1980s and 1990s have put soil degradation on the global agenda, but shifted the process-driven approach towards an indicator-driven approach. Effects were measured at much broader scale than before, but the relation with driving processes could not be made easily. The 2000s saw technological innovations, by means of more accurate satellite imagery, digital soil mapping and coupling with ecosystem models, that will facilitate research on identification of driving processes from imagery in the next decennium. There is new concern about feeding the world and food production has to compete for land with energy (biofuels) and feed (increased animal production), which has renewed global interest in soil science and agriculture (Hartemink, 2008). Therefore, soil degradation, as the *dark side* of agricultural land use, will remain a major issue as long as an ever increasing number of people depend on the same land resources. The trend in publications shows that we vigorously continue to develop policy on land management based on new facts, figures and insights.

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IUSS Alerts December 2009 - April 2010

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 alfred.hartemink@wur.nl Below are the still relevant contributions that appeared in the IUSS Alerts between December 2009 and April 2010.

Ask a soil scientist !

The Soil Science Society of America developed a 'Ask a Soil Scientist' program. If you have any question on soils, soil science, and careers in soil science, this is the place to get answers. And, teachers, if you'd like to arrange for a soil scientist to visit your classroom, this is the place to make a request. Your question(s) will be sent to a Soil Science Society of America member, in your region. As our members are volunteers with this program, please allow 24-48 hours for a response. www.soils.org/lessons/ask

New Pedometron

We are happy to bring you the latest issue of Pedometron, December 2009. You can download it at: www.pedometrics.org/pedometron/pedometron28.pdf here (size: 3. 3 Mb). It has exciting and latest articles on every aspect of Pedometrics: The Richard Webster Medal, PM 2009 report from Beijing, Soil texture wizard (in R), an article on how to incorporate soil aging in digital soil mapping, the Hilbert-Huang transform, digital soil mapping in Ireland, soil carbon sequestration, a detailed report from the Geomorphometry conference 2009, Soil Bibliometrics on NIR in soil science, Profiles: Sabine Grunwald & Anthony Young. There is also some Pedomathemagica to solve. The next pedometrics conference will be held in the Czech Republic in mid 2011.

New Newsletter

The latest issue of the History, Philosophy, and Sociology of Soil Science Newsletter has been released. This issue includes information on the value of historical studies to scientists, a student writing contest, symposium plans for the 2010 WCSS in Brisbane, recent books and articles, and much more. The newsletter is available on the IUSS website by clicking on the 'IUSS Newsletters' link and scrolling down to 'Commission for History, Philosophy and Sociology of Soil Science' to 'Number 17 – January 2010'.

Some Soils in the News

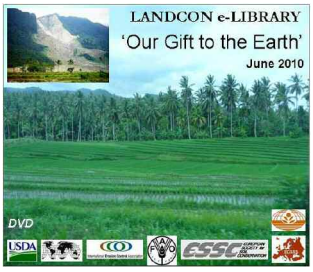
ScienceDaily
Your source for the latest research news

ScienceDaily is a popular science news website. Since 1995, the site has been used by students, researchers, healthcare professionals, government agencies, educators and the general public around the world. It has more than 3 million monthly visitors, and ScienceDaily generates nearly 15 million page views a month. Occassionaly there are 'soils' items on this news website, like, for example: Is Iron from Soil a Factor in Algal Blooms?; Spreading Antibiotics In The Soil Affects Microbial Ecosystems; From the Ancient Amazonian Indians: 'Biochar' as a Modern Weapon Against Global Warming; Changing Climate May Lead To Devastating Loss Of Phosphorus From Soil; Landfill Cover Soil Methane Oxidation Underestimated; Microorganisms Cited as Missing Factor in Climate Change Equation.

ICSU Statement on the IPCC

As a scientific organization with global representation and active engagement in global environmental change research including climate change, the International Council for Science (ICSU) has been closely following the ongoing controversy concerning the Intergovernmental Panel on Climate Change (IPCC). Important issues have been raised in relation to both the interpretation of scientific knowledge, especially in making predictions of future developments, and the procedures used by the IPCC in its assessment. This statement is endorsed by the Officers of the International Council for Science (ICSU, February, 2010). ICSU is a non-governmental organization representing a global membership that includes both national scientific bodies (119 members) and international scientific unions (30 members). The statement does not necessarily represent the views of all individual Members.
For the statement, see: www.icsu.org (www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/3031_DD_FILE_IPCCstatementICSUfin.pdf)

Join the project 'Our Gift to the Earth'



The World Association of Soil and Water Conservation (WASWAC) is producing LANDCON e-LIBRARY: Our Gift to the Earth, a set of 4 DVDs offering a collection of technical papers/documents that will serve *research* and *implementation* in the fields of land, soil & water degradation, management, care, restoration, conservation, and improvement. The goal is to preserve valuable works for the long term and to enhance the visibility of works, authors, organizations and publishers. We invite you to submit digital works, including: (1) papers/articles from meetings, proceedings, books, magazines, bulletins; (2) whole books-documents; (3) PowerPoint presentations and (4) posters, brochures, flyers, paintings and other forms of art, calendars, maps, video-movies, audios (e. g. songs related to land, soil, water, river, forest, mountain), poems, photographs etc. Contributors will receive one complimentary set of DVDs and co-publishers will have their logos printed. Contact Samran Sombatpanit at sombatpanit@yahoo.com

Explore the world

Gapminder is a non-profit venture – a modern 'museum' on the Internet – promoting sustainable global development. The initial activity was to pursue the development of the Trendalyzer software and to unveil statistical time series by converting numbers into enjoyable, animated and interactive graphics. The current version of Trendalyzer is a web-service displaying time series of development statistics for all countries. It aims to keep the statistical content up-to-date and making time series freely available. It produces videos, Flash presentations and PDF charts showing major global development trends with animated statistics in colorful graphics. Gapminder has the intention of being a 'fact tank' that promotes a fact based world view. There are no soils data but there are various statistics on land use, water, climate and the environment; all downloadable and with splendid graphs that show both spatial patterns and trends over time. See www.gapminder.org

Five questions to a soil scientist

Five questions to David Rossiter

Position: Senior University Lecturer (since 1997)
Age: 60
Address: University of Twente, Faculty ITC, Enschede (NL)
E-mail: rossiter@itc.nl

1. When did you decide to study soil science?

While taking introductory Ecology at the NY State College of Agriculture (Cornell University) in spring 1971 I did a project correlating occurrence of *Tsuga canadensis* to soil map units of the Tompkins County soil survey. I became fascinated with the idea of soil classification and especially how a mostly-hidden resource could be reliably mapped. I got an A+ on the project; neither the ecologist nor I realized at the time that the map units with fragipans and perched water tables on hillsides (Volusia series) were most likely mapped by the presence of the hemlock!

2. Who has been your most influential teacher?

I was the last undergraduate advisee of Marlin Cline, one of the glorious generation of American soil geographers. I did a senior project with him on soil moisture and temperature regimes of the Dominican Republic (following a field trip) and also took a summer 'Agronomy tour'' of the upper Midwest under his guidance. He taught me soil genesis, classification and soil survey interpretation. I learned practical field mapping from my party chief in North Carolina, Roy A. Goodwin. For my PhD I worked with Armand Van Wambeke, who taught me 'we only have one quality of work… high' and 'to make progress in soil science, you have to go outside it. '

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

Soil is such a complicated system: everything is happening at multiple scales and mostly hidden away from direct view. Further, the soil cover is the result of a long history, which we can't directly observe. What excites me most is the challenge of making reliable predictions of soil functions over the landscape, which requires understanding how soils occur and evolve, all based on a tiny fraction of direct observations and a large dose of inference. This leads to the need for clever application of a wide range of empirical and process modeling techniques.

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

Show them two things: (1) the intellectual challenge – it is very difficult, requires multiple skills, diverse instrumentation, and above all clever inference; (2) the fun of field work – being outdoors, going everywhere on the landscape, seeing the unexpected. If these don't excite them, we don't want them.

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

Positive in that the soil resource is ever more important, and is viewed from ever more angles by society. We're well away from 'soil science = soil fertility', and the environmental function of soils is more or less in the public conscience. Negative in that in many countries there is only ad-hoc or project work on soils, and thus little continuity and institutional memory. Positive in that the new possibilities for studying and mapping are exploding; negative in that many soil scientists are sometimes afraid to learn new things and to think creatively – you can read articles published today that repeat work done in the 1910's.

Five questions to Pavel Krasilnikov

Position: Head of Laboratory (since 1996)
Age: 41
Address: Pushkinskaya str., 11, Institute of Biology, Karelia Research Center RAS, Petrozavodsk, Russia
E-mail: pavel.krasilnikov@gmail.com

1. When did you decide to study soil science?
When I was a schoolboy I was interested in biology. Thus I selected the Institute of Biology as a place for my summer practice in scientific translation. I dreamed about studying biology and working then in this institute. The Director of the Institute, however, sent me to the laboratory of Soil Science; he considered that there were too many biologists and few soil scientists. The head of the laboratory Dr. Antonina Strelkova gave me papers for translation, and introduced me gently to the world of soils. Two years later I entered the Faculty of Soil Science in Moscow University.

2. Who has been your most influential teacher?
I was lucky to have very good teachers at the university. It was a good pyramid of researchers of different generations, from Gleb Dobrovolsky (who is 96 now) to Sergey Shoba (65) and 'micro-supervisor' of my diploma work Sergey Sedov (48). However, the teacher who influenced me more than any other professor, and still influences me strongly is Viktor Targulian. He is really great.

3. What do you find most exciting about soil science?
I believe that few scientists besides pedologists have a chance to perform multidisciplinary research. Soil science is related to such a variety of natural sciences, that anyone may find his or her niche in soil biology, soil physics, soil mineralogy or any other branch of soil sciences, integrate or alternate the topics in the course of scientific career. I am happy that I managed to work in various areas of pedology, from clay mineralogy to biodiversity studies, classification theory and soil geography. It is like a chance to live several lives in science.

4. How would you stimulate teenagers and young graduates to study soil science?
I see two complimentary options. On one hand, we should stress the basic character of soil science: in fact, we are studying physics, chemistry, biology or geography as basic sciences and then apply them to soil bodies. We can attract clever boys and girls, if we'll manage to explain that soil science may be equally, or even more fascinating than basic sciences. On the other hand, we should work on public image of soil science to prove its utility for practical purposes. For many young people it may be very encouraging.

5. How do you see the future of soil science?
I want to be an optimist, though there are some perils in the future of soil science; the main danger is the loss of identity. We see how soil science is diluting by other disciplines: some traditional areas of soil science separate to form new disciplines, while soil science community adsorbs specialists with limited soil knowledge. I know soil research projects, where no one of the participants has basic education in soil science. However, I hope that soil science would manage to transform into a holistic branch of science that would integrate the research related to complex processes at the Earth's surface.

Five questions to John Ryan

Position: Soil Scientist (since 1992)
Age: 65
Address: Int. Ctr for Agric. Res. in the Dry Areas (ICARDA), Aleppo, Syria
E-mail: j.ryan@cgiar.org

1. When did you decide to study soil science?
Prior to graduation with a B. Agr. Sc Degree from University College Dublin in 1967, I had already settled on soil science for graduate study. Coming from a farm background, I was always fascinated by soil. I loved the smell of soil after freshly dug potatoes in early summer and the fragrance of the earth after rain. I often pondered why mushrooms grew profusely n one field and not so well in another. I also wondered how the dung that I spread by pitchfork worked wonders in producing a good crop of potatoes or why growth of grass was so green and lush after spreading ammonium sulfate, or why we used to sidedress sugar beet seedlings by hand with Chilean nitrate. I loved the smells of the farmyard, particularly from the dung heap in early summer (I was later to learn that it was ammonia being given off). Choosing soil science for graduate studies and a career was, for me, much more than a means to making a living; there was a broader almost spiritual element to it.

2. Who has been your most influential teacher?
Graduate degree programs in Ireland are wholly based on research (a mistake, as I now see it), and so one is not normally exposed to a range of teachers as in the USA (I was later to audit several courses in the

US while at the University of Arizona). However, the person who influenced me most and furthered my interest in soils was the late Professor William 'Bill' Brickley, one of nature's true gentlemen. I admired his obvious love of soil science, especially the practical aspects. I was attracted to his fundamental human decency and his impish sense of humor—and I loved the smell of the tobacco from his pipe that was always close by! As an undergraduate in the Soils Teaching Lab, I enjoyed listening to his soil stories from his years as a local agricultural instructor. After post-doc studies in the USA and some time as a professor at the American University of Beirut, I looked forward to coming home and seeing him again and thanking him (over the proverbial pint of Guinness) for setting me on the right career path. Unfortunately, it was not to be, but I treasure his memory.

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

The most obvious aspect is that our food supply comes from the soil, with a bit of help from manures and fertilizers and often some lime, as in Ireland. Later in Arizona, I came to appreciate that soil had an environmental dimension and that soil can mediate with the atmosphere for absorption of gaseous pollutants. As I traveled, I came to appreciate the global diversity of soils and that few soils are perfect for growing crops, while others may have components that are toxic to crops. I also saw soils as living incinerators of man's wastes. Soil and water are inextricably linked. At ICARDA in the historic Middle East region, I saw how soils dictated the rise of ancient civilizations, and how civilizations fell with the abuse of soils. The 'Dead Cities' that litter northeastern Syria are mute testimony to the follies of previous generations. There, a study of tells, or ancient man-made habitation mounds, served to indicate the importance of soils for the archaeologist in his quest to elucidate the evolution of earlier societies. The emergence of 'soil forensics' serves to demonstrate the many and varied aspects of this material that some call 'dirt'. The recently published, and unique book 'Soils and Culture' by Landa and Feller, rounds off the wonderful spectrum of characteristics of soil. Working with an international agricultural research center sponsored by the Consultative Group on International Agriculture (CGIAR) has afforded me a perspective of soils in relation to society that I could not have gained anywhere else.

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

With fewer and fewer people coming from an agricultural background and the inexorable trend toward urbanization, the challenge to break down the barriers of ignorance about agriculture is immense.
Soil scientists need to adapt to the changing circumstances and become communicators to a non-science non-agricultural audience. National soil science societies should strive to have soils information part of schools curricula in geography and environmental studies, and indeed cultural studies. Soil science needs another Norman Borlaug as well global champions such as David Attenborough, or maybe a Bob Geldoff for soils? We need to address other scientific disciplines; it often amazes me when talking to some well educated professional people how little they know about the material that supports them, the material that provides medicines for them, the material on which their cities are built upon, and the material that will eventually consume them and so complete the cycle of life. The problem is that, as soil is all around us, we take it for granted. Innovations in thinking and communications are needed to address the problems of a changing world.

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

I don't have a crystal ball, but I hope that renewed appreciation of soil will not come from a major world catastrophe, but from the collective and rational will of society and its scientific institutions. With a world population now at unprecedented levels, the role of soil in balancing the global food demand-supply equation was never greater, and even more so when we consider the environment and the need to live in a world where animals and plants and nature must co-exist. 'THEY ARE NOT MAKING LAND ANY MORE'; if anything, the supply of land is diminishing, being buried under concrete. The decline of soil science as a profession in the past decades is a bad omen. But the challenges in future can be great, especially as soil science is broadened to embrace concerns other than food production, in which it had a major contribution. The challenges for soil science to contribute to sustainable food production are still urgent in developing countries. New and exciting frontiers are emerging for soil scientists, especially in relation to the environment, energy, and climate change. As soil science has evolved to serve the interests of society over the past century, it surely will continue to do so. Soil science is international--- and a global career beckons.
The profession can have greater visibility in serving mankind.

Five questions to Susan Ikerra

Position: Principal Agricultural Research Officer (since 2000)
Age: 50
Address: ARI Mlingano, P.O. Box 5088, Tanga, Tanzania
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1. When did you decide to study soil science?

In 1977 I decided to to study soil science when I was doing my BSc. at Sokoine University of Agriculture in Morogoro Tanzania. The reason for studing soil science was my expectation that I would get a good salary given the fact that there were few soil scientists in the country. The second reason was my high academic capacity in science subjects particularily soil microbiology and soil chemistry.

2. Who has been your most influential teacher?

Prof. Salema Manase currently working with the IAEA in Vienna. He was my supervisor for my first special project which was in the field of soil microbiology. I managed to get upper second with honors degree because of his mentoring and hard working nature. He always encouraged me to work hard and gave me very good grades.

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

Soil science is the backbone for agricultural production which is a backbone to most economies in third world. The latter is highly influenced by what type of soil and soil management practices. When I work with farmers the most important questions they ask are how to improve their degraded soils so that they get higher yields to feed their kids. It is not always easy to answer such questions until I analyse the soils. Doing soil analysis has always been my hobby although some people find this boring. Once the results are out I rush back to the farmers fields to correct the problem. This also makes me happy and gives me job satisfaction

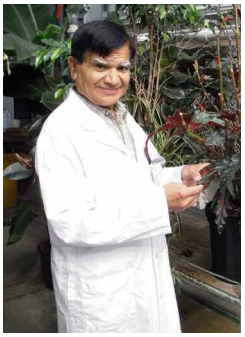
4. How would you stimulate teenagers and young graduates to study soil science?

If I had authority I would pay soil scientists reasonable salaries and provide most conducive working environments so that young scientists become attracted to this field of study. I would also change the teaching methodology so that it becomes less complicated. If I were a university Profs. I would motivate and inspirer students instead of trying to prove to them that soil science is complicated and those who have graduated in this field are very intelligent. I would recognize and reward all the small success that teenagers and young graduates are making. I am planning to conduct a role modeling event in one of the girls secondary schools that will encourage students to opt for science subjects.

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

The future of soil science is endangered (in Tanzania) because most young scientists don't opt for this field. The reasons being: Profs at universities making it look complicated and having most students failing, having soil scientists receiving very low salaries (<500 US $/months), scientists working in remote areas and even less marketable. People in other soft sciences get 10 times better salaries than soil scientists. A few competent soil scientists run away for better pastures in other fields. Many soil scientists are now bankers!

Five questions to Yash Kalra



Position: Soil Chemist (Head, Soil and Plant Analysis Laboratory), since 1967
Age: 68
Address: Canadian Forest Service, 5320-122 Street, Edmonton, Alberta, Canada
E-mail: ykalra@nrcan.gc.ca; ypkalrasoilchemist@gmail.com

1. When did you decide to study soil science?

I grew up on a farm and, therefore, have been interested in agriculture from an early age.
I studied agriculture at the A. N. Jha College, Rudrapur and obtained a B. Sc. (Agriculture)) degree from

the Government Agriculture College (C. S. Azad University of Agriculture and Technology), Kanpur, India in 1961. For M. Sc. (Agricultural Chemistry), we studied these subjects (1) Inorganic Chemistry (2) Organic and Plant Chemistry (3) Statistics (4) Chemistry of Milk Products, Animal Nutrition, and Feeds, and (5) Soils, Fertilizers, and Manures. I found soil science most interesting and decided to specialize in this field. An International Travel Award from the Prime Minister of India in 1963, a Research Fellowship from the University of Manitoba, Winnipeg, Canada (1963-64), and a Research Assistantship from the National Research Council of Canada (1964-66) enabled me to accomplish this.

2. Who has been your most influential teacher?

I have been taught by some of the most dedicated teachers in the world. My most influential teacher was Dr. A. N. Pathak, Professor and Head, Department of Soil Science and Agricultural Chemistry, C. S. Azad University. For my thesis, I conducted research under his supervision. He taught us soil science. I was fascinated by his lectures. In addition to being an excellent teacher, he was a noble man. He inspired me to achieve excellence in whatever I did. I learnt from him the same way as I learnt from my parents: 'It is nice to be important but it is even more important to be nice'.

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

Soil science is an interdisciplinary science enabling one to specialize in chemistry, fertility, physics, mineralogy, analytical techniques, etc. Soil and plant analysis can play a significant role in addressing complex environmental problems There are exciting opportunities to develop methods of analysis. I had the opportunity of coordinating the first international study on the validation of methods for soil analysis under the auspices of the *AOAC INTERNATIONAL* and the *Soil Science Society of America*. After having served as Head of the Soil and Plant Analysis Laboratory for more than 42 years, I still find the work challenging and exciting.

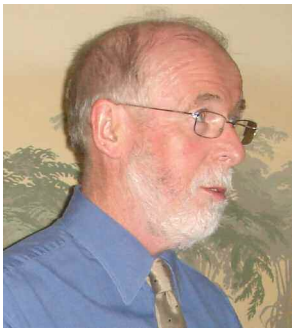
4. How would you stimulate teenagers and young graduates to study soil science?

A strong mechanism needs to be developed to promote soil science education to teachers and students in schools. It is very important that elementary school students be exposed to soil science by teachers who can make it interesting. With the introduction of the importance of soil science, the students can be attracted to the exciting field of soil science for their further studies. As soil scientists, we have a responsibility to inspire teenagers and young graduates to study soil science. Parents can do their part by taking children to activities such as Earth Day, field days at universities and colleges, and visits to farms, greenhouses, and vegetable gardens.
Many schools participate in local, regional and national science fairs. I have served as a judge at the Annual Edmonton Regional Science Fair for 22 years. I have noted a decline in projects related to soil science. This is a cause for concern. We should encourage the students to participate in these events. The graduate students should be encouraged to participate in conferences, symposia, and other scientific meetings.

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

The future of soil science is promising. There are many opportunities and challenges. One of the major challenges relates to the cause and effect of climate change. Extensive laboratory analyses are required for several environmental problems. Having served as President of the *Soil and Plant Analysis Council* and Chair of the *7th International Symposium on Soil and Plant Analysis* held in Edmonton in 2001, I strongly feel that financial assistance must be increased to enable a greater participation of scientists from developing countries in international scientific meetings.

Five questions to Jim Gauld



Position: Soil Survey of Scotland 1967 to 2005, latterly as Head of Soil Survey and Land Evaluation within Macaulay Research and Consultancy Services; currently Treasurer to International Union of Soil Sciences.

Age: 66

Address: IUSS Office, Macaulay Institute, Craigiebuckler, Aberdeen. AB15 8 QH, Scotland

E-mail: j.gauld@macaulay.ac.uk

1. When did you decide to study soil science?

My initial studies in soil science commenced as an

undergraduate in the Department of Soil Science at Aberdeen University in 1963. Prior to that I had spent many happy vacations on Newton Farm in Glenbuchat (40 miles due west of Aberdeen) and one summer in 1960 (or thereabouts!!!) had been sent by the local farmer to investigate the activities of two persons digging soil pits and recording vegetation on Tom na Gabhar hill. It transpired they were Eric Birse and colleague from the Macaulay Institute. I reported back that their activities appeared harmless but fascinating…. perhaps the seeds had been sown for my future career.

2. Who has been your most influential teacher?

Without question my most influential teacher has been Fitz (Dr E. A. Fitzpatrick) whose lectures at Aberdeen University on pedology were an inspiration while his interest and teachings on micromorphology and soil classification led to many stimulating discussions and debate. After joining the Soil survey of Scotland, Sandy Walker, through his constant promotion of soil maps, at a variety of scales, to a wide range of environmental topics, was a major influence, which undoubtedly fashioned my future career. The satisfaction derived from this applied work has never diminished.

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

The range of scientific topics encompassed within the general heading of 'soil science' never ceases to amaze me. These fields are ever increasing and can be applied at a variety of scales to an ever increasing range of topics demonstrating the overall importance of soils to mankind. Effective soil management is essential as world populations increase and food reserves become at risk through inappropriate exploitation of the soil. Away from the science itself, researchers can find great satisfaction through interaction with politicians, policy -makers and the general public, from primary children to pensioners, to demonstrate and convince them that soil science is essential to maintain sustainable management of life on this vulnerable planet.

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

New Zealand has to be complimented on two great achiements…Their All Blacks rugby team in never losing to Scotland and the person who invented the slogan'never treat soils like dirt'. The latter fact should be stressed to all primary pupils. Soil as a medium for growth and with special characteristics e. g. texture and infiltration should be highlighted with basic experiments in the classroom. At secondary level the curriculum could incorporate more sophisticated physical and chemical experiments to characterise soils rather than the current situation in Scottish schools where soils are taught in the geography classroom and the emphasis is on the features of podzols, brown earths, gleys and peats with all tropical soils lumped into ferrasols. For undergraduates, finding a university teaching soil science might be difficult in the first instance!! Journals such as the excellent 'Soil Use and Management' should become compulsory reading to highlight not only the wide range of soil science applications but also the current and future challenges to be addressed using both accepted and new scientific procedures and technological studies

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

I remain the eternal optimist and see a bright future for soil science. I have, however, concerns that in the UK, universities are no longer teaching the discipline as a degree subject and that soil surveyors belong, in part, to the 'retired'generation. Perhaps in developed countries soil science has been a victim of its own success but continued training of soil scientists to address new issues is required and is essential for developing countries where past soil research has been minimal. In the future soil scientists will play a pivotal role in addressing the complex issues such as those relevant to land use change, different forms of pollution, climate change impacts, securing food security, different impacts on soils and biodiversity. This has to be achieved by re-defining soil science education and achieving more integration with scientists in allied fields. Finally soil scientists must become more proactive and effective in communicating to politicians, policy makes and the general public about issues where success in our subject has been achieved. Only through such initiatives will new students, irrespective of their age, be attracted and excited about soil science both as a topic worthy of study and a worthwhile career.

Favourite Soil Science Books of Eric Brevik

Picking three favorite books out of all the books available in the soil science literature was a rather difficult undertaking, particularly given my diverse interests within the field of soil science. The basic approach I chose to take was to select one book from each of three areas that I am currently involved in. Those areas are 1) soil genesis and survey, 2) sustainable soil management, and 3) soil science history.

In soil genesis and survey, my favorite book is *Soils: Genesis and Geomorphology* by R. Schaetzl and S. Anderson. This book provides a very complete overview of the modern status of the material it covers, and I find it highly valuable both as a professional reference and as a textbook for the soil genesis and survey class I teach. I am also rather partial to the subject material, as someone who did masters work in geomorphology and doctoral work in soil genesis and survey.

Under the sustainable soil management heading, I recently had the opportunity to read *Building Soils for Better Crops* (3rd edition) by F. Magdoff and H. Van Es. This book is clearly written and the information is presented at a level that should be assessable to most farmers, who are after all the ones who are ultimately responsible for whether or not our soils will be managed sustainably. The topics are logically arranged, information on additional resources is provided for those who want more information, and everything is nicely synthesized in the final chapters.

My current favorite in the soil history category would be *Footprints in the Soil: People and Ideas in Soil History* edited by B. Warkentin. *Footprints* covers some topics I find to be absolutely fascinating. Some of the highlights include chapters written by authors who went back to early manuscripts and other primary sources produced by societies such the Romans and Aztecs documenting their soils knowledge. Additional information and interpretations of the ideas of individuals who are well-known to the soils and, in some cases, broader scientific community is also presented. *Footprints* provides some excellent information on the roots of our field.

So there it is, my list of three. It wasn't easy to make! There are so many other books I considered in each of these categories while making this list and several times that I started to settle on a book for the list and then changed my mind. I also considered listing a few of those other titles here without additional explanation, but in the end I decided to stop with just the requested three.

Yash P. Kalra Retires

Yash P. Kalra, Soil Chemist, Northern Forestry Centre, Canadian Forest Service, Natural Resources Canada, Edmonton retired in April 2010 after a distinguished 42-year career as Head, Soil and Plant Analysis Laboratory. For his significant contributions to the Northern Forestry Centre, he received the 'Award of Recognition' from Tim Sheldon, Director-General.

Yash is recognized internationally for his research in soil and plant analysis. He has published his work in several national and international journals. He is an alumnus of the C. S. Azad University of Agriculture and Technology, Kanpur, India and the University of Manitoba, Winnipeg, Canada. He has been a member of 15 national and international scientific societies and has served on the organizing committees of more than 50 conferences, symposia, workshops and other scientific meetings worldwide.

He has participated in more than 125 conferences, symposia, workshops, and other scientific meetings in 14 countries: Australia, Canada, China, France, Germany, Hungary, India, Japan, Mexico, the Netherlands, Pakistan, South Africa, Thailand, and USA.

Yash is regarded for his leadership qualities. He has served as President of (1) AOAC INTERNATIONAL Pacific Northwest Section (2) Bhoovigyan Vikas Foundation (Earth Sciences) India, Overseas Chapter (3) Canadian Society of Soil Science (4) Group of Analytical Laboratories, Canadian Forest Service (5) Professional Institute of the Public Service of Canada, Edmonton Branch (6) Soil and Plant Analysis Council International, and (7) Western Enviro-Agricultural Laboratory Association, Canada.

He is one of the world's leading soil scientists. He coordinated the first methods validation study for soil analysis for the AOAC ITNERNATIONAL and Soil Science Society of America for which he received the Associate Referee (Study Director) of the Year Award in Nashville, Tennessee, USA in 1995. He is a Fellow of the (1) AOAC INTERNATIONAL, USA (2) Canadian Society of Soil Science (3) Indian Society of Agricultural Biochemists (4) Indian Society of Soil Science and (5) National Academy of Agricultural Sciences, India

Yash has served on the Editorial Boards of (1) Communications in Soil Science and Plant Analysis, USA (2) Journal of Forest Research, Japan (3) Journal of the Soil Science Society of Pakistan (4) Journal, '*Fertilitas Agrorum*', Italy and (5) Malaysian Journal of Soil Science.

Yash has a long association with ISSS/IUSS. After

being a regular member for a few years, he became a life member in 1983. During the International Workshop on the Laboratory Methods and Data Exchange Program (LABEX) held at the International Soil Reference and Information Centre, Wageningen, he had discussions with W. G. Sombroek, Secretary-General and J. Hans V. van Baren on several aspects of the ISSS activities. He has participated in the ISSS Congresses in Canada (1978), India (1982), Germany (1986), Japan (1990), France (1998), Thailand (2002) and USA (2006). He was one of the four Canadian scientists invited to contribute chapters for the book 'The Future of Soil Science', a special publication edited by Alfred Hartemink for distribution at the World Congress of Soil Science in Philadelphia (2006).

He served on the Registration Committee of the 11th ISSS Congress in Edmonton in 1978. He was Treasurer of the First ISSS Workshop of the Working Group MO, hosted by the Canadian Society of Soil Science in Edmonton (1992). He has served as a Member of the Committee on Standardization (Comm. V1).

Yash is a regular contributor to the IUSS Bulletins. He published 65 reports in the Bulletins during 1991-2009. We have a series (IUSS PEOPLE) in the Bulletin in which 2-4 soil scientists from around the globe answer five questions on their discipline. Recently he was invited to answer those questions. His replies are published in this issue of the Bulletin.

I have worked with Yash for 20 years. This Laboratory will not be the same without him. We wish him well in his retirement.

Curtis Olive
Canadian Forest Service, Natural Resources Canada
Edmonton, Alberta, Canada
Email: COlive@nrcan.gc.ca

Yash P. Kalra has published 65 reports in the ISSS/IUSS Bulletins in the last 19 years (1991-2009); more than any other scientist in the world. A list of his reports is given below:

1. International Symposium on Soil Testing and Plant Analysis in the Global Community, Orlando, Florida, USA, August 22-27, 1991. Bulletin 80 (1991): 58-59.
2. 3rd Annual Meeting of the Group of Analytical Laboratories (GOAL). Bulletin 82/83 (1992): 65.
3. Kalra's Soil Analysis Crossword. Bulletin 82/83 (1992): 66-74.
4. Soil and Environmental Chemistry Workshop, Olympia, Washington, USA, June 24-25, 1993. Bulletin 84 (1993): 40.
5. International Symposium on a Decade of Potassium Research, New Delhi, India, November 18-20, 1993. Bulletin 85 (1994): 60-61.
6. 4th Annual Meeting of the Group of Analytical Laboratories, Sault Ste. Marie, Ontario, Canada, October 7-9, 1993. Bulletin 86 (1994): 38-39.
7. The 7th Annual Western Enviro-Agricultural Laboratory Association and Alberta Water Analysts Committee Workshop, Edmonton, Alberta, Canada. Bulletin 86 (1994): 39-40.
8. Diamond Jubilee Symposium of the Indian Society of Soil Science, New Delhi, India, November 28-December 1, 1994. Bulletin 87 (1995): 24-26.
9. The 40th Annual Conference of the Canadian Society of Soil Science, July 1994. Bulletin 87 (1995): 37-38.
10. Kalra's Soil Analysis Crossword. Bulletin 87 (1995): 43-53.
11. International Symposium on Soil and Plant Analysis, Wageningen, the Netherlands. Bulletin 89 (1996): 49-51.
12. 41st Annual Conference of the Canadian Society of Soil Science. Bulletin 89 (1996): 56-57.
13. Retirement of Dr. Umesh C. Gupta. Bulletin 89 (1996): 73.
14. The 87th Annual Meeting of the American Society of Agronomy. Bulletin 90 (1996): 56-58.
15. Canadian Society of Soil Science. Bulletin 91 (1997): 63-65.
16. Soil and Environmental Chemistry Workshop, Bellingham, USA. Bulletin 93 (1998): 65.
17. 5th International Symposium on Soil and Plant Analysis, Bloomington, Minnesota, USA. Bulletin 93 (1998): 66-67.
18. AOAC INTERNATIONAL Annual Meeting and Exposition, San Diego, USA. Bulletin 93 (1998): 70.

19. Canadian Society of Soil Science Annual Meeting, Truro, Nova Scotia. Bulletin 93 (1998): 79-81.
20. Annual Meeting of the American Society of Agronomy. Bulletin 93 (1998): 84-85.
21. Canadian Society of Soil Science Annual Meeting, Vancouver. Bulletin 95 (1999): 35-36.
22. Annual Convention of the Indian Society of Soil Science. Bulletin 95 (1999): 38-39.
23. First National Symposium on Plant Nutrition, Querétaro, Mexico. Bulletin 96 (1999): 36-37.
24. International Symposium on Soil and Plant Analysis, Australia. Bulletin 96 (1999): 37-38.
25. Canadian Society of Soil Science Annual Meeting, Charlottetown. Bulletin 96 (1999): 45-46.
26. Soil and environmental chemistry workshop, Tacoma, USA. Bulletin 97 (2000): 67.
27. Annual meeting of the American Society of Agronomy. Bulletin 97 (2000): 77-78.
28. AOAC INTERNATIONAL Annual Meeting and Exposition, Philadelphia, USA. Bulletin 98 (2000): 94-95.
29. Annual Meeting of the American Society of Agronomy. Bulletin 99 (2001): 81-82.
30. Eighth International Congress of Soil Science, Islamabad, Pakistan. Bulletin 99 (2001): 82-84.
31. Soil and Plant Analysis Council, Inc. Bulletin 99 (2001): 95.
32. Workshop of the Western Enviro-Agricultural Laboratory Association. Bulletin 100 (2001): 99.
33. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, USA. Bulletin 100 (2001): 102-103.
34. Soil and Environmental Chemistry Workshop, Tacoma, Washington, USA. Bulletin 100 (2001): 104-105.
35. Soil and Plant Analysis Puzzle. Bulletin 101 (2002): 89 (Y.P. Kalra and J.A. Crumbaugh).
36. 7th International Symposium on Soil and Plant Analysis, Edmonton, July 2001. Bulletin 101 (2002): 91-93.
37. Annual Meeting of the American Society of Agronomy, Charlotte. Bulletin 101 (2002): 102-103.
38. 115th AOAC INTERNATIONAL Annual Meeting, Kansas City, September 2001. Bulletin 101 (2002): 104-105.
39. Workshop of the Western Enviro-Agricultural Laboratory Association. Bulletin 101 (2002): 105.
40. Annual Meeting of the Canadian Society of Soil Science, Banff, Alberta, May 18-21, 2002. Bulletin 102 (2002): 47-49.
41. Annual Meeting of the AOAC INTERNATIONAL PNW, Tacoma, USA, June 20-21, 2002. Bulletin 102 (2002): 57-58.
42. A review of the book 'Fundamentals of Soil Science' (G.S. Sekhon, Editor), Indian Society of Soil Science. Bulletin 102 (2002): 79-80.
43. Annual Meeting of the AOAC INTERNATIONAL PNW, Tacoma, USA. Bulletin 103 (2003): 31.
44. International Agronomy Congress, New Delhi, India. Bulletin 103 (2003): 32-33.
45. International Conference on Sustainable Agriculture, Water Resources Development, and Earth Care Policies, New Delhi, India. Bulletin 103 (2003): 34-35.
46. A review of the book 'Food security: Dynamics and dimensions' by M.M. Jha. Bulletin 103 (2003): 57.
47. International Symposium on Soil and Plant Analysis, South Africa, January 2003. Bulletin 104 (2003): 33-35.
48. Workshop of the Western Enviro- Agricultural Laboratory Association, April 2003. Bulletin 104 (2003): 36 (Y.P. Kalra and J.A. Crumbaugh).
49. Workshop of the Western Enviro-Agricultural Laboratory Association, Edmonton, Canada. Bulletin 105 (2004): 49-50 (Y.P. Kalra and J.A. Crumbaugh).
50. Third International Nitrogen Conference, Nanjing, P.R. China. Bulletin 106 (2005): 32-34.
51. International Symposium on Soil and Plant Analysis, Mexico. Bulletin 107 (2005): 29-30.
52. Workshop of the Western Enviro-Agricultural Laboratory Association, Edmonton, Canada. Bulletin 107 (2005): 39-40.
53. Soil and Environmental Chemistry Workshop, USA. Bulletin 108 (2006): 53-55.
54. Third International Conference on Plants and Environmental Pollution, India. Bulletin 108 (2006): 56-58.
55. My observations at the 18th World Congress of Soil Science, Philadelphia, Pennsylvania, USA. Bulletin 109 (2006): 48-50.
56. A mid-congress tour during the 18th World Congress of Soil Science, Philadelphia, Pennsylvania, USA. Bulletin 109 (2006): 50-51.
57. Annual Meeting of the Canadian Society of Soil Science, Banff, Alberta, Canada. Bulletin 109 (2006): 54-55.
58. International Symposium on Balanced Fertilization for Sustaining Crop Productivity, Ludhiana, India. Bulletin 110 (2007): 56-57.
59. Workshop of the Western Enviro-Agricultural Laboratory Association, Edmonton. Bulletin 110 (2007): 59.

60. Tenth International Symposium on Soil and Plant Analysis, Budapest, Hungary. Bulletin 111 (2007): 31-32.
61. Annual Meeting of the AOAC INTERNATIONAL PNW, Tacoma, USA. Bulletin 111 (2007): 33-34.
62. Annual Meeting of the AOAC INTERNATIONAL Pacific Northwest Section. Bulletin 113 (2008): 48-49.
63. Annual Meeting of the Western Enviro-Agricultural Laboratory Association, Edmonton, Alberta, Canada. Bulletin 114 (2009): 41-42.
64. Annual Meeting of the AOAC INTERNATIONAL PNW, Tacoma, Washington, USA. Bulletin 115 (2009): 32-33.
65. Eleventh International Symposium on Soil and Plant Analysis, Santa Rosa, California, USA. Bulletin 115 (2009): 34-36 (Y.P. Kalra, J.A.Crumbaugh, and D.E. Kissel).

Reports of meetings

10th International Meeting on Soils with Mediterranean Type of Climate

Beirut, Lebanon 23-26 June 2009

The 10th International Meeting on Soils with Mediterranean Type of Climate was held in Beirut, Lebanon 23-26 June 2009. It was jointly organized by the International Union of Soil Science and national Council for Scientific Research-Center of Remote Sensing (CNRS-CRS. The meeting was attended by 45 experts from Kuwait, Iran, Jordan, Syria, Lebanon, Alger, Tunisia, Morocco, Spain, Germany, France, Italy, China, Canada and experts from regional and international organization ACSAD and ICARDA. The book of extended abstract contained 54 original works. The program was spread over four days. During the opening ceremony Dr Mouin Hamzé, the Secretary General CNRS, Dr Ahmet Mermut the Chairman of the International Working Group on Soils with Mediterranean Type of Climate (IUSS), Dr Khaled Be Ramdan, Deputy DG ACSAD, Dr Ali Moumen the FAO Representative in Lebanon, and Dr Mohmoud El Solh the DG of ICARDA all presented fact and figures about current regional and international issues in soil science.

The first session was devoted to the use of remote sensing and GIS in land resources studies, land degradation, mass movement and soil erosion. Three keynote lectures were presented: 1) W. Erian on soil survey mapping at different scales in Sudan and Egypt, 2) W. Wu on landuse and biomass production in Sudan and China, and: 3) S. Khresat on landuse/cover changes detection in Jordan. Keynote lectures were followed by three oral presentations on the assessment of land degradation in coastal Syria by M. Al-Abed, mass movement hazards in Lebanon by Ch. Abdallah and land degradation in Lebanon by Mr Antonio Youssef.

The topic of the second session was on the impact of climate change on soil behavior and productivity and soil resilience to erosion, drought and desertification. One keynote lecture was given by Hong Ma on benchmark and indicators for desertification monitoring and assessment in Asia region followed by a presentation on soil erosion in Alger by Gh. Abderahim and another presentation on the role of ACSAD in the soil research in the Arab countries by W. Erian.

The third session held on Wednesday 24/6/2009 was on Land management and organic amendment to enhance carbon sequestration. A keynote was presented by R. Sommer on using the cropsyst model for assessing soil organic carbon sequestration, fol-

lowed by a presentation on soil organic carbon stocks at Tunisia scale by T. Gallali and in the Lebanese territory by T. Darwish. The last two oral presentations of this session were given by R. Bachour on field experiments on CA in Lebanon and on influence of no-tillage on hydrodynamic properties of a Mediterranean Vertisol by R. Moussadek. The third session was followed by examining 16 posters dealing with soil genesis and classification, soil mapping, soil pollution, and nutrient management.

The fourth session dealt with Indigenous Mediterranean ecosystems- the Mediterranean anthroscapes. Indicators of the reshaping processes of the Mediterranean landscape. Two keynotes were given: 1) R. Harfouche on combining archaeology and pedology in the study of Mediterranean anthroscapes and 2) E. De Pauw on land suitability for deroking. One oral presentation was given by A. Ramadan on the use of chemical stabilizers for sand stabilization.

On Wendsady 25 June 2009 a field trip was organized to present the Lebanese soils with a visit to the Cedar mountain forest at Falougha and Baalback Roman Temples.

Session five and six dealing with effective irrigation and fertilization of Mediterraean soils within the context of integrated production, secondary soil salinity and soil management and contamination were held on Friday 26 June 2009, the last day of the meeting. Three key-notes and five oral presentations have been made on these sessions. The first keynote by A. Hennings on the development of pedotransfer functions to estimate annual percolation rates in countries of the Arab regions. The second keynote was presented by F. Trolard on Astuce and Tic program: a collaborative tool to integrate soil and water resources for spreading cities. The third keynote was presented by S. Loddo on GIS based model to assess risk of soil salinization in Sardinia (Italy). The five presentations were made by 1) Th. Atallah on the origin and distribution of soil salinity in greenhouses along coastal Lebanon, 2) M. Benkhelifa on the effects of salinity and sodicity on physical properties of sandy soils under semi-arid Mediterranean climate, 3) G. Bourrié on copper mobility in contaminated soils in Chile, 4) R. Wakim on selenium levels in Lebanese environment and 5) A. Hasanzadeh on the ssessment of input and output energy in chickpea production under rainfed farming systems.

Each session was followed by discussion and the meeting was closed by general discussion where a positive evaluation was given to the organization and smooth flow of sessions in a thematic way. Participants emphasized the importance of variability in the topics which enriched the management of natural resources keeping soil as a central focus in the land degradation assessment, land contamination, indigenous ecosystems, irrigation and fertilization, land management, climate change and soil resilience to drought and use of modern techniques in the studies of land resources. They confirmed that involvement of participants in the sessions were serious and active participation in the poster session reflecting the interest of participants about land contamination, climate change, new techniques related to using nematodes found in the soil to fight forest insects, beside some basic studies on soil genesis and classification. The fact that the final session was attended by more than 75% of participants indicates the seriousness and success of the meeting. A proposal to hold the next, 11th International Meeting on Soils with Mediterranean Type of Climate, in Algeria in 2011 was discussed.

Indonesian Soil Science Society Conference

20-22 November 2009 in Yogyakarta

We were fortunate to being invited to the Indonesian Soil Science Society Conference 20-22 November 2009 in Yogyakarta. www.hiti.or.id/

The conference was organised by the Yogyakarta branch of the Indonesian Soil Science Society Conference (HITI) with a theme of effective utilization of land to support food and energy security. In an effort to boost soil science research in Indonesia, the conference also select five top papers which would be suitable for publication in international journals. The conference was held at Hotel Garuda which was located at the famous Malioboro St in Yogyakarta with over 300 delegates from all over Indonesia. It started Friday night on a dinner and a keynote by Prof. Triwibowo Yuwono, the dean of Faculty of Agriculture at Universitas Gadjah Mada, on the use of biotechnology in supporting soil research. He proposed a soil biological indicator as a tool for measuring the 'quality of the soil'. The dinner also provided the opportunity for a discussion by the soil science society of Indonesia. There were a number of interesting questions from the floor and the topics raised were very similar to the challenges and issues currently being discussed in Australia. These included;

Soils in the making, lahar from the 2006 Mt Merapi covering the Mbebeng village.

how can the society has more influence on the governmental policy making in land use, soil scientists should engage the public through writings in magazines and newspapers.

The continuation of the conference on Saturday, started with plenary presentations by Budiman Minasny on technologies for digital soil mapping and Damien Field on soil carbon and structure. After the plenary session the conference was divided into three parallel sessions with papers presented of International, regional and national relevant research. The international session selected 16 best papers which were hoped to be publishable in international journals.

We were pleased see the high quality papers, although most were presented in Bahasa Indonesia. Notably a paper by Heri Santoso on mapping the disease spread of basal stem rot in oil palm using remote sensing. Mr. Napoleon on the use of indigenous bacteria strain from South Sumatra for bioremediation of oil-sludge contaminated soils. Ms. Lily Ishak on estimating soil erosion in a watershed in Sulawesi where soil data is minimal. Ana Maria on the use of soil quality index. Saberina on mixing the clays from ultisol and vertisol into a sandy inceptisol so that it can be used as a growth media for growing red nile.

Neighbouring soil scientists

A field trip was held on Sunday, and we are fortunate to be able to see the range of soils from South to North of Yogyakarta. We can see one of the few places in the world of soils in the making, influenced by Mount Merapi which erupted various times since 1000 years ago. We visited Mbebeng, the north of Kaliurang where the village was covered by lahar from the 2006 eruption. We saw areas for Salak Pondoh (Salacca zalacca) plantation. The coast at Parangkusuma with sand dunes. And at Samas, South of Bantul, where the sand dunes were modified (with addition of clays and organic matter) and used for growing horticultural crops.

It is exciting to see soil science in the heart of the tropics much alive and solving practical problems, making efficient use of the soil for food production to support the ever-growing population and decreasing land size.

Budiman Minasny
Damien Field
The University of Sydney, Australia.

International Conference Soil Geography: New Horizons

Huatulco Santa Cruz, Oaxaca, Mexico
16-20 of November 2009

The International Conference 'Soil Geography: New Horizons' was hosted by the National Autonomous University of Mexico (UNAM), the National Institute of Statistics and Geography (INEGI) and the National Council for Research and Technology of Mexico (CONACyT), from 16 to 20 of November in the Pacific coast resort Huatulco Santa Cruz, Oaxaca, Mexico. The event was held under the auspices of the International Union of Soil Science (IUSS), Latin American Society of Soil Science (SLCS), the Mexican Soil Science Society (SMCS), the European Confederation of Soil Science Societies (ECSSS) and the European Soil Bureau of the Joint Research Centre of the European Union (JRC). It was the first international conference on soil geography during the last decades, apart from several national and regional meetings, that tried to bring together the pedological disciplines, such as soil morphology, hydropedology, digital soil mapping and classical global soil geographical studies.

The conference started with a Plenary Session 'The theory and methods of soil geography' (Conveners: Dr. Ramón Peralta y Fabi and Dr. Teresa Reyna Trujillo) and continued with the following symposia:

- 'Landscape dynamics, soil geomorphology, and hydropedology' (Convener: José-Ramón Hernández Santana)
- 'Pedometrics, digital soil mapping, and soil geography' (Convener: Christina Siebe)
- 'Pedodiversity and soil geography' (Conveners: Juan-José Ibáñez and Pavel Krasilnikov)
- 'Soil classification and soil mapping units: theory and application (Convener: María del Carmen Gutiérrez Castorena)
- 'Driving forces of soil diversity: lithogenic versus climatic factors' (Conveners: Viktor Targulian and Teresa Reyna Trujillo)

- 'Paleosols in the present and past soilscapes' (Conveners: Edoardo Costantini and Serghey Sedov)
- 'Mountainous tropical soilscapes' (Conveners: Norma E. García Calderón and Raisa Gracheva)

Each simposium included oral presentations and an extensive poster session.

Complementary activities were a round table 'WRB and soil mapping' directed by Peter Schad and a joint business meeting of the First Division of the IUSS diected by the Division Chair, Ahmet Mermut. The Paleopedology Comission also organised an additional business meeting.

At the business meeting the current situation in pedogeographic studies was discussed. Professor Mermut stressed the importance of the development of soil geography in modern world, and called for volunteers to organise the next conference on soil geography (proposals are expected at the Comission business meeting during the 19th WCSS in Brisbane).

A Mid-Confernce field tour was prepared to present complex soil catenas in the tectonically active mountain region Sierra Sur de Oaxaca, since the Conference was partly supported by the research grant of CONACyT 'Soilscapes of dynamic tropical areas: the case of Sierra Madre del Sur' (55718).

During the conference more than 90 researchers from Austria, Canada, Chile, China, the Czech Republic, Denmark, Germany, Iran, Italy, Mexico, The Netherlands, Poland, Russia, Spain, and the USA presented their contributions.

The participants were most satisfied with the high level of organisation and the scientific quality of the contributions.

Before and after the conference, pre- and post-conference tours were held, which gave an excellent insight into landscapes and soils of Mexico, reaching from arid to humid tropical environments.

Winfried E. H. Blum

Trans-Mexican Meridian Field Tour

9–15 of November 2010

The tour was linked to the International Conference 'Soil Geography: New Horizons', held in Huatulco Santa Cruz, Oax., Mexico 16-20 of November 2009. The tour was organized by the National Institute of Statistics and Geography (INEGI) and National Autonomous University of Mexico (UNAM).

The idea of the tour was to cross the main natural zones of Mexico from north to south, from subtropical deserts to tropical rain forests. In seven days the participants of the tour visited five physiographic provinces of Mexico, namely the Mountains and Valleys of the North, Eastern Sierra Madre, Northern Coastal Plain of the Mexican Gulf, Trans-Mexican Volcanic Belt, and Central American Cordillera. The

Participants of the Trans-Mexican Meridian Field Tour at the first day, Torreon, Coahuila.

The route of the Trans-Mexican Meridional Tour.

Participants of the tour (and interested dog) at the seventh day of the tour near Acayucan.

tour started in Torreon, Coahuila; at this site the participants observed arid landscapes with strong Aeolian activity. The soil profiles included Solonchaks, Solonetz and Protic Arenosols. The next day the tour crossed extensive semiarid landscapes between Torreon and Zacatecas with Kastanozems-Solonetz complexes and an area with relict red-coloured Cambisols. The next day included complex profiles with Luvisols buried under cemented volcanic sediments (tepetate) and soils formed in gypsum sediments on

the way from Zacatecas to Tamasopo. The next day the participants observed topographic combinations of Vertisols and Phaeozems on the route from Tamasopo to Tuxpan. Wetlands and mangroves were observed on the way from Tuxpan to Misantla. The next day Misantla–Tlacotalpan included volcanic soils: Andosols and Vitric Cambisols. At the last day of the tour, that brought the participants to Huatulco Santa Cruz, they observed some landscapes and soils of tropical rain forests.

Twenty participants from Mexico, USA, Spain, Germany, Italy, Russia, The Netherland, Denmark and Chile took part in the tour, which seemed to be one of the longest soil tours ever held (2, 600 km). The participants noted high level of the guidebooks published by INEGI and good organization of the tour. The program included a number of cultural events: a visit to El Tajín ancient city, local music etc.

The disadvantage of the tour was that the distances were very long, and most time the participants had to spend in the buses; there were only 2-3 soil profiles a day. May be, shorter tour with more soil profiles would be a better option.

Technologies for Waste Disposal and Soil Protection Zadar, Croatia

18–21 October, 2009

Croatian Academy of Engineering – Center for Environmental Protection and Development of Sustainable Technologies in cooperation with Croatian Society of Soil Science organized the Scientific-professional Meeting which was held in Zadar from 18-21 October, 2009. The Meeting was organized as a Croatian Meeting with International participation, which was implemented through contributions of participants from 6 countries - Bosnia & Herzegovina, Deutschland, Italy, Kosovo, Spain and Croatia.

The Meeting was prepared and organized by team of organizers working in Congress Scientific-organizing Committee constituted of multidisciplinary members with regard to professions, specialties, institutions and companies from which they were elected. The Congress was headed by Prof. Ferdo Baši?, PhD, Congress president, Prof. Branko Salopek, PhD, vice president of the Committee, and Committee Secretaries Assoc. Prof. Ana –Vrsalovi? Prese?ki, PhD and Assoc. Prof. Zvjezdana Findrik. The Honorary Congress Committee was made up of the leading Croatian scientists.

After the three plenary lectures, given by the President of the European Society for Soil Conservation (ESSC) Jose Louis Rubio from Spain (Bioengineering technologies for soil conservation and soil restoration), Ferdo Baši? from Croatia (Soil damages and technologies of protection of soils of Croatia – opened questions) and Franz Scherbaum from Deutschland (Decontamination of soil burdened with Cr(VI)), congress work proceeded including following sections:

- *Soil Damage and Soil Protection Measures*
- *Soil Damage Classification – Problem Ranking, Applicability of DPSIR Model*
- *Landscape – Anthroscape as Factor For Location of Waste Disposal Sites*
- *Soil Properties as Elimination Criteria for Location of Waste Disposal Sites*

Nature Park, Vransko Lake (Photo: B Komesarovi?)

• *Technologies for Waste Disposal Sites*

The program included 26 oral presentations. One-day Congress excursion included visits to Korlat, Vransko Field and Vransko Lake.

The main outcomes of this Scientific-professional Meeting were defining the situation assessment and determination of the possibilities and the guidelines for waste disposal solutions including soil protection and other two sphere (hydro and atmo) protection in respect to technologies that are feasible in practice, socially and environmentally sustainable and economically justifiable. This Meeting presented Croatia to all EU nations as a respectable business partner.

Prof. Stjepan Husnjak, PhD
President of Croatian Society of Soil Science

ICSU GeoUnions Meeting in Institut de France (Academie de Science), Quai de Conti, Paris

6th April 2010

1. Present: Ron Abler (IGU), Orhan Altan (ISPRS), Tom Beer (IUGG), Peter Bobrowsky (IUGS), Ian Corbett (IAU), Ian Dowman (ISPRS), Alik Ismail-Zadeh (IUGG), Francois Lefeuvre (URSI), Stephen Nortcliff (IUSS), Uri Shamir (IUGG), Roger Swift (IUSS),

2. Minutes of the Meeting 19. 10. 2008 in Maputo: Approved

3. Matters arising:

All the actions identified had been pursued (most related to points which were to be raised in the Unions Meeting and the full meeting at the General Assembly of ICSU in Maputo which followed the GeoUnions meeting) meetings. Whilst all the action points had been raised in the GA it was still not clear whether there were any actions on these points and whether the contribution of the Unions was as strong as we considered it should be in the overall procedures of ICSU.

4. Brief Updates from Unions

IUGS – ICSU Grant € 20000 on permafrost gained. A new Task Group on the Global Geoscience Workforce had been established (there is a general concern that most of the 'baby boom' bubble of geoscientists are approaching retirement and there should be a recognition that this cohort of geoscientists need replacing). IUGS will celebrate its 50th Anniversary in 2011. IUGS has joined the UNESCO Africa initiative to develop the geosciences in this continent.

ISPRS – Recently established initiatives to develop a stronger base and greater involvement of local scientists within three regions of the world (Latin America, Africa, and SE Asia) where ISPRS activities are currently under represented. As part of this initiative there will be a meeting in Chile 2010. These initiatives are being undertaken in collaboration with the ICSU regional offices. ISPRS will hold its Centenary meeting in Vienna in July 2010; there will be an Extraordinary General Assembly on July 4, where a representative from the GeoUnions will be invited to speak.

URSI – the General Assembly will be held in Istanbul in 2011. A Working Group on Risk Management has been established but it is not, as yet, linking well with risk management activities within the other GeoUnions. Concern was expressed that a number of National Members are showing reluctance in renewing their membership to URSI as many of the National Academies are reducing their contributions to international unions. (There was a general discussion on this point as this is becoming a more common phenomenon).

IUGG – The Union celebrated their 90th Anniversary in 2009. We were reminded that IUGG has in many respects an unusual structure compared with many of the GeoUnions in that it is a grouping of 8 International Scientific Associations (covering areas such as meteorology, hydrology, etc.), the Council is made up of National Members and the Science is run by the Associations. IUGG co-ordinated a successful application of an ICSU grant on Hazards which involved the three Regional Offices. Relations with the Regional Office for Africa had not proceeded smoothly although one of their action areas was Africa. Key areas for future activities included extending membership in the spheres of the three Regional Offices, consideration of the establishment of IUGG Honours, and continuing action on capacity building and outreach.

Alik Ismail-Zedeh (IUGG) outlined the Global Geoscience Initiative (organised by AGU, EGU, GSL and other national Geoscience groupings) together with a series of Town Hall meetings which have been organised for the presentation of keynote addresses. There are tentative ideas for this to be developed

into an international programme.
More information is available at:
www.agiweb.org/members/ggi/index.html
Alik Ismail-Zedeh will attend the EGU meeting in Vienna in May and should indicate the potential involvement of the GeoUnions.
IAU – 2009 was the International Year of Astronomy which was launched together with UNESCO with over 140 countries participating during the year. IYA was very successful and there is now an active 'Legacy programme', the aim of IYA was to bring the wonders of astronomy to the general public. A Strategic Development Plan is looking to use astronomy as a tool for encouraging students and other to become involved in science. An ***Office for Astronomy Development*** will be set up later this year (costing $200000 per year); there have been 20 serious applications to host this office. UNESCO has shown considerable interest and provided encouragement to these developments. The next General Assembly will be in Beijing in 2012. There have been discussions within IAU which have raised questions about the value of ICSU to the Unions. Specifically the question asked has been 'What does the IAU get from ICSU?'
IUSS – 2010 the year for our WCSS in Brisbane August 1-7. The focus of the WCSS is on trying to find solutions rather than identify problems under the broad heading 'Soil Solutions for a Changing World'. At present our President is from the Country which will host the next Congress, we are currently considering whether this linkage is to the best advantage for the Union and the development and promotion of Soil Science.
We shall be replacing the SG and DSG from the end of 2010 and the new President (from South Korea) will take office in 2011. IUSS is seeking to establish a fund to provide more active support for the involvement of soil scientists from developing countries within the Union. Within Europe the Union has been involved in initiatives in conjunction with JRC at ISPRA to increase knowledge of soils and soil science and the training of soil scientists.
IGU – Was successful in obtaining an ICSU grant on 'Scientific Literacy in relation to Risk' (€30 000). The S-G was elected as Korean Ambassador to China, and will be replaced by Michael Meadows (South Africa) in July at the Conference in Tel Aviv. In addition to the General Assemblies which are held on a 4 year cycle (there will be a GA in Cologne in 2012 and Beijing in 2016). IGU is planning to run inter GA meetings on an annual rather than biannual cycle. It was noted this is in contrast with the trend in most Unions Banding of dues based on GDP will be established in the near future. It was noted that 2022 is the centennial year of IGU.
Action: Gather together information on timings and location of General Assemblies and the registration fees.
IGU proposal for a United Nations International Year of Global Understanding (Benno Werlen, University of Jena). Following the IYPE IGU was considering how to continue the efforts and outcomes which had arisen from this initiative. The proposal is the IY of Global Understanding which is seen as linked to the ICSU Initiative on Global Sustainability. The year seeks to consider 'How are human actions linked to changing environmental conditions?' The focus is trans-disciplinary and seeks to integrates social, natural and spatial perspectives of global sustainability (Globalisation). One of the key aims is to broaden the awareness of an individual's position in the globalised environment. (It was also noted that there is a need to include Science, Engineering and Technology.)
In discussion it was noted that one of the key considerations has to be the financial background to this, without involvement of Governments or possibly major commercial organisations this will revisit many of the problems encountered in IYPE.
Research Topics within the GeoUnions Group
In Maputo the GeoUnions focused on two key areas: Health and Natural Hazards.
Two recently successful grant applications were outlined:

a. Ian Dowman briefly outlined the GeoUnions Health and Wellbeing project. It was noted that the problems of these initiatives are that they are complex and possibly too large and that the complexity is often a potential hazard to making scientific progress. This project focused on urban areas in sub-Saharan projects.
b. The project on Extreme Natural Hazards and Risks was briefly outlined by Alek Ismail-Zadeh. Three projects are located in Asia, Latin America (Brasilia) and Africa (Pretoria). There will be a series of symposia and events culminating in a meeting in Melbourne 2012. There is to be a website www.enhans

Future Proposals were also outlined.

a. IUGS (Commission on Geoscience Information) hopes to put forward a project on data sharing and data management in the December Grant deadline (The One Geology Initiative is an ongoing example of some of the ideas that this initiative will deal with.)

b. Open Geospatial Consortium is an initiative by ISPRS which is also trying to address some of the problems on data interoperability. This might involve more of the GeoUnions than Geologists and similar scientists. How does this link to the project GlobalSoilMap. net? Would this be something that IUSS should be involve with? What about the feature that many Governments consider their data to be 'owned' and not available for public access? IUGS Commission will contact the other Unions.

5. Joint GeoUnions Action

Uri Shamir outlined the success of the collaboration amongst the GeoUnions. Should the GeoUnions be taking joint *ad hoc* action on topics which arise?
He stressed we should ensure that the GeoUnions ensure that their websites cross link to the other GeoUnions.

Action: Ensure that the IUSS site links to the other Union's websites.

The unions discussed this and agreed with the general principles which are espoused in the document, but it was unclear what was the audience for such a statement? It was agreed that this would go on our individual Union websites and probably on the ICSU website. With some editing it could be released by ICSU as part of the press release and possibly a 'side event'.
IUSS will receive any further amendments and send this to ICSU.

The revised resolution circulated to the Unions was:

RESOLUTION[1]

Natural Hazards, Risks and Disasters

Adopted by the ICSU GeoUnions Consortium, comprising

- The International Astronomical Union
- The International Geographical Union
- The International Society for Photogrammetry and Remote Sensing
- The International Union for Quaternary Research
- The International Union of Geodesy and Geophysics
- The International Union of Geological Sciences
- The International Union of Soil Sciences
- The Union Radio-Scientifique Internationale (International Union of Radio Science)

on 6 April 2010

Recognizing that

1. natural hazards have a significant disaster potential;
2. the first decade of the 21st century has been marked by a number of environmental disasters;
3. many vulnerable people reside in areas of significant natural disaster risk;
4. better knowledge of the geosciences will increase mitigation of natural risks; and advanced technology, observations, and timely warnings can reduce damage, improve preventive measures and reduce loss of life;
5. the economic impact of natural disasters greatly exceeds the cost of mitigation;
6. disaster reduction, management, preparedness and warning systems are all essential long-term planning needs;
7. reducing the impact of disasters should be carried out mainly at the local level;
8. geoscience knowledge and propagation of this knowledge can assist rescue agencies to obtain more rapidly understanding of the extent of a potential disaster and plan remediation;
9. sharing remote sensing and spatial information are vital in damage assessment supporting the rescue operation after natural disasters; and
10. one element in reducing the impact of natural hazards is to improve our predictive capability of their occurrence, which requires a thorough understanding of the nature of the dynamic processes of the Earth system;

We recommend that

1. multi-disciplinary and multi-national natural hazard and risk assessment research programs be developed to share and integrate diverse data streams, to improve understanding of the natural phenomena associated with disasters, to develop observation techniques, predictive modeling capability and to produce planning tools for disaster risk assessment and reduction at all scales:
2. earth science education becomes an integral part of education systems at all levels and in all countries;

[2] This Resolution is based on the ISPRS Beijing Declaration. www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/2124_DD_FILE_ISPRS_Beijing_Declaration.pdf, IUGG Resolution 'Science on Natural Hazards and Environmental Disasters' (www.iugg.org/resolutions/nathaz2010.pdf), IUGS Resolution (www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/3013_DD_FILE_IUGS-Declaration-Haiti-Earthquake-Jan2010.pdf).

3. systems and procedures are developed for reliable real-time monitoring, early warning, increasing public awareness, establishing regional evacuation routes and shelters and general risk mitigation based on charts of vulnerability to natural hazards and risk assessments;
4. regional and local disaster management centers are established where they do not now exist to catalog information on the population and infrastructure at risk, and to monitor land, ocean and atmosphere in relation to all kinds of natural hazards; and
5. regional natural hazard warning systems are established which can disseminate timely and accurate information needed by decision makers and the public;

and so
resolve to

1. promote the development and application of scientific expertise and experience in the understanding, modeling and visualization of geological, physical, technological, biological and social processes and their implications for the mitigation of natural disasters;
2. make this critical information freely available to the public with special consideration being given to government officials, policy makers, emergency planners and the insurance industry
3. urge international agencies and developed countries to provide economic and technical support for the implementation of programs and systems for identifying potential hazards in less-developed countries with significant risks of natural disasters, on the understanding that assistance before a disaster will save lives and reduce economic hardship.

The GeoUnions saw no advantage in seeking to produce a Strategic Plans for all the GeoUnions.
An offer was made for the next GeoUnions Meeting be held in Torino as part of GEOITALIA in September 2011 just prior to the ICSU GA in Rome? This was considered a good idea.

6. ICSU Relations
The question posed was 'Have things changed since the departure of Thomas Rosswall?'
Uri Shamir stated that the new Executive Director, Deliang Chen is a 'breath of fresh air'; Catherine Brechignac is for less concerned with seeking compromise that the previous President which has resulted in more decisions being taken. He observed that the Executive Board seems to be working well.
There was a feeling amongst the Unions that whilst the Executive Director was providing a fresh approach not all of the 'lieutenants' appear to have changed, but this is relatively early in the process.
Members considered that there appears to be the same problem of relatively poor representation of Union nominations in the various committees, for example we still do not receive information about the candidates to various committees and on who nominates whom. There still seems to be an element of an 'old boys club' (often committee members appear to be appointed from within the Union membership without any reference to the Unions and often apparently in preference to Union nominees. It was noted that CSPR is the place where the committee membership is decided, but that the activities within this committee are often not widely known.
The Unions considered that ICSU often seems to ask us to do something and suggest names for involvement, but then it often sticks with the incumbents. We shouin relation to why particular nominations are accepted and why other nominations are not supported and where decisions are taken.

Regional Offices
ROA - Sospeter Muhongo left as Regional Director at the end of February 2010 with mutual consent.
ROAP is working reasonably well.
ROLAC is moving its location from Brazil to Mexico but is working reasonably well.
Regional Office in the Arab World appears to have made relatively little progress.
The Regional Offices are still a key part of the ICSU framework and are linked to the core strategic aims of ICSU.
It was reiterated that we need to be clear as Unions what we actually want from ICSU, what do we perceive ICSU as delivering to us as Unions?

7. Briefing concerning of the meeting with Robert Misotten
This meeting is taking place in the context of a proposal for a new Global Geoscience Initiative(see note from IUGS above). There was an indication from Misotten that he might wish to discuss with the GeoUnions possible future programmes within UNESCO.
There is the possibility that there could be a closer relationship between ICSU and UNESCO the one ad-

dressing non-governmental (ICSU) and inter-governmental (UNESCO) remits. The ICSU Executive Director and DG of UNESCO have a closer relationship than was the case in the past.
The contact for ICSU is the Basic Science Associate Director General, but they recognise the interdisciplinary nature of a great deal of ICSU's work programme.
IGBP, IGP are UNESCO programmes which fall within ICSU's interdisciplinary programmes.
UNESCO's financial contribution to ICSU has declined in recent years. UNESCO has allocated money to regional offices and wishes to direct more to regional science programmes with active involvement of the ICSU unions. UNESCO has an increased tendency to work with Unions. UNESCO funding is often a key funding prime for funding from Governments.
New DG of UNESCO is probably more interested in science than her predecessor. As a first step she fired her ADGs and chose to appoint new persons to these positions.
IUGS stated it has had close contacts with UNESCO for a number of years particularly in the context of IGCP. When originally raised this meeting was also expected to involve the big players in geological science (e.g. Geological Society of London), but this has not happened.
It was noted that some of our areas of interest (e. g. Hazards), are not within the remit of the Misotten's.
We need to ensure that ICSU and its Unions speak with a single voice. A recent review of UNESCO identified the need to work more closely with ICSU and its Unions.
Within UNESCO the Divisions do not match well with our GeoUnion interests, but often cut across our subject interests.
Some questions that we need to raise with UNESCO: What do they want?
What are the common areas – Ecosystems; Disaster; visioning the future of Earth System Science (Sustainability Research).
One area is to see whether there are new disciplines and new possibilities, possibly outside the normal strict disciplinary scientific areas.
One area of key significance for the global future relates to land and the production of food, fibre and bioenergy from the land. The demands on the fixed amount of land that is available are very diverse and often conflicting. How do we produce more on the fixed amount of land that is available? These are linked to food security, water resources.
In conclusion it was noted that ICSU has begun to develop closer ties with the Federation of Engineering Sciences (both UN involved and recognised) and the ISSE.

8. IYPE and the Planet Earth Institute
Arising from the International Year of Plant Earth, the proposal for The Planet Earth Institute was presented by Stephen Nortcliff (IUSS) on behalf of Ed de Mulder.
The GeoUnions were pleased to see this initiative and wished the group well with the work on this and once it is more fully developed they would revisit this to consider the possibility of more active involvement.
IUGG was not inclined to support this financially, given the lack of clarity in what was to be delivered.
Uri Shamir stated his concerns that there is insufficient emphasis given in the proposal to the scientific content of the initiative.
IUGS would be happy if such a thing was born, but would not be able not support it financially at this time.
The meeting closed at 17. 30

Stephen Nortcliff
Secretary General IUSS

ICSU Unions Meeting Institut Pasteur, Paris

7-8 April, 2010

31 Unions were represented at the meeting which was also attended by members of the Executive Board of ICSU, The Executive Director of ICSU, Deliang Chen, and staff members of ICSU. The meeting was opened by the Executive Director, Deliang Chang.

DAY 1 MORNING SESSION

ICSU Scientific Programmes

Kari Ravio EB and Chair of CSPR spoke about the progress on the ICSU Strategic Plan for 2006-11 and the Scientific Programmes with which ICSU had a lead role or played a significant part with other partners.
He asked the question 'How do we use our disciplinary knowledge and expertise to solve interdisciplinary/multidisciplinary questions?'
He saw three interlinked themes:
- International Research Collaboration
- Science and Policy
- Universality of Science

International Research Collaboration

He cited the International Polar Year (2007-8) which was initiated by ICSU as a key action in this area.
He reviewed Current initiatives:

- International Human Dimensions Programme on Global Environmental Change (IHDP)
- Earth Systems Science Programme (ESSP)
- International Geo-Biosphere Programme (IGBP)
- World Climate Research Programme (CRP)
- Scientific Committee on Problems of the Environment (SCOPE) – the ICSU involvement in SCOPE was discontinued from 2008.

Science for Policy

UN Commission on Sustainable Development
UNEP and the International Platform for Biological and Environmental Systems
UNESCO
WMO
The Regional Offices were also a key part of the links between Science and Policy; ROA – based in Pretoria; ROAP –based in Kuala Lumpur; ROLAC – based in Rio de Janeiro to 2010 then Mexico City.

Universality of Science

There have been strong moves to strengthen the regional base and increase the membership of ICSU through these regional activities.
There are ongoing attempts to ensure there are closer ties with the Social Sciences and Engineering and Technology.
There has been a relaunch of the ICSU World data System and a refocusing of CODATA.

Key priorities in 2009-11

ICSU has undertaken a 'Visioning Process' for Earth Systems Research (Sustainability Research).
New World Data System and Strategic Co-ordinating Committee for Information and Data – SCCID.
Review of Regional Offices
Integrated Research on Disaster Risk (IRDR) has been established wirh an Office in Beijing
Programme for Ecosystem Change in Society (PECS) has been established
Health and wellbeing in the changing urban environment is in the final stages of development as an ICSU programme.
Plans for the next Strategic Plan (2012-17) are underway.
There is a plan to hold a Rio + 20 meeting in 2012 (ICSU was asked to lead on the science planning of this).

Finally Kario Ravio noted that there had been increased engagement between ICSU, its Committees and the Unions in recent years.

Discussion

During discussion it was noted that some of the Unions with a broad discipline remit, such as IUPAC and IUPAP were at a disadvantage when applications for funds required the collaboration of at least two Unions.

International Years and Trans-Union Activities

Tom Beer, President of IUGG presented brief details of the 'Years' in which IUGG and other GeoUnions had been involved: -
International Polar Year
International Heliophysical Year
Electronic Geophysical Year
International Year of Planet Earth
International Geophysical Year + 50.

Nicole Moreau, President of IUPAC presented brief details of the International Year of Chemistry in 2011. This is chosen because it is the 100th anniversary of the award of the Nobel Prize to Marie Curie. The launch will take place in Paris 27-28 January 2011 at UNESCO HQ.
One of the themes will be Women in Chemistry.

IUBMP raised the question of the value to ICWSU to his Union's membership. There was a concern that the information flow from ICSU to IUMBM was not working at present.

Benno Werner on behalf of ***IGU*** outlined a proposal for an International Year of Global Understanding. This year will seek to link the biophysical and social and cultural aspects. The argument presented is that Global Understanding is the basis for Global Sustainability, and Global Sustainability will influence Global Understanding!

IUFOST presented brief details of a Food Security Task Force and encouraged other Unions to be actively involved with their activities in this area.
Ian Corbett, IAU reported briefly on the very successful International Year of Astronomy in 2009. This had involved 147 different countries and had a very strong outreach element. The legacy from this year was being sustained by establishing a small secretariat with funds of €620000 raised from a number of sources.

DAY 1 AFTERNOON SESSION

Leah Goldfarb (ICSU Staff) gave a presentation on the ongoing *Visioning Process for Sustainability Research*.

This is described as a holistic strategy on sustainability research which was based on a series of research priorities which arose from a meeting of 50 invited participants, which included 15 early career scientists (there appears to have been very little or no Union involvement in identifying the appropriate participants!).

There is to be a meeting in Paris on June 22 which will be an Open Forum at which point the Unions should have the opportunity to make a, albeit somewhat late in the day, contribution.

A series of Challenges have been identified:

1. Forecasts of future environmental issues
2. Observation necessary
3. Risk management in relation to these issues
4. Institutional changes required
5. Innovations necessary to move these challenges forward.

The process of developing the *Strategic Plan for 2012-2017* was briefly outline.

It becomes apparent that CSPR has a key role to play in this process, but it is unclear how membership of CSPR is determined and by whom.

There will be the same three strands as in the earlier Plan:

1. Co-ordinating and Planning of Research
2. Science and Policy (strong links to the UN system)
3. Universality of Science.

There was a mention of their being a series of reviewers and reviewing panels but there is no clear indication of how these reviewers and panels will be chosen.

Paul Cutler (ICSU Staff) presented a brief outline of the *Foresight Analysis* (http://foresight.icsu.org). Foresight will guide the strategic choices for the future.

There will be a Foresight Task Team or Teams, the membership of which appears to be determined by CSPR.

The aim is to endeavour to look 20 years ahead, to develop scenarios which identify:

1. Interplay of drivers
2. Uncertainties
3. Things to avoid
5. Preferences

This was followed by a series of Breakout sessions which sought to consider how science and the management of science will change. There were a wide range of views:

a. Science will grow together with increased collaboration between disciplines, but it may become centred in a smaller number of larger centres.
b. Scientists must use data efficiently and effectively.
c. Data and data handling is likely to become increasingly important and we need support in these areas.
d. The complexity of the problems faced will require large teams with wide ranges of specialisms, but there will need to be a core of disciplinary knowledge. This could have strong influences on the training of students and young scientists.
e. The over-riding importance of the integrity of the scientific method was stressed.
f. There is a need for the population to be educated in the very basic elements of science.
g. It was noted that politically what is required is certainty not probability!
h. As more an more cross disciplinary research is undertaken and there is a drive for rapid publication there are concerns about quality control as peer reviewing becomes less common.

ICSU Initiative on Human Health and Wellbeing.

This initiative which stemmed from original ideas from within the Unions is in its final planning stages and should be recommend to the GA in 2011 as a new ICSU Programme.

DAY 2 MORNING

ICSU Finances were briefly outlined by the *Treasurer Hans Ott*. 2009 had been a difficult year with stock based investments suffering a considerable decline because of the financial crisis.

Income:

Membership fees cover salaries and core grant

UNESCO and NSF money is linked to specific projects in Developing countries and the Environment.

France generously provides considerable funds but they are strongly controlled in how they can be spent.

Membership Dues:

National Members	c. €2m
Unions	c. €150k

(NM dues vary from €1k to €270k; Unions dues vary from €1. 8k to €28k)

The losses in stock value has resulted in a reassessment of the investment policy with decrease in the

proportion of stocks and increase in the proportion of bonds. The €280k for Grants ahs been retained.
It was noted that the 'social costs' of a French base were high!
Progress towards *Weighted Voting* was presented by *Bryan Henry* on behalf of the EB. There has been a debate within ICSU for some time as to whether voting strength should be determined by the magnitude of the membership dues paid by a Union or National Member.
It was noted that the current equal weight voting of National Members and Unions was not considered to be up for discussion at present.
The possibility of four bands for Unions was outlined.
There is some support for the idea that weighted voting should not apply to votes on non-financial matters.

The ICSU Grants programme was briefly outlined. Following the discontinuation in 2007 the programme was re-introduced in 2008 with a€30k maximum and a requirement for input from more than one Union and in 2009a wish to involve the Regional Offices. The Grants programme was well received and served to act as a pump-priming exercise.

Reiko Kiroda outlined the Unions roles in the ICSU programme. He stressed the need for cross and interdisciplinary work. He noted that the office for Integrated Research on Disaster Risk had been recently opened in Beijing. There seemed to be some scepticism amongst some Unions that CSPR always saw a necessity to involve Unions in its discussions and prioritisations. There was also a request for considerably greater transparency in relation to the appointments to Committees, Task Forces, etc. There was a feeling amongst some Unions that ICSU was not always using the full potential of its Union Membership.

Jacinta Legg (ICSU Communications Officer) outlined changes in ICSU Communications. Principal amongst these changes is a revamp of the ICSU website in September 2010.

The Regional Offices
There were presentations from each of the Regional Offices: -
ROLAC – Alice Abreu
ROAP – Bruce McKeller
ROA – Ricky Skeef

DAY 2 – AFTERNOON
Mustapha Mokrane gave a presentation on *Data and Information*, focusing on a number of matters relating to the new World Data System and the importance of long term stewardship of data and the need to ensure quality of the data and its accessibility.
Carthage Smith (Deputy Executive Director) gave a presentation on the *Committee on Freedom and Responsibility in Science*. There was some wide-ranging and lively discussion about matters such as research integrity, misuse of citation indices, cheating on impact factors, etc.
Gisbert Glaser (ICSU Senior Adviser) gave a presentation on *Sustainable Development.* He outlined the involvement of ICSU in Rio 1992, Johannesburg 2002 and most probably in Rio 2012 (Rio + 20).
The broad aim of Rio + 20 is to renew the political commitment to sustainable development in the light of lessons learnt over the last 20 years.
The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is being proposed by ICSU, IUCN and DIVERSITAS to further strengthen policy making, through enhancing the credibility, legitimacy and saliency of the science policy interface in areas relating to biodiversity and ecosystem services. The broad aim is to raise awareness and engage the scientific community and the broader civil society.

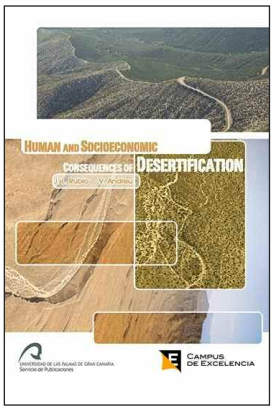
Stephen Nortcliff
IUSS Secretary General

New Publications

Organic Farming, Pest Control and Remediation of Soil Pollutants. Lichtfouse, Eric (Ed.) 2010, X, 418 p., Hardcover ISBN: 978-1-4020-9653-2. 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.

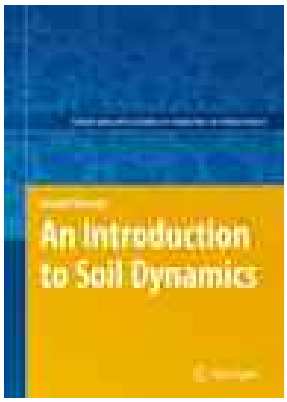
Landform - Structure, Evolution, Process Control. Proceedings of the International Symposium on Landform organised by the Research Training Group 437. Series: Lecture Notes in Earth Sciences, Vol. 115 Otto, Jan-Christoph; Dikau, Richard (Eds.) 2010, XII, 258 p. 134 illus., 14 in color., Hardcover ISBN: 978-3-540-75760-3. The book presents a selection of papers given at the International Symposium on

'Landform – structure, evolution process control', Bonn, June 2007. The meeting brought together senior experts and young researchers from various disciplines working on landform related issues in order to discuss the crucial role played by landform as a boundary surface between atmosphere, hydrosphere, biosphere, pedosphere and lithosphere. The book combines introductory/overview papers and case studies. The case studies present various new approaches towards a better understanding of the role of landform as a boundary surface. Additionally, new methods of handling, modelling and visualisation of landform data (incl. digital elevation models, weather forecasting models, hydrological models, and ecological models) are presented.



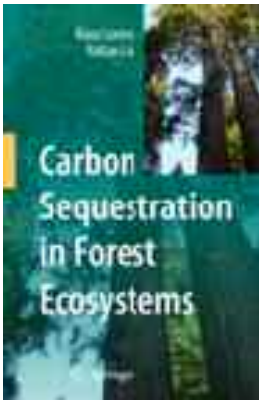
Human and Socioeconomic Consequences of Desertification. Rubio, J. L and Andreu, V. (Coords.). 2009, 276 p, 46 illus., 44 in color. Softcover, ISBN: 978-84-92777-42-6. As a result of human activities and climate change the processes of desertification are progressing. Around 40% of the earth surface is threatened by risk of desertification, including wide areas of Mediterranean. Desertification, at the latest consequences represents the dismantling of all biospheric potential of the affected zone and its conversion into a barren and unproductive territory. Te effects of soil degradation not only menace the land agricultural potential of providing food and biomass but also its implies the alteration of the hydrological cycle, drastic decrease in biodiversity, development of feedback mechanisms affecting important climatic parameters, and in addition, the increase of the catastrophic consequences of hazards such as forest fires, landslides and floods. All these processes give rise to important

human and socio-economic implications. However, the social perception of this problem is limited and, generally, its intricate mechanisms and processes are not visualized as something worrying at the level of perception of, for example, the tendency to global warming. Contributing to a greater information and scientific and social implication in the fight against desertification, in this book are analyzed processes and factors, biophysical and socio-economic consequences, scientific and technological responses, and proposals of integrative, participatory and implicated initiatives to avoid and reverse the tendency of the desertification menace. E-mail: serpubli@ulpgc.es

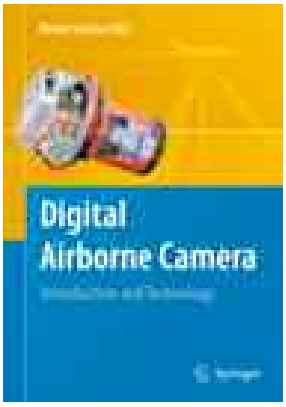


An Introduction to Soil Dynamics. Series: Theory and Applications of Transport in Porous Media, Vol. 24. Verruijt, Arnold. 2010, XIV, 434 p. 201 illus., 6 in color. With CD-ROM. Hardcover ISBN: 978-90-481-3440-3 This book presents the basic principles of soil dynamics, and a variety of solutions of practical interest for geotechnical engineering, geophysics and earthquake engineering. Emphasis is on analytical solutions, often including the full derivation of the solution, and giving the main parts of computer programs that can be used to calculate numerical data. Reference is also made to a website from which complete computer programs can be downloaded. Soil behaviour is usually assumed to be linear elastic, but in many cases the effect of viscous damping or hysteretic damping, due to plastic deformations, is also considered. Special features are: the analysis of wave propagation in saturated compressible porous media, approximate analysis of the generation of Rayleigh waves, the analysis of the response of soil layers to earthquakes in the deep rock, with a theoretical foundation of such problems by the propagation of Love waves, and the solution of such basic problems as the response of an elastic half space to point loads, line loads, strip loads and moving loads.

Carbon Sequestration in Forest Ecosystems Lorenz. Klaus, Lal, Rattan 2010, XIX, 277 p. 19 illus. in color. Hardcover ISBN: 978-90-481-3265-2. Carbon Sequestration in Forest Ecosystems is a comprehensive



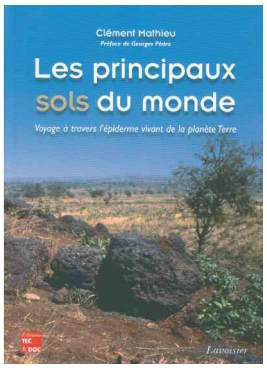
book describing the basic processes of carbon dynamics in forest ecosystems, their contribution to carbon sequestration and implications for mitigating abrupt climate change. This book provides the information on processes, factors and causes influencing carbon sequestration in forest ecosystems. Drawing upon most up-to-date references, this book summarizes the current understanding of carbon sequestration processes in forest ecosystems while identifying knowledge gaps for future research, Thus, this book is a valuable knowledge source for students, scientists, forest managers and policy makers. It is written for: Graduate and undergraduate students, scientists, forest managers, policy makers



Digital Airborne Camera - Introduction and Technology. Sandau, Rainer (Ed.) Original German edition published by Wichmann Verlag. 2010, XII, 343 p. 215 illus., Hardcover ISBN: 978-1-4020-8877-3. Digital airborne cameras are now penetrating the fields of photogrammetry and remote sensing. Due to the last decade's results in research and development in the fields of for instance detector technology, computing power, memory capacity position and orientation measurement it is now possible with this new generation of airborne cameras to generate different sets of geometric and spectral data with high geometric and radiometric resolutions within a single flight. This is a decisive advantage as compared to film based airborne cameras. The linear characteristic of the opto-electronic converters is the basis for the transition from an imaging camera to an images generating measuring instrument. Because of the direct digital processing chain from the airborne camera to the data products there is no need for the processes of chemical film development and digitising the film information. Failure sources as well as investments and staff costs are avoided. But the effective use of this new technology requires the knowledge of the features of the

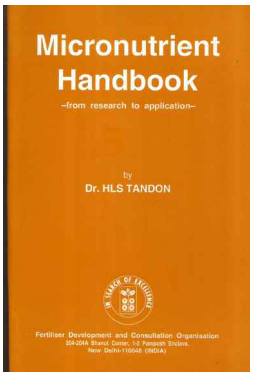
image and information generation, its possibilities and its restrictions. This book describes all components of a digital airborne camera from the object to be imaged to the mass memory device. So the image quality influencing processes in the nature are described, as for instance the reflection of the electromagnetic sun spectrum at the objects to be imaged and the influence of the atmosphere. Also, the essential features of the new digital sensor system, their characteristics and parameters, are addressed and put into the system context. The complexity of the cooperation of all camera components, as for instance optics, filters, detector elements, analogue and digital electronics, software and so forth, becomes transparent.

Soils, Plants and Clay Minerals. Mineral and Biologic Interactions. Velde, Bruce, Barré, Pierre. 2010, X, 349 p. 106 illus., Hardcover ISBN: 978-3-642-03498-5. This book considers the inter-relations between plants and minerals in an entirely new way, in that it introduces the notion of eco-engineering: i. e. the manipulation of the mineral world by the living world to the ends of the living world. These interrelations are the basis for traditional agriculture and should be the basis for new, ecologically oriented land management disciplines, including agriculture itself. These relations also have an impact on surface geochemistry and determine pollution problems. A better understanding of this concept will lead to a renewed consideration of surface environmental problems.



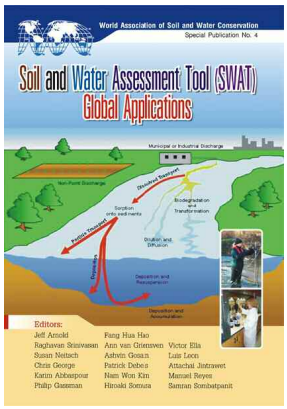
Les principaux sols du monde. Voyage à travers l'épiderme vivant de la planète Terre. Mathieu, Clément. 2009, 233 p., 388 illus. in colour. 42 fig., in French. Hardcover, ISBN: 978-2-7430-1196-3. Increasing food production to meet the requirements of 9 billion people in 2050 commands to better adjust soil use to soil properties. This book by Clément Mathieu not only describes the many soil types encountered on planet Earth, but, more importantly, gives the rational of their distribution. It is thus a key document to better tailor soil use. The reader feels that he can understand the reasons for soil spatial variability in each particular ecosystem. What makes the book fascinating is the 388 colour photographs, mainly from soil profiles, that allow the reader to visualize the different soil types described in the text. Clément Mathieu travelled extensively the world during his career, so he knows by himself what he is talking about. The last chapter of the book gives a good overview of the many dangers threatening the soil in a very comprehensive way. Throughout the book the author refers to both the old French classification (CPCS) and the WRB.

Manual of Methods for Soil and Land Evaluation. Edoardo A. C. Costantini (Editor). CRA-Centro di ricerca per l'agrobiologia e la pedologia, Florence, Italy ISBN 978-1-57808-571-2. 2009. 600 pages. US$119. 95 The goal of the manual is to supply an operational tool for pedologists, agronomists, environmentalists, and all of the other specialists who carry out land evaluation for agriculture and forestry or, more generally, stakeholders and policy makers who make decisions at the local level based on the knowledge of the nature of soil. Discussion of the topics is not only technical and operational, but also in-depth and didactic; therefore, the text may also be used as a valid complement for students majoring in subjects that involve soil use, management and conservation. The literature offers a wide choice of possible soil and land evaluation methods, while knowledge of the relationships existing between the physical characteristics of lands, particularly those of soils, and the requirements of specific uses is limited.

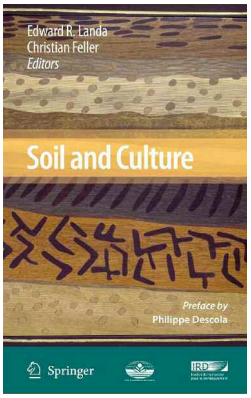


Micronutrient Handbook - from research to practical application. by Dr HLS Tandon. 2009. ISBN: 81-85116-60-1. Pages 212 +x. Fertiliser Development and Consultation Organisation, 204-204A Bhanot Corner, 1-2 Pamposh Enclave, New Delhi 110 048 (India), E-mail: fdco@airtelmail.in, fdco@vsnl.net, Price Price: US$ 60 (inclusive of airmail delivery). The book provides latest researched based practical information on the eight micronutrients, namely boron,

chlorine, copper, iron, manganese, molybdenum, nickel and zinc. Over the years, there has been a virtual explosion in the published literature on micronutrients. Much of the technical information has been processed and presented by the author from practical use point of view. This handbook is divided into 12 chapters supported by over 40 tables, 10 diagrams, a list of about 200 references. The various chapters cover the role of micronutrients and their deficiency/toxicity symptoms; micronutrients in soils: micronutrients in plants; micronutrient uptake and removal by crops; micronutrient fertilizers; the multi-micronutrient scenario: crop-wise practical recommendations; guidelines for efficient management micronutrients and a self-test by which a reader can judge his/her knowledge of micronutrients. The author has estimated the current annual micronutrient uptake (not removal) by crops in India to be 180, 000 tonnes. Out of this, the share of iron is 68%, manganese 13%, zinc 8. 5%, boron 7. 5%, copper 2. 1% and molybdenum 0. 04%. This micronutrient handbook will be of direct interest and use to all those who are interested in balanced fertilizer use in general and micronutrients in particular.

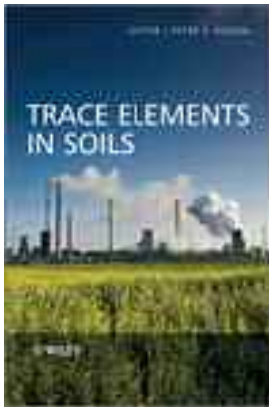


Soil and Water Assessment Tool (SWAT): Global Application. The Soil and Water Assessment Tool (SWAT) is one of the most widely used and flexible watershed-scale water quality models in the world, as chronicled in the sixteen chapters included in the three main sections of this informative volume. Part 1 of the book provides both an overview of the model components as well as a comprehensive review of over 200 SWAT applications that were reported in the peer-reviewed literature by early 2007. Part 2 presents 10 key SWAT studies that span a wide range of different regions, application scales, environmental problems, and data availability issues. These studies range from a SWAT application for a small 200 ha watershed on the Filipino Island of Mindanao to the entire African continent and cover topics such as blue and green water availability in Iran and Africa, supporting needs within the European Water Framework Directive, simulating the hydrologic balance of the conterminous United States, and other applications for watersheds in Chile, China, India, Japan, Philippines, and South Korea. Part 3 is split into four chapters that provide descriptions and application guidance for several key SWAT support software including MWSWAT, a public domain interface that is particularly attractive for regions with limited data. The book, published as the Special Publication No. 4 of WASWAC (World Association of Soil and Water Conservation http://waswac.soil.gd.cn/) and supplied with a DVD that contains necessary software and other SWAT and WASWAC information, is available from Manuel Reyes (mannyreyes@nc.rr.com) for readers in USA/Canada and from Samran Sombatpanit (sombatpanit@yahoo. com) for orders from the rest of the world.

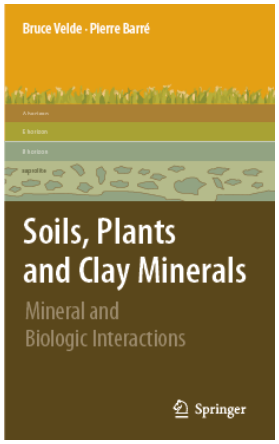


Soil and Culture. Landa, Edward R.; Feller, Christian (Eds.) Springer 2010, 524 p. Hardcover. ISBN: 978-90-481-2959-1. Soil has been called the final frontier of environmental research. The critical role of soil in biogeochemical processes is tied to its properties and place—porous, structured, and spatially variable, it serves as a conduit, buffer, and transformer of water, solutes and gases. Yet what is complex, life-giving, and sacred to some, is ordinary, even ugly, to others. This is the enigma that is soil. *Soil and Culture* explores the perception of soil in ancient, traditional, and modern societies. It looks at the visual arts (painting, textiles, sculpture, architecture, film, comics and stamps), prose & poetry, religion, philosophy, anthropology, archaeology, wine production, health & diet, and disease & warfare. *Soil and Culture* explores high culture and popular culture—from the paintings of Hieronymus Bosch to the films of Steve McQueen. It looks at ancient societies and contemporary artists. Contributors from a variety of disciplines delve into the mind of Carl Jung and the bellies of soil eaters, and explore Chinese paintings, African mud cloths, Mayan rituals, Japanese films, French comic strips, and Russian poetry.

Trace Elements in Soils. P. Hooda (Ed). Hardcover. 592 pages. April 2010, Wiley-Blackwell. ISBN: 978-1-4051-6037-7. Trace elements occur naturally in soils and some are essential nutrients for plant growth as well as human and animal health. However, at ele-



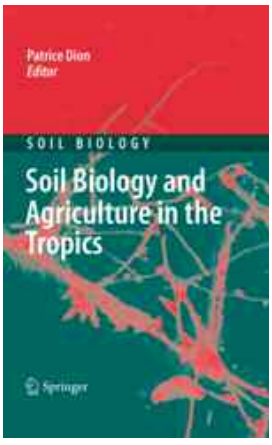
vated levels, all trace elements become potentially toxic. Anthropogenic input of trace elements into the natural environment therefore poses a range of ecological and health problems. As a result of their persistence and potential toxicity, trace elements continue to receive widespread scientific and legislative attention. *Trace Elements in Soils* reviews the latest research in the field, providing a comprehensive overview of the chemistry, analysis, fate and regulation of trace elements in soils, as well as remediation strategies for contaminated soil. Written as an authoritative guide for scientists working in soil science, geochemistry, environmental science and analytical chemistry, the book is also a valuable resource for professionals involved in land management, environmental planning, protection and regulation.



Soils, Plants and Clay Minerals. B. Velde & P. Barré. Springer. ISBN 978-3-642-03498-5. Harcover, 349 pp. This book considers the inter-relations between plants and minerals in an entirely new way, in that it introduces the notion of eco-engineering: i. e. the manipulation of the mineral world by the living world to the ends of the living world. These inter-relations are the basis for traditional agriculture and should be the basis for new, ecologically oriented land management disciplines, including agriculture itself. These relations also have an impact on surface geochemistry and determine pollution problems. A better understanding of this concept will lead to a renewed consideration of surface environmental problems.

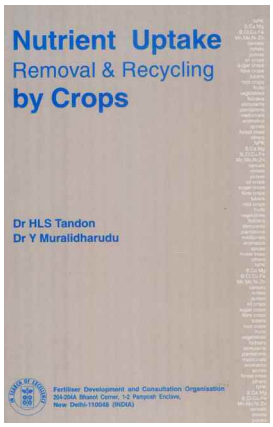
Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater. K. R. Reddy & C. Cameselle. Wiley, October 2009. Hardcover, 732 pages. ISBN: 978-0-470-38343-8. Electrochemical technologies are emerging as important

approaches for effective and efficient pollution remediation, both on their own and in concert with other remediation techniques. *Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater* provides a systematic and clear explanation of fundamentals, field applications, as well as opportunities and challenges in developing and implementing electrochemical remediation technologies. Written by leading authorities in their various areas, the text summarizes the latest research and offers case studies that illustrate equipment, installation, and methods employed in real-world remediations. Divided into nine sections, the coverage includes: Introduction and fundamental principles, Remediation of heavy metals and other inorganic pollutants, Remediation of organic pollutants, Remediation of mixed contaminants, Electrokinetic barriers, Integrated (coupled) technologies, Mathematical modeling, Economic and regulatory considerations, Field applications and performance assessment. Unique as a comprehensive reference on the subject, *Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater* will serve as a valuable resource to all environmental engineers, scientists, regulators, and policymakers.



Soil Biology and Agriculture in the Tropics. Dion, Patrice (Ed.) Springer, 2010, XIII, 350 p., Hardcover ISBN: 978-3-642-05075-6. The relationships between soils, microbes and humans are of crucial relevance in the tropics, where plant stress and microbial activity are exacerbated. This volume of Soil Biology presents the living component of tropical soils, showing how it is shaped by environmental conditions and emphasizing its dramatic impact on human survival and well-being. Following an introduction to the specificities of tropical soils and of their microbial communities, the biological aspects of soil management are exam-

ined, dealing with land use change, conservation and slash-and-burn agriculture, the restoration of hot deserts, agroforestry and paddy rice cultivation. As they are of particular relevance for tropical agriculture, symbioses of plants and microbes are thoroughly covered, as are the biodegradation of pesticides and health risks associated with wastewater irrigation. Lastly, traditional soil knowledge is discussed as a key to our sustainable presence in this world.



Nutrient Uptake, Removal and Recycling by Crops. by Dr HLS Tandon. and Dr Y. Muralidharudu. 2010. ISBN: 81-85116-61-X. Pages 167+xvi. Fertiliser Development and Consultation Organisation, India, Email: fdco@airtelmail.in or fdco@vsnl.net Price Price: US$ 60 (inclusive of airmail delivery). This compilation and analysis is probably the first one which is exclusively devoted to nutrient uptake, removal and recycling by crops. All major and micro plant nutrients are covered for over 180 crops. These include cereals, millets, grain legumes, crops yielding oils, sugar, fibre, fruits and nuts, vegetables, fodders and forages, pastures, stimulants, plantation crops, tubers, edible roots, those used as spices and for garnishing, medicinal and aromatic plants, industrial crops such as mulberry, cluster bean and rubber and finally, some forest tree species. The impact of soil-climate conditions, crop cultivar, season and soil fertility level/fertiliser application on nutrient uptake in relation to economic yield is discussed in relation to absolute yield, per tonne yield production basis and the N: P: K ratios in which these are absorbed with and without fertiliser application Where information is available, partitioning of the absorbed nutrients into various plant parts (both removed from the field and recycled) and their fate is dealt with. Two conclusions drawn are that (i) nutrient uptake estimated at harvest is not necessarily the maximum nutrient uptake by the crop and (ii) nutrient uptake cannot be equated with nutrient removal in most cases.

Soil and Water Conservation Advances in the United States. Ted M. Zobeck and William F. Schillinger, editors. ISBN 978-0-89118-852-0. Hardcover, 320 pp. Have agricultural management efforts begun in the desperation of the Dust Bowl brought us to where we need to be tomorrow? Questions about the environmental footprint of farming make this book required reading. Approximately 62% of the total U. S. land area is used for agriculture, and this land also provides critical ecosystem functions. Authors from each region of the continental United States describe the progress of soil and water conservation to date and visualize how agricultural production practices must change in future years to address the newest challenges. Available at: https://portal.sciencesocieties.org/Purchase/ProductDetail.aspx?Product_code=a4fb6a16-c815-df11-8644-0013210e308c

IUSS Honorary members

Year	Member	Country
1924	L. Cayeux †	France
	K. Glinka †	USSR
	Jos. Kopecky †	Czechoslovakia
	E. Ramann †	Germany
	Sir John Russell †	UK
	S. Winogradski †	USSR
1927	P. Treitz †	Hungary
1935	E.A. Mitscherlich †	Germany
	A. d'Sigmond †	Hungary
	J. Stoklasa †	Czechoslovakia
	G. Wiegner †	Switzerland
1950	A. Demolon †	France
	D.J. Hissink †	Netherlands
	W.P. Kelley †	USA
1954	S. Mattson †	Sweden
	E. Truog †	USA
1956	G. Bertrand †	France
	E.C.J. Mohr †	Netherlands
1960	F.A. Bear †	USA
1964	J.A. Prescott †	Australia
1968	F. Hardy †	UK
	W.L. Kubiena †	Germany
	L.A. Richards †	USA
	A.A. Rode †	USSR
1974	R. Bradfield †	USA
	G.V. Jacks †	UK
	Ch.E. Kellogg †	USA
	M.K. Kononova †	USSR
	A. Oudin †	France
	F. Scheffer †	Germany
1978	G. Barbier †	France
	V. Ignatieff †	Canada
	Y. Ishizuka †	Japan
	L. Krolikowski †	Poland
	L. Vettori †	Brazil
1982	Ph. Duchaufour †	France
	W. Flaig †	Germany
	V. Kovda †	USSR
	E. Mueckenhausen †	Germany
	E.W. Russell †	UK

Year	Member	Country
1986	H. Jenny †	USA
	D. Kirkham †	USA
	S.K. Mukherjee †	India
	R. Tavernier †	Belgium
1990	G. Aubert †	France
	E.G. Hallsworth †	Australia
	J.S. Kanwar	India
	P. Schachtschabel †	Germany
	R.W. Simonson †	USA
	I. Szabolcs †	Hungary
1998	G. H. Bolt	Netherlands
	R. Dudal	Belgium
	K.H. Hartge	Germany
	M. Kutilek	Czech Rep.
	J. Quirk	Australia
	W.G. Sombroek †	Netherlands
	K. Wada	Japan
	D.H. Yaalon	Israel
	S.V. Zonn †	Russia
2002	R.W. Arnold	USA
	G.V. Dobrovolsky	Russia
	W. Gardner	USA
	H.M. Hamdi †	Egypt
	L.A.L. Sarmiento	Colombia
	F. Mancini	Italy
	B.S. Nosko	Ukraine
	R. Rosell	Argentina
	A. Ruellan	France
	A. Tanaka	Japan
	P.B.H Tinker	UK
2006	W.E.H. Blum	Austria
	H-P. Blume	Germany
	J. Bouma	Netherlands
	S-J. Cho	South Korea
	J. Glinski	Poland
	M.G.H. Jamagne	France
	D.R. Nielsen	USA
	J.H.V. van Baren †	Netherlands
	L.P. Wilding	USA