REPORT OF ACTIVITIES

2005

ISRIC

World Soil Information

ISRIC – World Soil Information is an independent foundation receiving funds from the Dutch Government. Our mandate is *to increase worldwide knowledge of the land, its soils in particular, and to support the sustainable use of land resources.*

ISRIC – World Soil Information is registered with the Benelux-Merkenbureau.

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Front cover: Strongly weathered, strongly leached clay under Colchean rainforest, NE Turkey: *Haplic Acrisol (Manganiferric and Clayic)*. During 2005 revision of the World Reference base for Soil Resources was completed
Back cover: Digital data

Contents

INTRODUCTION

Activities focus on three fields: the educational and public information activities of the World Soil Museum; soil standards, documentation and dissemination under the World Data Centre for Soils; and applied research.

World Soil Museum

In November 2005, UNESCO and the United Nations of General Assembly declared 2008 the *International Year of Planet Earth*. This is an initiative of a consortium of international learned societies to raise the profile of earth sciences with a triennium of activities in eight global themes. ISRIC - World Soil Information is a founding member of the consortium; David Dent and Alfred Hartemink, with John Kimble of the USDA Natural Resources Conservation Service, produced the thematic brochure *Soil: Earth's Living Skin* to lead off an ambitious program of research, education and outreach.

UNESCO has also created a Chair in Land Resources to be held in our institute as a focus for international training, supported by all the related international training organisations in the Netherlands and Switzerland.

We are contributing to UNEP's regular assessment of the state of the environment: *Global Environmental Outlook*, leading the Land Chapter of GEO-4 and contributing to a separate *Global Deserts Outlook* to be published in 2006, which is the International Year of Deserts.

And, most visibly, a new exhibition is taking shape, catering for the growing number of visitors.

World Data Centre for Soils

New, revised editions of *Guidelines for soil description* and the *World reference base for soil resources* are now in press with FAO. These standards for soil description and classification do not supplant vigorous national systems but enable wider scientific communication and find very wide acceptance as *de facto* international systems.

Thanks to the collaboration of the EU Joint Research Centre, the whole of our map collection is now available on-line and on DVD as the European Digital Archive of Soil Maps. The first volumes – *Soil Maps of Africa*, *Soil Maps of Asia*, and *Latin America and the Caribbean* were launched in 2005; all publicly available at cost of handling. Discussions are in hand with other major holders of soil maps to create a decentralised global archive; FAO has already volunteered its extensive and valuable collection. We have also begun the larger task of digitising the supporting data and reports. These initiatives are all the more important in the light of the loss of many national and private collections and the uncertain future of many of those that remain.

Applied research

Projects completed include the GEF co-funded *Assessment of soil organic carbon stocks and changes at national scale.* One-third of the excess inputs of CO_2 into the atmosphere since the industrial revolution have been generated by land use change and the consequent loss of soil organic carbon. Perhaps the greatest challenge to soil science at the present time is to put the organic carbon back again into the soil, where it will be useful. The project has developed modeling tools using both dynamic, process-based models and the empirical IPCC method, driven by harmonized data bases of climate, land use change and soils. A main limitation to application of the tools is availability of data, which brings us back to our institutional mandate.

New starts in 2005 include:

- Soil and terrain database (SOTER) of Central Africa (Congo, Rwanda, Burundi) in collaboration with the University of Ghent
- Support for improved land management and planning in the Chittagong Hill Tracts of Bangladesh, under contract with the EU. This project will support post-conflict development in the Chittagong Hill Tracts through improved natural resources management, assisting local agencies with an environmental assessment, building technical and management capacity, providing improved access to land resources and management information, and initiating land use planning in partnership with local stakeholders.
- *Green Water* Credits: proof-of-concept for a global financial mechanism to pay land users for water management activities that are presently unrecognised and unrewarded. There is growing interest in payments for environmental services but a clear link between payment, appropriate management and actual improvement of the specified services has rarely been established. The project aims to demonstrate a watertight relationship between soil management in the catchment and improved downstream water resources, to specify and validate management activities, and to identify cost-effective options for payment. The project is supported by Swiss Development Cooperation and IFAD and undertaken in partnership with the Stockholm Environmental Institute, the International Institute for Environment and Development, and LEI – a truly interdisciplinary project that will enable us to grow our own staff, skills and ideas, and bring World Soil Information to a wider world.

David Dent, April 2006

WORLD SOIL MUSEUM: INFORMATION AND EDUCATION

One of our goals is to set world standards in collection, maintenance and exhibition of a comprehensive reference collection of the soils of the world. More than this, the collection should be an accessible, exciting resource that informs, to educates, and entertains.

Educational activities continue to expand, embracing visiting groups from universities and polytechnics in Western Europe, school parties from our own locality, and the general public. Few of these visitors are interested primarily in pedology but, rather, a broad school of environmental sciences addressing both the built and natural environment. We are following up their comments to improve our exhibition and the supporting information. The World Reference Base for Soil Resources is being introduced as the primary technical classification and, at the same time, we are providing a coherent system of common names in plain English.

Educational program

In 2005, some 35 groups with students, teachers and others visited the World Soil Museum. Most took advantage of an introductory lecture and a guided tour through the exhibition and several also undertook half-day field excursions. Seven German universities are regular visitors, each spending one or two days with us. Other university groups came from, Belgium, England, Iraq, Russia, Thailand, and the USA. About one-third of our student visitors are from Wageningen; exercises in the museum are now part of three regular courses of Wageningen University. Almost 400 visitors from The Netherlands included university and college students from Amsterdam, Delft, Deventer, Utrecht, and Velp, and local high school students, as well as visits from PROBUS and members of the general public.

Lectures and Courses

Otto Spaargaren lectured on *Soil physical characteristics of the major soils of the world* for the College on Soil Physics held at the International Centre for Theoretical Physics at Trieste, Italy, and contributed to the 3rd European Summer School on Soil Survey in Gödöllö, Hungary. Alfred Hartemink organised three courses: *Introduction to Soil Science* for high school geography teachers; *Soil science and drainage* for scientists from Iraq; and *Trends and ethics in scientific publishing* for members of the CT de Wit Graduate school PE&RC; also a two-day excursion to Limburg for IHE-UNESCO, Delft. He gave keynote papers at the National Herbarium Leiden (Netherlands), Delaware and Kansas State Universities (USA) and Khon Kaen (Thailand). Along with David Dent, he supervises MSc and PhD students from Wageningen University.

UNESCO has endorsed a proposal from ISRIC to host a UNESCO Chair in Land Resources to act as a focal point for international training. This is supported by several universities and international training organisations in The Netherlands and Switzerland.

Public Information

As an International Collaborating Institute of UNEP, World Soil Information is contributing to the *Global Environmental Outlook GEO-4.* David Dent is Coordinating Lead Author of the Land chapter to which Alfred Hartemink contributes the section on nutrient depletion; Godert van Lynden contributes to the section on Land Degradation, and Niels Batjes to Biological Cycles. An authors' workshop was convened at ISRIC 14-18 November. David Dent, Paul Driessen and Niels Batjes, also contributed to UNEP's *Global Desert Outlook* to be published in 2006, the International Year of Deserts.

Projects in 2006

1. *World of Soils:* Exhibition and educational material on the world-wide-web; link to ISIS profile data and reference photo collections
2. *Exhibition:* New thematic displays, including representation of the World Reference Base for Soil Resources
3. *International Year of Planet Earth: a*dvancement of soils theme (brochure *Soil – Earth's living skin* will be distributed to all participants of the 18th World Congress of Soil Sciences), planning and fundraising for activities during the triennium 2007-9
4. *World Soil Policy:* Initiative to raise the profile of soils at national and international policy level
5. *Rwanda Agroforestry and Soil Management, MSc* (NUFFIC project)*:* partnership with Wageningen University
6. *GLOBE (Global Learning and Observations to Benefit the Environment):* development of soil research modules for secondary schools in the Netherlands
7. *Publications:* policy briefs, *Booker Soil Manual, Global Environmental Outlook GEO-4*

WORLD DATA CENTRE FOR SOILS

World Data Centres operate under the International Council for Science (ICSU) to support the scientific community. Data from ICSU programs, particularly in global change, climate and the environment, and related data sets are scrutinised, maintained and made freely available.

These days, less and less new soil data and information are being produced; the older data and information being pumped around more and more. Therefore, it is vital to maintain the older data that are the foundation of most current information; all users of soil and land resources information need access to the source materials, e.g. to assess the reliability of the derived information. World Soil Information is responding with a major program to digitise our holdings and make them available through the world-wide web.

Holdings of the World Data Centre for Soils

- **World Soil Reference Collection**: since the establishment of the Institute, a primary responsibility has been to create and maintain a world soil reference collection and accompanying analytical information. This now comprises 950 soil profiles - physical representatives of the mapping units of the *FAO-UNESCO Soil Map of the World:* a unique educational and cultural resource. In 2005, five new profiles were collected from Germany, including the northernmost Chernozem from the island of Poehl.

- **Glinka Memorial Collection**: a collection of some 50 soil monoliths from across the former Soviet Union, brought together on the occasion of the First International Congress of Soil Science in Washington DC in 1927. Part of this collection (duplicate soils from Russia) has been shipped to the new Dokuchaev Soil Museum in St. Petersburg for display.

- **ISIS dataset:** computer-based data management system holding data on the World Soil Reference Collection, operational since 1986. Conversion to SQL format was completed in 2005. An output module is still under construction; special attention has been paid to reporting analytical procedures.

- **WISE dataset:** soil profile data compiled for global climatic change studies and continually updated. Subsets include:
  - *WISE Global Soil Profiles,* a publicly accessible, harmonized set of 4382 profiles, and several derived raster data sets suitable for a wide variety of environmental studies;
  - A working data set of more than 9500 profiles.

- **SOTER datasets**: Spatial mapping units and geo-located point data for South and Central America, Central and Eastern Europe, and Southern Africa at scales from 1:1 million to 1:5 million. Soil analytical data for Brazil, Kenya, Southern Africa, and the Indo-Genetic Plain of India were harmonised by filling gaps in measured data using taxo-transfer and expert

rules, derived from WISE. Boundaries have been re-located according to the standards of the Digital Chart of the World.

- **GLASOD and ASSOD:** Global and SE Asian land degradation status, based on expert judgement by local scientists; spatial distribution of erosion by wind and water, salinity, physical deterioration and chemical contamination.

- **Reference soil samples:** Soil samples from ISIS profiles, fully analysed by standard methods. During 2005, sub-samples have been provided to Wageningen University for research on quantitative retrieval of soil organic carbon using laboratory spectroscopy and spectral indices; to the Netherlands Institute for Research of the Sea, Texel, for assessment of marine influences on shore soils; and to the International Centre for Agricultural Research in the Dry Areas, Aleppo, Syria, for assessment of pre- and post-Chernobyl soil conditions in the Middle East.

  Unfortunately, many samples were removed from storage in error and some 1 400 samples rendered unsuitable for further research. Urgent efforts are under way to restore the integrity of the collection.

- **Micromorphology collection:** A unique collection of the major soils of the world, comprising:
  - Systematic collection of large thin sections from the ISIS profiles;
  - *Schmidt-Lorentz* collection of more than 15 000 small thin sections of soils, mainly from Europe, Africa, Asia and Australia;
  - *Jongerius-STIBOKA* collection of some 14 000 samples, mostly large thin sections and blocks, mainly from the Netherlands, added in 2004.

  A common catalogue is in preparation and facilities for the study of thin sections have been expanded.

- **Kubiena collection**: samples from 11 profiles from Russia.

- **Mohr collection**: hundreds of display boxes with soil materials, mainly from the former Dutch East Indies and Africa.

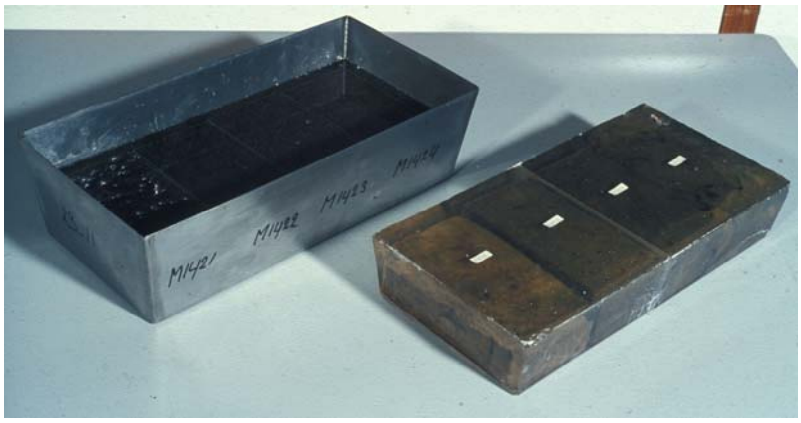
- **Colour transparencies**: Twenty thousand items including systematic photographic records of the ISIS sites and profiles. An annotated selection of 350 slides has been prepared for teaching and illustration.

Documentation

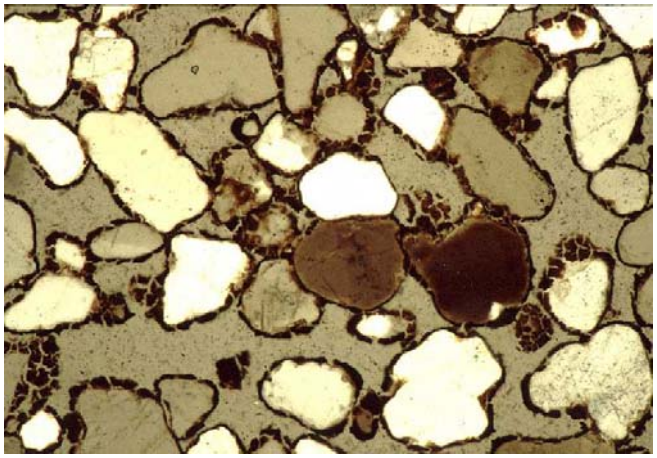
WDC Soils maintains a systematic collection of soil maps and reports including *grey literature*, specialist texts, and journals that hold important contributions to soils and land resources survey, especially from tropical countries.

In cooperation with the European Soil Bureau, high-density digital scans are being made of all ISRIC map holdings under the EuDASM program. Thematic/geographic collations are now available through the internet and good quality paper copies can be printed, on request. Our collection from Africa, Asia and Latin America is also available on DVD; the *Soil maps of Africa* DVD was successfully launched during the 7th Conference of Parties of UNCCD in Nairobi, October 2005.

Sampling thin sections of a Podzol, the Netherlands



Blocks ready for slicing into thin sections



Microphoto of a Podzol B with cracked humus coatings
(*STIBOKA-Jongerius Collection*)

World Reference Base for Soil Resources

A major revision of the World Reference Base for Soil Resources (WRB) was completed during 2005. To fulfill its role as the system for international soil correlation and communication, definitions and subdivisions of the reference soil groups were scrutinized and updated by international working groups; dialogue continued during the year through the internet and the revisions were discussed during meetings of the WRB task force in Gödöllö, Hungary, and Rome, Italy. The revised WRB will be published by FAO and presented during the 18th World Congress of Soil Science in Philadelphia, USA, in July 2006.

Internet

The structure and contents of the website were overhauled in 2005; the new site is now operational: www.isric.org. Several new SOTER and WISE-derived data sets were added to our publicly available, on-line collection.

Projects in 2006

1. *Geoloketten* – Development of an open infrastructure for the documentation and exchange of geo-information, with geographical focus on the Netherlands; partnership with Wageningen UR Centre for Geo-Information
2. *Decentralised global digital archive of land resources data* – expansion of the European Digital Archive (EuDASM) established in 2005; partnership with the European Soil Bureau, FAO and others
3. *Map collection digitisation;* partnership with European Soil Bureau
4. *Map and document catalogue and search facility*
5. *Reference photo collection* – Documentation and digitisation
6. *Common digital data management system*
7. *Micromorphology collection* – Common catalogue
8. *Library reopening and refurbishment*
9. *World Soil Reference Collection* – Relocation to secure site, recovery of lost samples, new acquisitions to fully represent WRB, on-line catalogue
10. *Publications: Guidelines for soil profile description – fourth edition; World reference base for soil resources – second edition*

APPLIED RESEARCH

Land resources data are fundamental to any land-related assessment, not in their own right but in relation with other data and knowledge, and their applications. The Applied Research Program compiles our own and other data for a wide range of applications - land use planning and policy, assessment of food and water security, and predictive models for global climatic change – and makes the data work. During 2005, the existing continental SOTER databases have been harmonized, gaps in primary data of some have been filled, and work began on compilation of sub-continental data for Central Africa.

A new initiative seeks to raise appreciation of the significance of soils, soil use and management to water resources: *green* water, held by soils and available *in situ* to plants, and *blue* water – streams and groundwater that can be tapped for use elsewhere for irrigation, domestic and industrial supply, and environmental flows.

Development and use of soil and terrain databases - SOTER

SOTER is a long-standing joint program with FAO to develop a harmonised, global soil and terrain spatial database. Landform units, formerly difficult to quantify, can now be defined by quantitative attributes derived from the SRTM 90m digital elevation model (DEM). The techniques approved by a European Soil Bureau workshop in late 2004 are now being applied in Cambodia and Central Africa, and the experience from these case studies will be incorporated in the revised *SOTER Procedures Manual* to be published in 2006.

Harmonized SOTER database

Parameter estimates for 18 soil attributes were generated for all existing regional and continental SOTER and similar databases. Using the procedure developed by Batjes (2003), parameters were generated according to the taxonomic similarity between soil profiles lacking particular data and the comprehensive set of profile data in the WISE database.

Sub-continental activities

In collaboration with the University of Ghent, compilation of a SOTER database of DR Congo at scale 1:2 M and of Rwanda and Burundi at scale 1:1 M began at the end of 2005, using data collected by various national and Belgian organizations. Landform units were delineated by interpretation of the SRTM 90m DEM.

SOTER for Latin America and the Caribbean (SOTERLAC)

Updating of SOTERLAC (version 2.0) at scale 1:5 million incorporates: 1) Topographic base adapted to match the Digital Chart of the World, the standard for SOTER maps; 2) Attribute database improved with respect to the number of soil

attributes that can be stored, and updated data for half of the geo-referenced soil profiles - particularly from Brazil, Costa Rica, Nicaragua, Peru and Puerto Rico.

Land resources conservation and degradation

Global Assessment of Land Degradation and Improvement (GLADA)

A new Global Assessment of Land Degradation and Improvement (GLADA) is under way in partnership with the Centre for Geo-Information, Wageningen University and Research Centre This is the spearhead of the much larger FAO/UNEP program - *Land Degradation in Drylands* (LADA). Using the GIMMS dataset of 24 years of global, fortnightly satellite measurements of reflected infra-red radiation at 8 km resolution, GLADA will identify: 1) the status and trends of land degradation; 2) *hotspots* suffering severe degradation, and 3) their counterpoint – areas where degradation has been arrested or reversed.

A pilot study was completed in North China demonstrated the feasibility of the methodology and developed algorithms to extract and analyze the data and to plot the results; local field validation and characterization of hotspots was carried out. This was supported in part by the Fellowship Program of the Netherlands Ministry of Agriculture, Nature Management and Fisheries.

World Overview of Conservation Approaches and Technologies (WOCAT)

WOCAT is a global network of soil and water conservation specialists that share their expertise and experience of sustainable land management and make it available for planners and decision makers. Since 1993, ISRIC has coordinated the network, produced the WOCAT newsletter and contributed to the development of methodology.

Godert van Lynden participated in a meeting of the WOCAT Mapping Task Force in Bern (June), the Annual Workshop and Steering Meeting in Belgrade (September), and a special WOCAT session during the 3rd World Congress on Conservation Agriculture and the training course immediately following in Kenya (November).
Stephan Mantel participated in the 2nd WOCAT National Training Workshop on documenting conservation approaches and technologies in Bandarban, Bangladesh.

Soil and Water Protection (SOWAP)

SOWAP is an environmental protection project in Belgium, Hungary and the UK, funded by the EU and Syngenta. ISRIC is responsible for coordination and implementation of the dissemination strategy and WOCAT activities within SOWAP. Godert van Lynden contributed to plenary meetings in the UK (November) and to the sister project in S. Europe (ProTerra), attending joint meetings in Leuven (March) Basel (March) and Toulouse (May). He also gave presentations about WOCAT/SOWAP/ProTerra during international conferences in Iceland and Kenya.

Comprehensive Assessment of Water Management in Agriculture

A broad partnership of practitioners, researchers, and policy makers is critically evaluating the developments in water management of the past 50 years, the challenges facing communities today, and possible solutions. Godert van Lynden contributed as a lead author of the chapter *Conserving land, protecting water* and attended authors' meetings in Montpellier, London and Nairobi.

Green and *blue* water

Green and *blue* water management aims to optimize rainwater management; water use by rain-fed farming and range management where the rain falls and, also, the resultant water resources downstream.

Green Water Credits (GWC) is a mechanism to pay land users for their water management activities that are presently unrecognised and unrewarded. World Soil Information is leading a GWC proof-of-concept project funded by IFAD and the Swiss Agency for Development and Cooperation, in collaboration with the Stockholm Environmental Institute, International Institute for Environment and Development, the Agricultural Economics Research Institute, and national partners. First activities in 2005 included identification of potential basins within the Savannas and Semi-Humid Zones of West and Eastern Africa; specialist contributions include the input of SOTER and WOCAT databases, specification of appropriate management practices, and soil water modelling.

David Dent presented the concept at the FAO-Netherlands Water for Food and Ecosystems Conference in The Hague, 31 January; Sjef Kauffman presented *green* water management and the GWC project at the CGIAR *Comprehensive Assessment of Rainfed Agriculture* workshop at ICARDA, Aleppo (April) and the *Green Water Management* workshop organized by Soil Water Management Network of ASARECA, Kampala (November).

Assessment of soil organic carbon stocks and change at national scale (GEF-SOC)

GEF-SOC, co-funded by GEF (2002-2005), implemented by UNEP and co-ordinated by The University of Reading (UK), developed the GEFSOC Soil Organic Carbon Modelling System© to quantify the potential impact of land management and climate scenarios on sequestration of organic carbon in soils at national and sub-national level.

National scientists from Brazil, India, Jordan, and Kenya worked with groups in Austria, France, the Netherlands (World Soil Information, represented by Niels Batjes, funded by the Dutch Ministry of VROM), the United Kingdom, and the USA. The final project presentation was given at UNEP, Nairobi, 23-26 May 2005. The GEFSOC Modelling System© with supporting data sets of climate, land use and soils is available on http://www.reading.ac.uk/GEFSOC/index.htm.

Results can support land-use policy formulation. Model output has been used to improve national-scale estimates of land use-related C emissions/ sequestration for Amazon-Brazil, Jordan, Kenya and the Indo-Gangetic plains of India – and can be

used at finer scales where complex systems are involved; the primary limitation at any scale is the availability of data.

Global data set of soil parameter estimates

The standardized taxo-transfer procedure, elaborated in the framework of the GEF-SOC project, was applied to the updated SOTER databases for Latin America and the Caribbean, Southern Africa, Central and Eastern Europe, and comparable data sets for North and Central Asia (East of the Ural), and North-eastern Africa. The resulting secondary data sets, which contain estimates for 18 soil parameters commonly required for environmental modelling, were later used to generate a 5 by 5 arc minutes Harmonized Global Soil Resources Database for FAO.

WISE-derived soil parameter estimates for the soil types of the world

A new, harmonized, global set of soil parameter estimates, at a resolution of 30 by 30 arc-minutes, using the WISE database, was prepared for access through the website.

Chittagong Hill Tracts land use planning

The Chittagong Hill Tracts Improved Natural Resources Management Project (CHARM) aims to improve sustainability of land management in the Chittagong Hill Tracts (CHT) by provision of improved access to knowledge and information on the environment and sustainable land management alternatives. The project is funded by the EU Asia Pro-Eco program.

Increased pressure on the land has shortened fallow periods in the traditional *Jhum* farming system (rotational slash and burn) from 15-20 to 3-5 years. This means land degradation, declining crop production, loss of biodiversity and off-site effects on downstream and urban areas – all exacerbated by long-running civil conflict. Proper planning and support for land management are vital to the post-conflict sustainable development. The project assists local agencies with environmental assessment, capacity building, access to land resources and management information, and initiation of land use planning.

Stephan Mantel met stakeholders in the area in March; visited the project partners in Spain (Universitat de Lleida) and Bangladesh (Centre for Environmental and Geographic Information Services, and Bangladesh Centre for Advanced Studies); and initiated the program in Dhaka in December.

Projects in 2006

1. *SOTER:* Procedures Manual; database of Central Africa; procedures development for DEM landforms analysis and soils placement within landscapes; web-based GIS tools for data surfaces and interpretations
2. *Andean carbon sequestration study* - Partnership with CSEQ
3. *Feasible soil carbon gains from improved management*
4. *Soil and Water Protection (SOWAP)* - Funded by EU-Life/ Environment and Syngenta

5. *World Overview of Conservation Approaches and Technologies (WOCAT)* Partnership with CDE, Bern, funded by SDC, DANIDA and Syngenta Foundation
6. *Land evaluation, Cambodia* - Support to Ministry of Land Management, Urban Planning and Construction, funded by GTZ
7. *Chittagong Hill Tracts land management and planning (CHARM)* – Funded by the EU
8. *Green water credits – Funded by* IFAD and the Swiss Agency for Development and Cooperation.
9. *Global assessment of land degradation and improvement* – Funded by GEF/FAO
10. *Land suitability assessment for Oil palm, Kalimantan, Indonesia* – Funded by LNV, partnership with Alterra

Other activities

International Union of Soil Sciences and Dutch Society of Soil Science

Alfred Hartemink is Deputy Secretary General and webmaster of the International Union of Soil Sciences. During 2005, IUSS bulletins 106 and 107 were produced and the website was expanded; during 2005 the number of visitors was 100 000. Also started in 2005: *IUSS Alerts,* e-mailed monthly to over 12 000 people in 100 countries.

Stephan Mantel is Secretary and Treasurer of the Dutch Society of Soil Science.

Consultancies and Training

Vincent van Engelen conducted several consultancy missions to Cambodia to assist the Land Management Project of GTZ with the compilation of a land resources database needed for the assessment of land for smallholder settlement.

Zhanguo Bai briefed The Central Project Management Office for PR China - GEF Partnership on Land Degradation in Dryland Ecosystems on WOCAT methodology and its potential applications to documenting China's experiences in soil and water conservation and land improvement.

David Dent provided a brief to Syngenta on remediation of salinity in relation to the Asian tsunami.

A one-week course on SOTER-DEM was provided at ISRIC to ACSAD, Syria staff (Messrs Bassem Katlan; Sanaa Ibrahim; Naji Assad).

Dr Ibrahim Hashem of Soil & Water Research, Egypt undertook six months training in ISRIC on SOTER-DEM applications to the Nile Delta.

PUBLICATIONS

Alfred Hartemink is review editor of *Geoderma* with overview of discussion papers and book reviews, and Co-editor in Chief of *Developments in Soil Science*, and editorial Board member of *Pedosphere* and *Outlook on Agriculture*. David Dent is an Associate Editor of *Soil Use and Management.*

Papers in primary journals

Batjes NH 2005. Organic carbon stocks in the soils of Brazil. *Soil Use and Management* 21, 22-24

Batjes NH 2005. Soil carbon stocks and projected changes within croplands in Jordan. *Geoderma* (doi: 10.1016/j.geoderma.2005.05.013)

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Hartemink AE 2005. Nutrient stocks, nutrient cycling and soil changes in cocoa ecosystems - a review*. Advances in Agronomy* 86, 227-253

Hartemink AE 2005. Plantation agriculture in the tropics - environmental issues. *Outlook on Agriculture* 34, 11-21

Hartemink AE and van Keulen H (Editors) 2005. Soil degradation in sub-Saharan Africa. Special issue of *Land Use Policy* 22, 1-74

Siges T, Hartemink AE, Hebink P and Allen BJ 2005. The invasive shrub *Piper aduncum* and rural livelihoods in the Finschhafen area of Papua New Guinea. *Human Ecology* 33(6), 875-893

Wan GJ, Chen JA, Wu FC, Xu SQ, Bai ZG, Wan EY, Wang CS, Huang RG, Yeager KM and Santschi PH 2005. Coupling between 210Pbex and organic matter in sediments of a nutrient-enriched lake: An example from Lake Chenhai, China. *Chemical Geology* 224, 223-236

Contributions to edited books

Dent DL 2005 ISRIC – World Soil Information. In R Lal (editor) Encyclopedia of Soil Science. Marcel Dekker, New York, pp 950-954 (doi: 10.1081/E-ESS-120041260)

Sevink J and Spaargaren OC 2005. Weathering and (Holocene) Soil Formation. In: Koster EA (editor), The Physical Geography of Western Europe. Oxford University Press, Oxford, pp 309-329

Spaargaren OC and Deckers JA 2005. Factors of Soil Formation / Climate. In: Hillel D (editor), Encyclopedia of Soils in the Environment. Academic Press, Oxford, pp 512-520

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Bai ZG, Schaepman ME and Dent DL 2005. Quantitative assessment of land degradation and improvement using satellite NDVI data: North China Pilot. Proceedings of the *2nd International Yellow River Forum*, Volume II, the Yellow River Conservancy Press, pp 233-243

Bai ZG, Dent DL, Bartholomeus H and Schaepman ME 2005. *Assessing land degradation and improvement* using NASA GIMMS, Shaanxi, China. The RGLDD Conference, Trier, September 7-9, pp 128-135

Hartemink, A.E. & J. Huting 2005 Sandy soils in Southern and Eastern Africa - Extent, properties and management. Proceedings *Management of tropical sandy soils for sustainable agriculture*, Thailand, November 2005

Hartemink, A.E. 2005 Poor soils make poor people and poor people make the soil worse. Proceedings *Management of tropical sandy soils for sustainable agriculture*, Thailand

Lynden GWJ van, Jones C and Gillijns K 2005. Documentation and evaluation of case studies of soil and water protection using conservation tillage in N. and C. Europe. 3rd World *Congress on Conservation Agriculture* 4-8 October 2005, Nairobi, Kenya (in CD-Rom)

Lynden GWJ van 2005. Documentation and evaluation of case studies of soil and water protection using conservation tillage in Europe. International Workshop on Strategies, Science and Law for the Sustainable Management and Conservation of the World´s Soil Resources", 14-18 September 2005, Selfoss, Iceland

Mantel S, Gobin A and Kirkby M 2005. Mapping erosion risk in climatic and land use scenarios for the Iberian Peninsula. European Congress of International Association of Landscape Ecology, March 29-April 3 2005, Faro

Reports

Bai ZG, Dent DL and Schaepman ME 2005. *Quantitative Global Assessment of Land Degradation and Improvement: pilot study in North China*. Report 2005/07, ISRIC - World Soil Information, Wageningen

Batjes NH 2005. *SOTER-based soil parameter estimates for Latin America and the Caribbean (ver. 1.0)*. Report 2005/02, ISRIC - World Soil Information, Wageningen

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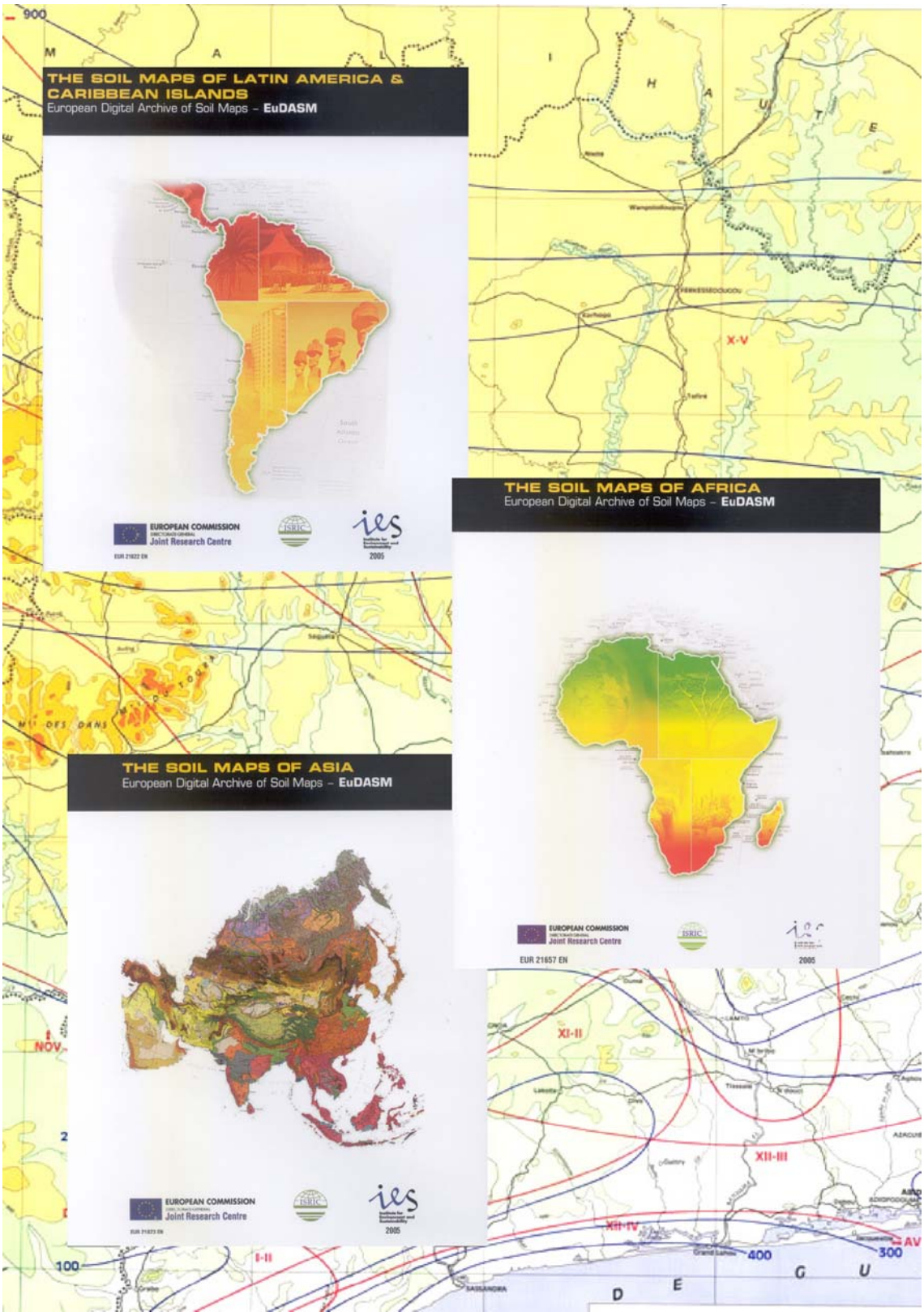
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EUROPEAN COMMISSION
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European Digital Archive of Soil Maps – EuDASM
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Joint Research Centre
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TRAVEL AND MEETINGS

In connection with program activities, ISRIC staff participated in training, workshops, and presented papers and posters at international conferences and symposia.

Participant	Event	Venue	period (2005)	organized by
Bai	EU-China Forum on sustainable development	Beijing, China	5-6 Sep	EU-China EMCP
Bai	2nd International Yellow River Forum	Zhengzhou, China	18-22 Oct	The Yellow River Conservancy Commission, Ministry of Water Resources, PR China
Batjes	GEFSOC Workshop 5.5: Final presentation run-through	The University of Reading	4-7 Apr	GEFSOC Project/The University of Reading
Batjes	GEFSOC Final project presentation	UNEP, Nairobi	23-26 May	UNEP/GEF and The University of Reading
Dent, Kauffman	FAO-Netherlands Conference Water and the Environment	The Hague	31 Jan-4 Feb	Netherlands Government
Dent	3rd PROLAND Supervisory Board Meeting	Pulawy, Poland	8-12 Mar	IUNG
Dent	International Salinity Congress	Riverside CA, USA	25-27 Apr	Am Soc Agron
Dent	LADA and Green Water Credits planning meetings; visit WFP	Rome, Italy	17-21 May	FAO, IFAD
Dent	Green and Blue Water planning meeting	Stockholm	9-10 Jun	SEI
Dent, Kauffman	GEO-4 workshop (UNEP); Meetings with Green Water project partners	Nairobi, Kenya	20-25 Jun	UNEP and ISRIC
Dent	GEO-4 Land, content review	York, UK	19 Jul	SEI
Dent	Year of Planet Earth management meeting	London	29 Jul	Geological Society
Dent	GEO-Deserts Authors' meeting	Mendoza, Argentina	5-9 Sep	UNEP
Dent	European Soil Atlas and Soils of Africa launch	London	18 Oct	JRC
Dent, Hartemink, Batjes, van Lynden	GEO4-Land Author's meeting	Wageningen, The Netherlands	15-17 Nov	UNEP
Dijkshoorn, Spaargaren	Soil monolith collection	Poehl/Rostock, Germany	30 Jun-4 Jul	University of Rostock
Hartemink	International Year of Planet Earth meeting	Unesco, Paris	6-7 Feb	Unesco
Hartemink	Sandy Soils Conference	Khon Kaen, Thailand	25 Nov–3 Dec	IRD, LDD

Participant	Event	Venue	period (2005)	organized by
Hartemink	NUFFIC Rwanda project: setting up and running a MSc in Agroforestry and Soil Management	University of Butare, Rwanda	13-18 Feb	University Butare
Hartemink	IUSS Meeting Delaware, visit Kansas State University	USA	13-23 Jun	IUSS
Kauffman	Kampala IWRM - Green Water Management workshop	Kampala-Seta, Uganda	26 Nov-4 Dec	ASARECA-SWMnet
Kauffman	Comprehensive Assessment workshop on Rain-fed Agriculture	ICARDA, Aleppo, Syria	9-15 Apr	IWMI organizers, ICARDA hosting
Mantel	Asia Pro Eco II stakeholders Briefing Session	Brussels, Belgium	15 Feb	EU Asia Pro Eco
Mantel	2nd National WOCAT training in Bangladesh	Bandarban, Chittagong Hill Tracts, Bangladesh	17-26 Mar	Chittagong Hill Tracts Development Board
Mantel	European IALE Congress 2005	Faro, Portugal	29 Mar-3 Apr	International & Portuguese Association for Landscape Ecology
Mantel	WOCAT Map meeting; Meeting with NDA South Africa and WOCAT project	Bern, Switzerland	16 Jun	ISRIC, NDA, WOCAT
Mantel	Meeting with CHARM project partner from University of Lleida	Lerida, Spain	27 Sep	ISRIC-UdL
Mantel	1st CHARM project mission	Dhaka, Bangladesh	Dec	EU Asia Pro Eco
Spaargaren	UNCCD-CRIC Meeting	Bonn, Germany	2-11 May	UNCCD
Spaargaren	European Summer School on Soil Survey	Gödöllö, Hungary	18-22 Jul	EC
Spaargaren	College on Soil Physics	Trieste, Italy	10-14 Sep	ICTP
Spaargaren	WRB-Ghana Tour	Accra/Kumasi, Ghana	23 Aug-2 Sep	University of Copenhagen
Spaargaren	UNCCD-COP7 Meeting	Nairobi, Kenya	15-21 Oct	UNCCD
Spaargaren	WRB-Task Force	Rome, Italy	5-10 Dec	FAO
van Engelen	SOTER Central Africa contribution of Ghent University	Ghent, Belgium	21 Mar	ISRIC/Ghent University
van Engelen	Land resources assessment training	Phnom Penh, Cambodia	7-27 May	LMAP-GTZ
van Engelen	LRA training Cambodia	Phnom Penh, Cambodia	19-30 Sep; 28 Nov-9 Dec	LMAP
van Lynden	SOWAP/ProTerra EU dissemination meeting;	Leuven, Belgium	14 Mar	SOWAP / ProTerra
van Lynden	SOWAP /ProTerra presentation, Syngenta HQ	Basel, Switzerland	22-23 Mar	SOWAP / ProTerra
van Lynden	International Workshop on Strategies, Science and Law for the Conservation of the World Soil Resources	Selfoss, Iceland	14-18 Sep	SCAPE, IUCN-CEL, Soil Conservation Service Iceland

Participant	Event	Venue	period (2005)	organized by
van Lynden	a) 3rd World Congress on Conservation Agriculture	Nairobi, Kenya	4-8 Oct	ACT, RELMA, etc.
	b) WOCAT training for IRHA/ Searnet	Nanyuki, Kenya	10-14 Oct	WOCAT
van Lynden	SOWAP plenary meeting	Harper Adams College, UK	7-11 Nov	SOWAP
van Lynden	WOCAT Map meeting; Meeting with NDA South Africa and WOCAT project	Bern, Switzerland	13-15 Jun	CDE, ISRIC, WOCAT

PERSONNEL

(As of January 2006)

Board of Trustees

- Dr SW Bie (Chairman)
- Prof. Dr H Hurni (National Centre of Competence in Research North-South, Berne, Switzerland, on behalf of the International Union of Soil Sciences)
- Ir GJA Nieuwenhuis (Centre for Geo-Information, on behalf of Alterra BV)
- Prof. Dr L Brussaard (on behalf of the Executive Board of Wageningen UR)

Changes in Board

Prof. Dr J Bouma retired as of April 2005
Prof. Dr L Brussaard was appointed Board member April 2005.
Ir W van Vuure retired as of November 2005

Honorary Fellows

- Prof. Dr Ir KJ Beek
- Prof. Dr R Dudal
- Dr R Brinkman

Staff

Dr DL Dent – Director
Ir JH Kauffman – Deputy Director; Green water engineer

- M Ahmad MSc – Soil monolith preparation
- Dr ZG Bai – Global assessment of land degradation and improvement
- Ir NH Batjes – Land resources information systems; Soils and global change
- WCWA Bomer – Graphic design, in-house publishing
- J Brussen – Secretariat, finance
- Ir JA Dijkshoorn – Soil and terrain databases
- Ir IJ Haas – Webmaster
- Dr AE Hartemink – Head, World Soil Museum; Soil fertility
- IH Huibers-Govaert – Library
- JRM Huting – GIS database management; Modelling and mapping
- YGL Karpes – Secretariat, communications
- S Mantel MSc - Land evaluation and decision support
- AJM van Oostrum MSc – Collections management and quality control
- Dr OC Spaargaren – Head, World Data Centre for Soils; Taxonomy of soils
- Ir P Tempel - Systems analysis, programming
- Drs VWP van Engelen – Research Team Leader; Land resources information systems
- Drs GWJ van Lynden – Land, water and environmental management

Guest researchers

- Drs JHV van Baren - Philosophy of Soil Science (IUSS program); Soils literature and documentation
- Dr LP van Reeuwijk – Laboratory methods and quality control
- Dr MJ Kooistra – Soil micromorphology
- Dr V Rutunga – Soil fertility; Food security strategy for Rwanda
- Dr Ibrahim Said Rahim Ahmed Hashem, Soils and Water Use Dept, National Research Centre, Cairo (17-4/17-10-2005) – Nile Delta soil and terrain database

Internships

- Carolin Sperk, University of Bonn (15-9/30-11-2005) – restyling the World Soil Museum
- Gunnar Jenet, University of Applied Sciences, Osnabrück (16-8-2004-15-1-2005) - Transfer of the soil classification from the Revised FAO-Unesco Legend into the WRB for all Brazilian profiles of SOTERLAC.

Staff Development

- Introductory course ArcGIS 9: van Engelen, Mantel, Batjes, Dijkshoorn
- Building Content Management Server 2002 Solutions: Haas, 5-7 December 2005
- SOTER landforms derivation: Bai

LIST OF ACRONYMS

Abbreviation	Description
ACSAD	The Arab Centre for the Studies of Arid Zones and Dry Lands, Damascus, Syria
ACT	The African Conservation Tillage Network
ArcGIS	Commercial integrated collection of geographic information system software products
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASSOD	Assessment of Human-induced Soil Degradation in South and Southeast Asia Soil Degradation in South and Southeast Asia
CDE	Centre for Development and Environment, University of Berne, Switzerland
CGIAR	Consultative Group on International Agricultural Research
CHARM	Chittagong Hill Tracts improved natural Resources Management
COP	Conference of the Parties
CRIC	Committee for the Review of the Implementation of the Convention
CSEQ	Carbon Sequestration Project, The Netherlands Cooperation CO-010402
DANIDA	Danish International Development Agency
DEM	Digital Elevation Model
EMCP	Environmental Management Cooperation Program, EU-China project
ESB	European Soil Bureau, Ispra, Italy
EC	European Commission
EU	European Union
EuDASM	European Digital Archive of Soil Maps
FAO	Food and Agriculture Organization of the United Nations, Italy
GEF	Global Environmental Facility
GEFSOC	Global Environmental Facility project, Soil Organic Carbon Project
GEO	Global Environment Outlook Program, UNEP
GIMMS	Global Inventory Modelling and Mapping Studies
GLADA	Global Assessment of Land Degradation and Improvement
GLASOD	Global Assessment of Status of Human-induced Soil Degradation
GTZ	Gesellschaft für Technische Zusammenarbeit, Eschborn, Germany
GWC	Green Water Credits project
ICARDA	International Centre for Agricultural Research in the Dry Areas, Aleppo, Syria
ICSU	International Council for Science, Paris, France
ICTP	International Centre for Theoretical Physics, Trieste, Italy
IFAD	International Fund for Agricultural Development, Rome, Italy
IHE	International Institute for Infrastructural, Hydraulic and Environmental Engineering, Delft, The Netherlands
IPCC	Intergovernmental Panel on Climate Change
IRD	Institut de recherche pour le développement, France
ISIS	ISRIC Soil Information System

Abbreviation	Description
ISRIC	International Soil Reference and Information Centre, Wageningen, The Netherlands
IUCN-CEL	World Conservation Union – Commission on Environmental Law
IUNG	Instytut Uprawy Nawożenia i Gleboznawstwa / *Institute of Soil Science and Plant Cultivation*, Pulawy, Poland
IUSS	International Union of Soil Sciences
IWMI	International Water Management Institute, Colombo, Sri Lanka
IWRM	Integrated Water Resources Management
JRC	Joint Research Centre of the European Union, Ispra, Italy
LADA	Land Degradation Assessment for Dryland Areas
LDD	Land Development Department, Bangkok, Thailand
LEI	Landbouw-Economisch Instituut / *Agricultural Economics Research Institute*, Wageningen UR, The Hague/Wageningen, The Netherlands
LMAP	Land Management and Administration Project, GTZ, Cambodia
LNV	Ministerie van Landbouw, Natuur en Voedselkwaliteit / *Netherlands Ministry of Agriculture, Nature and Food Quality*, The Hague, The Netherlands
NBV	Nederlandse Bodemkundige Vereniging / *Dutch Soil Science Society*
NDA	National Department of Agriculture, Pretoria, South Africa
NDVI	Normalized Difference Vegetation Index
NREL	Natural Resources Ecology Laboratory, USA
NUFFIC	Netherlands Organization for International Cooperation in Higher Education.
PROBUS	Stichting Probus Nederland Informatie Centrum, Delft, The Netherlands
PROLAND	EC Centre of Excellence Protection of Land and Water Quality and sustainable Development of Rural Areas, Pulawy, Poland
ProTerra	Soil protection in Mediterranean olives and vines, Syngenta, Basel, Switzerland
RELMA	Regional Land Management Unit, Nairobi, Kenya
RGLDD	Remote Sensing and Geoinformation Processing in the Assessment and Monitoring of Land Degradation and Desertification conference, Trier, Germany
SCAPE	Soil Conservation and Protection in Europe
SDC	Swiss Agency for Development and Cooperation
SEI	Stockholm Environment Institute, Sweden
SOTER	Soil and Terrain database program
SOTERLAC	SOTER for Latin America and the Caribbean
SOWAP	Soil and Surface Water Protection Using Conservation Tillage in Northern and Central Europe
SQL	Structured Query Language
SRTM	Shuttle Radar Topographic Mission, National Aeronautics and Space Administration (NASA), USA
STIBOKA	Stichting voor Bodemkartering / *Netherlands Soil Survey Institute* (now: Alterra, part of Wageningen UR, The Netherlands)
SWMNet	Soil Water Management Network of ASARECA
UdL	Universitat de Lleida / *Lleida University*, Spain
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification, Bonn, Germany

Abbreviation	Description
UNEP	United Nations Environment Program, Nairobi, Kenya
USDA-NRCS	United States Department of Agriculture, Natural Resources Conservation Service, Washington, USA
UNESCO	United Nations Educational, Scientific and Cultural Organization, Paris, France
VROM	Ministerie voor Volkshuisvesting, Ruimtelijke Ordening en Milieu / *Netherlands Ministry of Housing, Spatial Planning and the Environment*, The Hague, The Netherlands
Wageningen UR	Wageningen University and Research Centre, The Netherlands
WDC	World Data Center
WISE	World Inventory of Soil Emission potentials
WOCAT	World Overview of Conservation Approaches and Technologies. CDE, Berne, Switzerland
WRB	World Reference Base for Soil Resources

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