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CODE OF GOOD AGRICULTURAL PRACTICES IN ROMANIA

At the end of 2002, the first Code of Good Agricultural Practices in Romania was published (in Romanian and English). It was prepared according to the Framework Content in Annex 3 of the Governmental Division No. 904/October 13, 2000, approving the Action Plan for Water Protection against Pollution caused by Nitrates from Agricultural Sources.

The first volume, *Water protection against pollution caused by fertilisers from agriculture and prevention of soil degradation phenomena caused by agricultural practices* - 151 pp., besides a brief introductory note, includes 16 chapters and 10 annexes respectively:

- (1) Introduction;
- (2) Definitions;
- (3) Agricultural systems;
- (4) Biodiversity, ecological systems and landscape;
- (5) Water resources, water runoff and soil erosion; compaction and soil structure degradation;
- (6) Fertilizers – potential sources of water and soil pollution;
- (7) Fertilizers containing nitrogen;
- (8) Fertilizers containing phosphorus;
- (9) Storage and handling of chemical fertilizers; general norms;
- (10) Storage and management of effluents and manure in animal farms;
- (11) Application of nitrogen fertilizers;
- (12) Application of phosphorus fertilizers;
- (13) Management aspects of agricultural lands with regard to nitrogen dynamics;
- (14) Prevention of surface and groundwater pollution due to fertilizers in case of irrigation;
- (15) Fertilization plans and register of fertilizers used in farm;
- (16) Measures and works to conserve and improve the soil quality.

The second volume, *Water protection against pollution caused by pesticides and other pollutants generated by agriculture*, 57 pp., includes 6 chapters, respectively:

- (1) Introduction;
- (2) Plant protection;
- (3) Products for veterinary usage, products used for washing; disinfection and disinsection in agricultural and animal husbandry farms;
- (4) Wastes and residues from the agricultural and animal husbandry farms;
- (5) Wastes and wastewater from the sector processing the agricultural and animal products;
- (6) Products of mineral oil.

The preparation of the Code of Good Agricultural Practices is the outcome of the interdisciplinary participation of a large number of university professors and researchers, listed according to their responsibilities and contributions: Prof. Dr. Mihail Dumitru, Dr Cătălin Simota, Dr Emilia Dorneanu, Dr Nicolae Geambașu, Dr Petre Stanciu, Letiția Țigănaș, Prof. dr. Horia Iliescu, Prof. dr. Iulian Țogoe, Dr Ion Munteanu, Dr Elisabeta Dumitru, Prof. dr. Adrian Mitroi.

At the same time, the above team enjoyed the assistance of the Commission for the Implementation of the Action Plan for Water Protection against Pollution caused by nitrates of agricultural origin.

The Code was edited with financial support from the Government of Romania and the World Bank, and the translation into English was possible thanks to the support of APRA Project, implemented by DAI and IRG, and financed by USAID.

The present issue is the first draft which will be added to and improved by integrating the comments and suggestions received from stakeholders and others. Comments and suggestions should be addressed to:

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Reference

Code of Good Agricultural Practices, 2002. The Expert Publishing
House, Bucharest. 2 vols, 308 pp.

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THE CELEBRATION OF WORLD SOIL DAY IN ITALY

As is the case in many countries, the role played by the soil in the environmental equilibria is well known in Italy among the soil experts but the general public is still largely unaware of its importance. Such a lack of understanding is reasonably linked to the properties of the soil itself because, being a 'crypto-resource, soil shows its presence and, of course its importance, only on occasions of disastrous events or when its ability to produce goods and services is strongly jeopardized.

To contribute to building the missing link between soil science and society and to develop awareness about the vital importance of soil for life, for every citizen and, particularly, for the young generations, a celebration of the World Soil Day was organized in Italy in 2003. The event followed the proposal of the International Union of Soil Science at the end of the Bangkok congress.

The two-day initiative, 9-10 December 2003, was jointly organized by the Italian Society of Pedology, the Italian Society of Soil Science and the PhD School of Pedology of the University of Palermo, with the sponsorship of the European Society for Soil Conservation.

After an introductory speech by Carmelo Dazzi, the promoter, the Celebration of World Soil Day was inaugurated with an address on *The importance of soil for humankind*, given by Angelo Aru from the University of Cagliari.

A soil exhibition was then opened, showing soil monoliths taken from different Italian areas and illustrating the pedodiversity of Italian soilscapes. In some sections, the different methods of soil survey in the field, soil mapping, soil classification and soil evaluation were illustrated.

Some educational aids explained to the many visitors to the exhibition, what soil is, its genesis and its main features such as texture, structure and colour. Many classes have visited the exhibition, mainly student of primary schools. Each student received a small soil sample in a plastic



Opening the congress on the Importance of Soil for Humankind, during Italy's celebration of World Soil Day



Children receiving their 'bag of soil' as a souvenir

bag as a souvenir.

In the near future it will be possible to organize a permanent soil exhibition in a Museum of Science and Technology that the University of Palermo is developing in a wide building of the 18th century.

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**NATO - CCMS AND SCIENCE COMMITTEE WORKSHOP:
DESERTIFICATION IN THE MEDITERRANEAN REGION: A
SECURITY ISSUE. VALENCIA, SPAIN, 2-5 DECEMBER 2003**

Security issues related to desertification in the Mediterranean Region were the subject of a special NATO workshop held at the Museum of Science in Valencia, Spain. The workshop was organized by the Center for Desertification Studies (CIDE, Valencia, Spain), U.S. Environmental Protection Agency (Las Vegas, Nevada, USA), and the Desert Research Institute (Reno, Nevada, USA) on behalf of the NATO Science Committee and the NATO Committee on the Challenges of Modern Society (Public Diplomacy Division). ESSC participated as a Collaborating Institution.

The Workshop focused on two basic concepts: *security* and *environment* and their linkages. Since the end of the Cold War, traditional security concepts based on national sovereignty and territorial security have increasingly been brought under review. Currently, a broader definition of security that would incorporate non-traditional threats and their causes, including environmental stress, has been advocated. Most recent research indicates that global environmental change and its subsequent socio-economic effects are likely to continue and intensify in the future. The intensity as well as the interdependence of these problems will have effects on an international scale and will begin to impact on industrialized countries more directly. These challenges call for mutual cooperation at the international level which provides for multi-disciplinary integration of both technical and policy-making individuals involved in the areas of environment, development of natural resources, foreign relations, and security.

Desertification is recognized as a process of land degradation in arid, semi-arid, and dry sub-humid areas that is the result of several factors, including human activities and climate variation. Desertification is a worldwide phenomenon estimated to affect 40 million km² or approximately one-third of the Earth's surface area and 1 billion people in over 100 countries (or about one-fifth of the human population of the world).

At the global level, it is estimated that the annual income lost in areas immediately affected by desertification amounts to approximately US\$42 billion each year. However, there are enormous social costs as well. There is strong evidence that desertification exacerbates poverty and negatively affects social order and stability. It can contribute significantly to water scarcity, famine, internal displacement of people, migration, and social breakdown and thus presents a recipe for political, social, and economic instability which can also lead to tension between neighbouring countries and armed conflict. In sum, resource scarcity and environmental degradation create inequity in resource distribution that often contributes to insecurity and conflict.

While arid, semi-arid and dry subhumid ecosystems of the Mediterranean Region are vulnerable to numerous threats, including pollution from current or past anthropogenic activities, the overwhelming threat is from human population density and associated uncontrolled development, leading to depletion or degradation of natural resources (water, soil, biota). The predominant considerations in many parts of the world for environmental management decisions and ecosystem protection include understanding and establishing land and resource use priorities, establishing time frames for management, using comparative evaluation and assessment analyses, and clarifying where decision authority resides (i.e., local, regional, national, international).

It is a challenge for both scientists and decision-makers to include all these considerations and communicate effectively among all user groups. As a direct result of increasing discussion and research about the potential for large, regional-scale environmental changes and the general acknowledgement of the relationship between environmental change and human social, economic, and demographic issues, there is now more attention paid to the question of the relationship between environment and security. Thus, 'how environmental degradation in arid, semi-arid, and dry sub-humid lands (i.e. desertification) in the Mediterranean Region is related to human security' became the central question of the workshop.

For the purpose of the workshop the organizers turned to the Mediterranean countries that included 6 NATO Member countries, 4

NATO Partner countries, and 7 countries that comprise the Mediterranean Dialogue in the Middle East and North Africa for discussion of the issue. Because the region has a long historical record of political, economical, and cultural division (with perhaps the notable exception of the Roman Empire) the workshop attracted a large and diverse participation; over 225 participants registered for the workshop representing 22 different countries. The challenge before the workshop participants was to identify the regional causes of desertification and examine the consequences of past and future land use and physical processes, especially as they relate to international security.

For the purposes of the workshop the following key factors were central to the discussion:

1. *Variable population growth* in the northern vs. southern Mediterranean;
2. *Impact of climate change* due to increased temperatures and decline in precipitation;
3. *Scarcity of water* for potable consumption and irrigation;
4. *Decline in food production* and the increased dependence on imported goods, e.g. cereals,
5. *Progressive desertification* and subsequent soil erosion, salinization, and sodification;
6. *Increased urbanization* and pollution in major metropolitan areas.

The workshop was organized in five special sessions dealing with the consequences of degradation on social, economic, and political issues (especially food security and human migration); soil and vegetation monitoring techniques and programmes; water resources and management; and forecasting techniques and advanced technologies. Desertification was not treated solely as an environmental problem but

an issue with cultural, political, social, and economic importance. Thus the purpose of the NATO Desertification Workshop became eight-fold:

1. To provide a focus on land degradation in arid, semi-arid and dry sub-humid areas (i.e. desertification) within the Mediterranean Region;
2. To bring together interdisciplinary technical experts and decision/policy-makers throughout both the northern and southern Mediterranean states;
3. To recognize that there are remarkable demographic differences between the North and South Mediterranean and thus there are different socio-economic disturbance gradients as well as climatic gradients that affect environmental condition, sustainability of resources, employment, poverty, migration, and ultimately, security.
4. To evaluate the consequences of desertification to security both in regard to the ability of the environment to provide important ecological goods and services and relative to social and political instability;
5. To open discussion on the issue of linking security to environmental condition throughout the Mediterranean Region and to explore likely impacts on the social, economical, and political dimensions of human society;
6. To increase the knowledge base and provide assistance in developing mitigative measures and policy to thwart social and environmental instability;
7. To encourage interdisciplinary research especially in regard to integrating social and natural science;
8. To promote better mutual understanding and friendly relations across the region.

The workshop was made possible through the active cooperation and

participation of experts from government, academia, private industry, and non-governmental organizations from the NATO member and partner countries and the seven member countries of the Mediterranean Dialogue. The workshop provided a multi-lateral forum for cooperation, information exchange, and dialogue among the environmental, development, foreign and security policy communities. Additionally, it provided an 'enabling environment' to facilitate joint work programmes, e.g. bridging the Regional Implementation Annexes for Africa and the Northern Mediterranean within the UN Convention to Combat Desertification. The organizers recognize the importance of understanding the linkages between the environment and security in the Mediterranean and the further importance of having open discussion which is inclusive to all those who inhabit the region. It has been our sincere hope that this small effort represents the beginning of a larger process intended to bring environmental and societal stabilization to the area and thus will help advance the cause of peace. We would like to acknowledge and thank all those who participated in the NATO Desertification Workshop including not only those who provided expertise through the presentation of papers but all those who engaged in discussion and contributed their organizational support and planning assistance in making the workshop a success.

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**SOIL EROSION AND SEDIMENT REDISTRIBUTION IN
RIVER CATCHMENTS: MEASUREMENT, MODELLING AND
MANAGEMENT IN THE 21ST CENTURY: CRANFIELD
UNIVERSITY AT SILSOE, 9-11 SEPTEMBER 2003**

After a warm welcome from Mark Kibblewhite, Director of the National Soil Resources Institute, the first International conference on Soil erosion and sediment redistribution in river catchments began. Connectivity and communication was the primary theme of the conference, and the key challenge was to bring together scientists, practitioners, researchers and policy-makers to break the language barriers that usually develop between disciplines and across nationalities. Uniquely, the conference provided a forum in which delegates could communicate with each other on the interaction between soils and sediments and to the wider community on the need for holistic land and river management.

The three main topics: measurement, modelling and management, were led by Professors Des Walling (Exeter), Mark Nearing (Arizona) and Roy Morgan (Cranfield). Des Walling highlighted the new challenges and opportunities facing research into erosion and sediment delivery, and stressed the need for an integrated approach to land and water management as the protection of soil takes centre stage in the political process. As changes in policy direct our concerns from on-site problems associated with soil erosion to off-site problems, the direction of research has also shifted from traditional soil monitoring methods to sophisticated tracing techniques.

Other presentations within the 'measurement' theme had a distinctly global nature; from catchments in northern Russia (Aleksey Sidorchuk on behalf of M.V.Markelov, Moscow), to hillslopes in Hong Kong (Mark Ruse on behalf of Mervyn Peart, Hong Kong), to burnt forest catchments in Sydney (Rick Shakesby, University of Wales Swansea), and back to the UK as Bob Evans (Anglia Polytechnic University) stressed that if nutrient enrichment and sedimentation in rivers is to be tackled, we must be able to identify the respective contributions that upland and lowland sediment sources make to river loads.

After a break for lunch, the afternoon session began with an invited talk from Ellen Petticrew (UNBC, Canada) on the management of fine sediment in order to maintain the quality of habitat for in rivers for fish spawning. Continuing with the subject of suspended sediment, Dan Evans (Queens University Belfast) presented implications of transport dynamics for catchment management in County Antrim, and the impact of severe rainfall events on suspended sediment load was highlighted in two contrasting areas; the Iberian Peninsula (Joaquim Farguell, Barcelona) and central Poland (Lesek Hejduk, Warsaw). Ian Foster (Coventry) gave the second invited talk of the day and presented lakes and reservoirs as components of the sediment budget. His UK case studies provided a history of sediment-associated phosphorus concentrations in reservoir catchments and discussed the impact of land drainage systems on sediment sources. Heading back to warmer climates, the impact of vegetation on sediment movement in ephemeral channels in southeast Spain was examined by Jenny Mant (RRC, Cranfield University).

A tour of NSRI's erosion laboratory was next to help stretch legs after an excellent first day of presentations. Then it was back to the lecture theatre for a welcome drinks reception, a preview of the EA/Defra-funded Guidebook of Applied Fluvial Geomorphology and the first chance to examine conference posters in detail.

Day two, and under the theme of 'modelling', Mark Nearing focused on the importance of collecting and managing data effectively and consistently to avoid spatial and temporal variability. This is particularly crucial if data are being fed into modelling and prediction tools that support management decisions and inform policy. Other 'modellers' included Peter Kinnell (Canberra) who presented a modified version of the USLE that included runoff as a factor in accounting for event erosivity, Stefan Doerr (University of Wales Swansea) who highlighted the prospects, problems and potential approaches of addressing soil water repellency in soil erosion models, Bill Elliot (USDA Forest Service), examining the role of disturbance in forest soil erosion and how this may best be modelled using newly developed GeoWEPP technology, and Rudi Hessel (Alterra, Wageningen) who discussed using LISEM to study the effects of grid

cell size and time step length on simulation results.

The modelling theme continued with an invited talk from Victor Jetten (Utrecht) on combining landscape indicators with process modelling, with particular reference to simulating ephemeral gully incision. A new approach to calculate snowmelt erosion in Germany was presented by Michael Rode (UFZ, Germany, on behalf of G.Ollesch) as part of a model for continuous simulation of winter runoff generation in an experimental catchment. A probabilistic view of modelling soil erosion (Alexi Sidorchuk, Landcare Research, New Zealand) was next on the agenda, followed by an example of an application of a new model, INCAased, which simulates sediment delivery processes at the catchment scale (Nick Jarrett, Reading University). The final presentation before a break for lunch discussed the application of the WEPP model to a small Sicilian watershed (Feliciana Licciardello, Catania, Italy).

John Quinton (Lancaster) gave the second invited talk within the modelling theme on the risk of spatially distributed sediment sources connecting with surface bodies. The model presented took account of the issue of the source-sink connection, which is recognised in the literature, but not explicitly included in most models. Sue White (IWE, Cranfield) discussed modelling sediment inputs to the Tees Barrage, and Karen Schmelmer (Bonn, Germany) highlighted the effectiveness of buffer strips in reducing runoff and sediment yield using field measurements and simulations from three different models.

A quick break for refreshments and then it was time to see what erosion the flat plains of Bedfordshire had to offer! Many were doubtful that we could provide anything to rival the gullies of the Mediterranean or the USA, but most were greatly surprised by Sandy Pinnacle and the extent of erosion they observed. Possible solutions ranged from revegetation and fencing off the entire recreational area to placing armed guards on duty to keep day-trippers off the land! I'm not sure which the local council liked the sound of more.



Looking for erosion in a recreational area of mid-Bedfordshire - the mid-Conference field trip.

[Editor's note: there is erosion at the site - honest! Just not in this picture]

After the end of another stimulating day, the best way for the conference delegates to relax was at the conference dinner. A wonderful time was had by all (perhaps too good in Phil's case who was suspiciously late for the start of proceedings the following day!).

And so the final day dawned and Roy Morgan (NSRI, Cranfield) provided the keynote speech under the theme of 'Management'. Roy examined current practices and a future vision for managing sediment in the landscape as more countries establish legislation for soil protection. He highlighted the importance of integrated and holistic approaches to land and river management at the catchment scale. Management issues continued as Rory Walsh (Swansea) led us to the rainforests of Borneo and examined changes in the spatial distribution of erosion within a catchment that was selectively logged in 1988-89. South Africa was the next stop as Helen Watson (University of Natal) provided a comparative study of soil erosion in communal and commercial lands following land reform. Gavin Wood (NSRI, Cranfield University) then presented an erosion management tool for mapping the delivery of eroded sediment from land to water.

The session continued with an invited talk from Jos Brils (TNO, The Netherlands) on SedNet's view of environmentally, socially and economically viable sediment management. SedNet was established in order to structure and facilitate a harmonised European approach to sediment management. Fleur Visser (ANNU & CSIRO) then discussed her work into erosion management for sugarcane plantations on tropical floodplains, and Peter Fiener (TUM, Germany) highlighted the potential and seasonal variation in the effectiveness of grassed waterways in reducing runoff and sediment delivery. An extremely engaging talk (complete with sound effects!) was then given by Fred Theurer into the management implications of sedimentation in rivers for salmonids. The final paper of the conference was an invited talk by Jane Rickson (NSRI, Cranfield University) who stressed the need for accurate and reliable data on the effectiveness of sediment control techniques at the policy-making level as well as the implementation level. The scale at which data on erosion control practices are generated can, of course, influence the performance of these practices.

The meeting closed with a vote of thanks from Victor Jetten to Alison Collins, Phil Owens and the rest of the Cranfield staff for all their hard work and excellent organisation. A call was made for this conference to be arranged regularly. So anyone wanting to organise the 2nd

International Conference on Soil erosion and sediment redistribution in river catchments, please speak now.

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ELECTIONS OF THE E.S.S.C. COUNCIL 2004-2008

The following regulations are based on the ESSC Statutes and on the rules laid down by the first ESSC Council (see Newsletter 4/1989). They are the same as the regulations used to elect the ESSC Council for the period 2000-2004.

Regulations

Every European country with 5 or more members of the ESSC may be represented on Council. Those countries with 20 or more members of the ESSC may be represented by two council members.

The Executive Committee of the ESSC hereby publishes the call for nominations.

Every ESSC member may nominate either him/herself or other members as a candidate. Nominations must be sent in writing to the Secretary of the ESSC by February 29, 2004:

Prof. Dr. Gerard Govers
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The list of nominated candidates for each country will be published on an ESSC Notice Board at the Fourth International Congress to be held in Budapest, 25-28 May 2004.

Elections for the Council will be organised at the ESSC General Assembly in Budapest during the ESSC conference. Elections will be conducted in the following way:

1. The Council members for each country will be elected by the ESSC members of that country who are present at the General Assembly.

2. If only one candidate (or two candidates in the case of those countries eligible for two members of Council) has been nominated as a country's representative on Council, that (those) candidate(s) will be the elected member(s).
3. If no members from a country are present at the General Assembly, the Assembly will elect a representative for that country from the list of nominated members.
4. In addition to the country representatives on Council, the former Council will nominate up to six members to serve on the new Council.
5. After the country elections have been held, the complete list of members for the new Council will be presented to the General Assembly for ratification. The Assembly will decide to accept or reject the new Council in its entirety by a simple majority of votes.
6. The Council has the right to co-opt additional representatives on Council in the period between General Congresses.
7. No country can have more than four members on Council.

Duties of members of Council

1. Contribute to the collective wisdom of the Council in reaching decisions on matters relating to the Society.
2. Promote the Society within their country, e.g. encouraging new members, publishing its activities.
3. Report to the President on activities within their country which are of interest to the Society and its members.
4. Attend Council meetings.

Before standing for Council, candidates should ensure that they have sufficient time to undertake these activities and that they have sufficient funds to attend the majority of the Council meetings (held annually). It is very important that the Society has an active Council.

Deadline for nominations: February 29, 2004

ELIGIBILITY FOR COUNCIL MEMBERSHIP

Country	Members	Council representatives
Austria	5	1
Belarus	4	0
Belgium	19	1
Bulgaria	17	1
Croatia	4	0
Czech Republic	8	1
Denmark	7	1
Estonia	13	1
France	9	1
Georgia	2	0
Germany	50	2
Greece	12	1
Hungary	13	1
Italy	18	1
Lithuania	4	0
Moldova	6	1
Netherlands	18	1
Norway	11	1
Poland	17	1
Portugal	17	1
Romania	50	2
Russia	70	2
Serbia	2	0
Slovakia	10	1
Spain	44	2
Swedem	2	0
Switzerland	8	1
United Kingdom	19	1
Ukraine	36	2
USA	3	0

ESSC AWARDS 2004

Nominations are invited for the ESSC Awards to be presented at the Third International Congress in Budapest May 25-28, 2004

The Gerold Richter Award for outstanding contributions to soil conservation and protection within Europe

This is awarded to a person (exceptionally a corporate body) who has, over the period of his or her career, made significant and internationally recognized contributions to the investigation and/or promotion of soil conservation in Europe. The contributions may be in research, practice, policy-making or any other activity deemed appropriate. The recipient need not be a member of the ESSC.

Previous recipients

1996 Professor Giancarlo Chisci
2002 Professor Roy Morgan

The Young Person's Award for the understanding and promotion of soil conservation in Europe

This is awarded to a member of the Society, aged 35 years or under, who over the previous four years has made an important contribution to soil conservation in Europe through research, practice, policy-making or any other activity deemed appropriate.

Previous recipients

1996 Dr Jürgen Schmidt
2002 Dr Stefan Doerr

Nominations

Any member of the Society may propose a person (exceptionally a corporate body for the Gerold Richter Award). Individuals may propose themselves. Nominations should state the name and address of the person being proposed followed by a 500-1000 word statement describing the contribution on which the nomination is based.

Nominations for the Awards should be sent to:
Dr. J.L. Rubio
Centro de Investigaciones sobre Desertificación
Cami de la Marjal s/n, Apartado Oficial
E-46470 Albal-Valencia
Spain
e-mail: jose.l.rubio@uv.es

Deadline for nominations: February 29, 2004.

TASK FORCE ON SOIL QUALITY CRITERIA: A NEW BOOK ON THE TOPIC

In 1997, 'Soil quality criteria' was established as an official Task Force of the ESSC. As appointed leader, I wrote a note on the subject for the ESSC Newsletter 1+1/1998. Related to this Task Force, I have been involved in the editing of an upcoming book entitled *Managing soil quality: challenges in modern agriculture* (Schønning, P. et al. 2004, CABI Publishing).

The term soil quality is used very often in scientific papers and discussions. Like the term 'sustainability' it has become a 'buzz' word with no clear meaning and there is an urgent need to analyse and define the term more precisely. Most frequently, it is used to describe soil attributes. However, soil quality should be regarded as a concept and not just a common denominator for specific soil attributes. This is one key conclusion drawn in our book. In the following, I shall provide a brief introduction to the book.

Soil quality as a concept

'Soil quality is how well soil does what we want it to do'. The statement, extracted from the web-site of the USDA Soil Quality Institute, represents the very essence of the soil quality concept. The statement includes two aspects: 'how well' relates to grading soils while 'what we want' relates to priority of soil functions. Most previous books on soil quality have emphasized the descriptive grading of soils or management effects, often by focusing on soil quality indicators. It seems relevant, however, to focus on soil quality as it relates to what we want the soil to do. Clearly, one must define what we want before we can consider how well this service is delivered.

Science is a human activity, and science and society interact. The focus of science will inevitably reflect the priorities of society. In societies with shortage of food supply, the focus will be on soil productivity, while in societies with abundant supply of affordable food, focus will switch from sheer productivity to the overall sustainability of the food production systems. Sustainable agriculture involves a sustained

productivity but also the protection of natural resources. The concept of soil quality is deeply rooted in considerations on sustainable production, but since the priorities of society change over time and differ from one society to another, soil quality cannot be aligned with the universal laws of nature. The concept of soil quality is a human construct allowing specific soil functions to be evaluated against specific purposes. Nevertheless, the soil quality concept has been adopted mainly as a technical framework for grading soil and evaluating management effects. More emphasis should be directed to soil quality as a cognitive concept associated with sustainability. The grading of soils by indicators is difficult across soil types, climates and cropping systems and hence less useful.

Major challenges in modern agriculture

In the book, we have asked a selection of internationally well-known researchers, each expert in their field, to review specific challenges and key issues in modern agriculture. Accordingly, most contributions address challenges facing industrialized countries. However, the book also includes an important chapter devoted to soil quality in developing countries. Each contributor was asked to discuss his/her area with respect to the soil quality concept outlined above. This involved the potential identification of threshold values of soil quality indicators that might be judged sustainable. And further the potential identification of the management needed (management threshold) to produce the desired soil quality. For these exercises we adapted the definition of soil quality suggested by the Soil Science Society of America, namely: *Soil quality is the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation.* Each author was encouraged to define the sustainability criteria on which they based their discussion of good and bad soil quality.

The challenges addressed in the book include major plant nutrients (N, P, K), soil acidity, soil organic matter, soil biodiversity, soil compaction, erosion, pesticides and urban waste. Not surprisingly, it turned out that most issues are highly complex and it was generally not possible to identify simple thresholds, neither soil quality indicators

nor management. Much effort went into identifying indicator levels or management thresholds for all topics discussed. Generally however, simple answers could not be given. For example, one contributor dealing with soil biodiversity stated that a causal relationship between soil biodiversity (a potential soil quality indicator) and ecosystem functioning and stability does not seem to exist. One difficulty in establishing management thresholds is differences in soil type. For phosphorus, no soil type independent limits of P-levels too low (P deficiency in plants) or too high (P-loss to the environment) could be given. In our synthesis, we discuss the contributors' conclusions in relation to a suggested 'minimum data set' (Larson and Pierce, 1991) and indices that seek to integrate a number of soil attributes into one number expressing 'soil quality' (e.g. Andrews et al. 2002). From the lessons learned during the editing work on this book, we would clearly dissuade such approaches.

Research and the communication of knowledge

Although the conclusions drawn above may seem discouraging, the concept of soil quality remains useful as a tool for expressing sustainability considerations. Rather than hiding details in indexed expressions of soil quality, the researcher should relate a measured soil attribute to a specific purpose. The researcher is thus faced with a challenge of transferring scientific results to the end-user without reducing the complexity of the issue. This further calls for well educated farmers, extension officers and decision makers in general. Bouma (1994) suggested the term 'windows of opportunities' as a tool for decision makers coping with land-use problems. Each particular type of soil has a characteristic 'window of opportunity' as a function of management. We support Bouma's suggestions that scientists should participate in 'research chains' implying methodical steps in a process of identifying, selecting, resolving and presenting the soil quality issue and the knowledge gained. The 'chain' approach should be performed by interdisciplinary groups of researchers and stakeholders for identifying the limits of the 'window of opportunity' as a relevant measure of soil quality for any given type of soil.

An appeal to ESSC members

There is an urgent need for more interaction between *descriptive* and *prescriptive* branches of science. Typically, scientists in specific scientific disciplines perceive soil as an ecosystem component, and their approach is descriptive and observational in nature. Agricultural researchers, on the other hand, are concerned primarily with the production of food, feed and fibre, and perceive soils mainly as media to support plant growth. Thus, researchers involved in agricultural sciences are accustomed to produce prescriptions with the clear aim of increasing yields. We advocate a combination of the conceptual/descriptive and the quantitative/prescriptive approaches.

Much research reported and discussed within the ESSC (including ESSC Congresses) deals with the *processes* of soil degradation (e.g. water erosion). We need a more management oriented approach in order to identify ways (prescriptions) of reducing or avoiding soil degradation. In this context, the *precautionary principle* will probably have an increasing role in the interaction with stakeholders in the society. The precautionary principle is a culturally framed concept that takes its cue from changing social conceptions about the appropriate roles of science (O’Riordan and Cameron, 1994). The concept is related and interacts with the sustainability concept. One basic issue of the precautionary principle is *thoughtful action in advance of scientific proof*, which is rather difficult to combine with science. It means that management decisions should be based on a ‘burden of evidence’ when ‘hard’ data are not available (O’Riordan et al. 2001). However, we anticipate that this principle will increasingly face and provoke scientists, because concerned citizens, non-governmental organizations and political movements become more and more important in setting the research agenda in society. Considerations on precautionary actions will inevitably appear on the agenda of teams dealing with land management, where any decision has to be based on evaluations of benefits, risks and costs. Hence, scientists will increasingly have to deliver data including the probabilities of occurrence rather than fixed values. The scientific community should face this inevitable challenge by explicitly considering the sustainability concept and on this background interact with stakeholders in scientifically founded implementation of the precautionary principle. The contributions to the new book *Managing soil quality: challenges in modern agriculture*

may serve as part of the basis on which this implementation can take place.

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NEW PUBLICATIONS

Mathieu, C. and Pieltain, F. 2003. *Analyse chimique des sols, méthodes choisies*. Editions Tec et Do, France, 408 pp. £ 65.

Ce manuel pratique présente un inventaire détaillé et raisonné des analyses chimiques des sols réalisées en laboratoire. La caractérisation des sols et la compréhension de leur dynamique nécessitent en effet, outre des interventions in situ, des mesures et des analyses en laboratoire, notamment par les méthodes dites "classiques". Répondant aux besoins d'informations actualisées les concernant, ce volume décrit ces méthodes choisies en 14 rubriques qui abordent successivement après en avoir rappelé l'importance des prélèvements sur le terrain et de la préparation des échantillons de terre : la mesure du pH, les dosages du carbone organique, de l'azote total, de l'azote ammoniacal et de l'azote nitrique, du calcaire total et du calcaire actif et de la détermination du pouvoir chlorosant, les dosages du gypse, de la salinité totale, des sels solubles, la mesure de la capacité d'échange cationique, les dosages des cations échangeables, de l'acidité d'échange, du phosphore, du fer, de l'aluminium et du manganèse, des oligoéléments et des éléments traces.

Chaque rubrique est introduite par un rappel des concepts et des définitions du domaine analysé. Ce rappel permet de fixer les limites des méthodes présentées, d'évaluer les avantages et les inconvénients de leur usage. Les auteurs s'appuient également sur leurs expériences de terrain diversifiées pour proposer des choix appropriés. Après avoir exposé les méthodes, le matériel nécessaire et les modes opératoires, ils présentent des résultats.

Analyse chimique des sols, méthodes choisies s'applique à l'analyse des sols aussi bien en régions climatiques tempérées, méditerranéennes, arides que tropicales. Il s'adresse aux chercheurs en Sciences de la Terre, aux professionnels de l'agriculture, de l'aménagement du territoire, de la protection des milieux naturels et des laboratoires d'analyses agréés, intervenant dans le cadre de programmes concernant les ressources en sols, les productions agricoles, la conservation du

milieu ou de programmes de recherche. Il est également indispensable aux enseignants et étudiants en pédologie, en agronomie et en science de l'environnement.

Rappelons que les auteurs avaient déjà publié en 1998 l'ouvrage *Analyse physique des sols, méthodes choisies* conçu de la même façon, avec les mêmes objectifs et les mêmes caractéristiques.

Hecker, Jens-Martin, 2002. *Morphometrie und Dynamik verschlammter Bodenoberflächen: computertomographische Untersuchungen und Überprüfung von Modellen des Lagerungsdichte-Tiefenprofils*. WVB, Wiss. Verl. Berlin, XVI, 321 S.

Soil sealing is well known as an important process at the soil surface during water induced erosion events. Sealing mainly influences the splitting of precipitation into infiltration and overland flow. The dissertation focuses on microscale 3D-morphometrics of sealed soil surfaces and its dynamic in time and space. The bulk density distribution is suitable to qualify surface seals. The bulk density-depth function, i.e. the relationship of bulk density against depth, is widely accepted for the characterization of seals and/or the modelling the linked processes. The main technical problem is to measure the bulk density of the thin seals. To face this pitfall a non-destructive method is presented to measure the bulk density distribution in surface seals by X-ray computed tomography (CT). The scanning of soil cores provides a 3D-matrix of X-ray mass attenuation coefficients, expressed in [HU]. One value of this matrix represents a distinct volume - a so-called voxel. Due to the linear relation between attenuation and bulk density we obtain a 3D-bulk density matrix for further analysis. The advantages of this method are: (i) it is non-destructive, (ii) with a high resolution (< 1 mm in depth), and in conjunction with adequate data processing programs, (iii) it is useful for multi purposes (bulk density distribution, digital elevation model (DEM) of soil surface, the characterization of macro-pore system etc.), as well as (iv) other subsequent soil physical or chemical measurements.

Field studies were carried out at two different sites in Germany. One is

located near Müncheberg/ Brandenburg, on Pleistocene glacial till deposits, and the other site in southern Lower Saxony, representing loess derived soils. Five treatment series of soil samples, sealed under natural rainfall conditions during the vegetation period in 1996 and 1997, were used to evaluate the capability of the proposed method and to study the morphometrics of sealed soil surfaces.

The soil cores were scanned in a medical CT with voxel size of 1 x 0.125 x 0.125 mm. The subsequent data processing yielded: 3D-reconstruction, DEM of soil surface, including derived parameters such as maximum density in the upper 10 mm (g cm^{-3}) and thickness of disturbed layer (mm). The results – visualizations, microrelief parameters and bulk density-depth functions – showed significant differences. A non-linear regression analysis with recent models of the bulk density-depth function were conducted and a new equation presented. Further, a concept of process interactions between sealing and microrelief levelling is discussed.

NEW PhD THESES

Consuming the savings: water conservation in a vegetation barrier system at the Central Plateau in Burkina Faso

Wim Spaan

Wageningen University and Research Centre

Regeneration of degraded soils requires interventions for effective water conservation and improvement of water holding capacity. At the Central Plateau in Burkina Faso there is a preference for semi-permeable line measures that slow down runoff but prevent water logging. To evaluate the effectiveness of contour vegetation barriers under semi-arid in conditions, an on-station field experiment was executed. Seven local plant species (grasses, woody species and a succulent) were planted in 21 plots of 20 x 20 m as contour vegetation barriers. Stone rows and barriers of natural vegetation replaced some of the less successful species. Runoff plots with different slope lengths were laid out to determine the efficiency of the barriers and the influence of slope length and alley treatment. Grass barriers and stone rows proved to be very effective in reducing runoff, woody species and the succulent less effective. Runoff could be well predicted by total rainfall. The influence of rain intensity on runoff was marginal. For longer slopes all factors that determine runoff became less important, runoff volumes exceeded quantities that can be dammed by the barrier. Barriers of grass and natural vegetation proved to be very effective in diminishing sediment transport. Less effective barriers only slightly reduced sediment transport. Sediment yield could be best predicted by rain intensity and runoff volume. Despite the differences in effectiveness of the barriers and soil water dynamics, there were no striking differences in crop yields. Effective barriers conserved during dry years enough water to compensate their own consumption and increased crop yields over a distance of 6 m. In dry years less effective barriers competed for water with crops. In wet years effective barriers caused water logging and less effective barriers improved yields a few meters upstream. The contour vegetation barrier constitutes a cheap option in terms of labour and material requirements, which does not explain the low adoption and poor maintenance of vegetation barriers.

The labour requirement in the beginning of the growing season is not a real constraint. At The Central Plateau well-managed contour vegetation barriers can play a vital role in conserving soil and water and can contribute to the greening of the area.

Integrated water and nutrient management for sorghum production in semi-arid Burkina Faso

Robert B. Zougmore

Wageningen University and Research Centre

Loss of water and nutrients through runoff are major agricultural problems for inherently poor fertile soils in semi-arid West Africa. The intensification of crop production requires an integration of soil, water and nutrient management that is locally acceptable and beneficial for smallholder farmers. To that end, two semi-permeable soil and water conservation measures (stone rows, grass strips) and two nitrogen inputs (compost, urea) applied alone or in combination were studied on the Central Plateau of Burkina Faso. Stone rows greatly reduce runoff, soil erosion and improve soil moisture. Under unfertilized continuous sorghum cropping, stone rows induced a limited effect on soil fertility improvement. During erratic rainfall years in the Sahelian zone, stone rows alone doubled sorghum yield compared to plots without stone rows and therefore, can reduce risks of crop failure. During well distributed rainfall years, stone rows alone did not induce significant yield increase. Grass strips of *Andropogon gayanus* were also an efficient anti-erosion measure and could be an interesting alternative to stone rows, especially in stone-limiting areas. However, *Andropogon* grass must be managed properly to alleviate shading and other effects of competition on crops near to the strips. The sole applications of compost or urea improved nutrient uptake and crop biomass production that subsequently demands more available water for transpiration. Combining stone rows or grass strips with compost in intensified crop production systems resulted in substantial crop yields and economic benefits. This integrated water and nutrient management may help to alleviate poverty and may empower smallholder farmers to invest in soil management for better crop production in West Africa.

FORTHCOMING MEETINGS

4-12 September 2004

Freiburg im Breisgau, Germany

EUROSOIL 2004

Meeting sponsored by Ministerium für Umwelt und Verkehr Baden-Württemberg, Gesellschaft für Umweltmessungen und Umweltermessungen (UMEG), Bundesanstalt Geowissenschaften und Rohstoffe (BGR) and German Soil Science Society. Some 25 symposia will take place over four days (Monday, Tuesday, Thursday and Friday) with up to 20 volunteer papers and one keynote in each symposium. Symposia cover: soil as a living space; education in pedology - soil education and public awareness; soil protection; preferential flow; gas exchange in soils; soil and society; organo-mineral interactions in soils; regionalization of soil data; forest soils; remediation of polluted soils; soil deformation; soil erosion; soil and water; desertification and salinization; soil information systems; knowing and mapping soil associations and pedological systems; buffering functions of soils; international soil politics; significance of soil forming processes; beneficial plant and microorganism interactions; functional genomics of soil organisms; soil organic matter; soil monitoring; urban soils and land resources; and soil indicators.

In addition dedicated two-hour poster sessions will be held on themes related to the Divisions of the International Union of Soil Science: soils in space and time; soil properties and processes; soil use and management; and the role of soils in sustaining society and environment.

Two-day excursions to: (1) South German cuesta landscape and Alpine Foreland; (2) the Rhine Valley from west to east; (3) The Hegau and Lake Constance.

One-day excursions to: (1) Soils of the Black Forest foothill zone; (2) the Kaiserstuhl Volcano; (3) Tuttlingen Field Research Station; (4) Northern Switzerland with theme of carbon cycling in terrestrial ecosystems.

Half-day excursions to: (1) Mediæval Black Forest mining and soil pollution; (2) the Conventwald forest ecosystem study; (3) soil and water conservation of the Kleine Kinzig drinking water dam; (4) Kaiserstuhl Volcano: nature and culture; (5) soil and land use in Freiburg and its region; (6) the Feldberg Nature Preserve and the House of Nature.

Conference language: English.

Deadlines: Abstracts (200-300 words) for oral and poster presentations by 31 December 2003. Submission on line via: <http://www.forst.uni-freiburg.de/eurosoil> or sent on floppy disk or CD to Kongress & Kommunikation gGmbH, Hugstetter Straße 55, D-79106 Freiburg, Germany. Details of format for abstract are contained on the web-site. Each participant can submit only one abstract as first-author. Authors will be notified by 1 May 2004 whether their paper has been accepted.

Registration: Only registered participants may present papers or poster. Authors of accepted papers are not automatically registered and must therefore register themselves. Registration is online: www.forst.uni-freiburg.de/eurosoil or by sending/faxing registration for to: Kongress & Kommunikation gGmbH, Hugstetter Straße 55, D-79106 Freiburg, Germany.

Registration fees cover one copy of complete conference material, admission to all sessions, exhibits, posters, coffee breaks, and free access to the public transport system of Freiburg-im-Breisgau (VAG). Registration fees may be paid by credit card (Euro/Mastercard, Visa, American Express), cheque or bank transfer.

Payment by 1 December 2003: €135 / students €80

Payment between 1 December 2003 and 1 May 2004:

€150 / students €90

Payment after 1 May 2004: €180 / students €110.

A cancellation fee of € 50 will be charged for cancellations received before 1 August 2004. After that date, no refund is possible.

Meals and accommodation are not included in the Registration Fee.

Further details from: Conference organisers, Institute of Soil Science and Forest Nutrition, University of Freiburg, Kongress und Kommunikation gGmbH. Details of the convenors of each symposium, the poster sessions and excursions can be found on <http://www.forst.uni-freiburg.de/eurosoil>.

12-17 September 2004

Cartagena, Spain

Fourth International Conference on Land Degradation

Conference organized by the International Union of Soil Science, Spanish Society of Soil Science, Technical University of Cartagena, University of Murcia and European Society for Soil Conservation. The conference is open to land and water conservation researchers, educators, policy makers, practitioners and advocates interested in land degradation throughout the world. The conference will provide an opportunity to extend personal and professional networks. The conference will be held in the building of the Antiguo Hospital de Marina, Technical University of Cartagena, Campus Muralla del Mar s/n, 30.202 Cartagena, Murcia, Spain.

The main topics will be: geographical perspectives of land degradation; historical and archaeological perspectives of land degradation; linkages to global issues; quantifying land resource stresses; managing land quality to reduce degradation; human impact on land degradation; policy and legal framework; rehabilitation of degraded land.

Study tours will examine the major soils and focus on their degradation, particularly the influence of mining, industrial activity and bad agricultural practices, as well as possibilities for restoration.

Registration:

Members of SECS, IUSS and ESSC: €300

Students (with supporting evidence): €150

Non-members: €400

Payments made after 30 June 2004 will increase by 25 per cent.

Registration fees should be paid by bank transfer, indicating very clearly the code ICLD4 to account number 0049-6661-15-2516119598, Santander Central Hispano, Cartagena, office number 6661, Aire 21. From outside Spain, please consider IBAN:ES89 0049 6661 1525 16119598. Please make sure that the surname of the registered person is clearly detailed on the transfer receipt. All bank charges must be paid by the person who registers.

Further details:

<http://www.upct.es/icld4>

20-24 October 2004

Udine, Italy

Role of multi-purpose agriculture in sustaining global environment

The topics for presentations include: land, water and air pollution in agricultural areas; precision agriculture and yield forecasting; landscape ecology; forestry and range land management; climate changes and global agricultural environment; biotechnology and agricultural biodiversity; desertification and land degradation control; agricultural waste reuse and field management; wetland and coastal ecology in humid environment; remote sensing and GIS techniques in agriculture; current advances in restoration of rural areas for sustainability,

Abstracts:

Submit a 250 word summary by **31 January 2004** to:

Prof. Dr. Giuseppe Zebri, Symposium Secretary General, University of Udine, Udine, Italy (zebri@dpvta.uniud.it) or Eng. Sajid Mahmood, International Coordinator, University of Agriculture, Faisalabad, Pakistan (smahmoodpk@yahoo.com).

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