

Annual Highlights 2009

ISRIC - World Soil Information

On solid ground

The world's production capacity for food and other eco-systems services is rooted in the Earth's living skin – the soil. In a world desperately searching for political, financial, food and energy security, effective management of the natural resource base will increasingly play a decisive role. Land, water, air and biodiversity are precious resources whose proper management benefit human welfare.

Policy makers, leaders of private enterprises and society at large are all increasingly aware of the need to use the world's natural resources in a more effective and sustainable fashion. To do this properly, they need science-based information.

This highlights the importance of ISRIC as a world centre for collecting and housing information about land and soil. With this importance likely only to increase in the future, ISRIC is committed to pursuing and strengthening its mandate as an ICSU-designated World Data Centre for Soils.

With this aim, ISRIC developed a strategic plan in 2009 – the main priorities are presented here. We would like to acknowledge all former directors and Board members of ISRIC for their past contributions.



ISRIC staff Front row from left to right: Koos Dijkshoorn, Johan Leenaars, Prem Bindraban, Godert van Lynden, Vincent van Engelen, Jan Huting, Wouter Bomer. Back: Ger Naber, Zhanguo Bai, Mateen Ahmed,

Niels Batjes, Stephan Mantel, Ad van Oostrum, Ingrid Haas, Piet Tempel, Yolanda Karpes. Not in picture: Alfred Hartemink, Bob MacMillan, Johanna Martinez, Sjef Kauffman, Rogier de Jong, Laura Batlle Bayer, Ruth Krause.



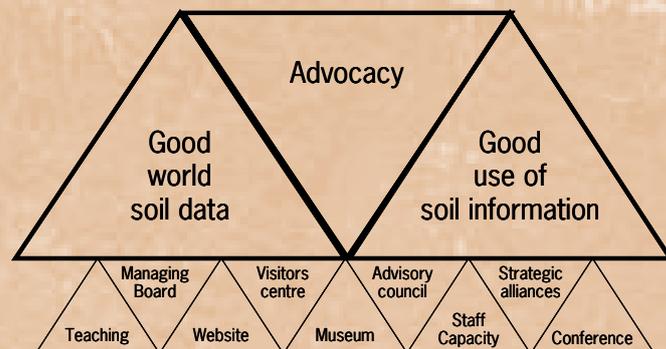
World Soil Information

Strategy

In 2009, ISRIC developed a strategic plan for 2012-2013, targeting three main areas.

- ISRIC is committed to providing high quality soil and terrain data to the world community. It is developing web-based services for improved access to soil information and is actively pursuing expansion of its collections.
- ISRIC will continue to stimulate and catalyze use of soil information by engaging in quantitative assessments of soil degradation, availability of water and nutrients in soils and carbon sequestration.
- ISRIC will continue to strongly advocate for the role and importance of soil in global development issues by participating in scientific and societal debates, and by using a variety of effective communication strategies.

Several specific activities support these three main areas. ISRIC enhances its research output and participation in Graduate Schools at Universities. It pursues a dynamic human resources strategy, aiming to attract or develop internationally



ISRIC emphasizes the development of three main areas, supported by a suite of activities.

recognized scientists. Increased investments have been approved for improvements in hardware and software, staff training and exchange, scholarships and initiation of new research. ISRIC has strengthened and expanded its strategic collaboration with partner institutions worldwide in order to expand its impact and to provide society with science-based information for informed decision making. ISRIC has also begun to develop plans for new, improved facilities to house its activities in the near future.

Steep slopes with well maintained high intensity farming (coffee, maize, grass). Embu, Kenya.



Good world soil data

ISRIC obtained the status of *ICSU World Data Centre* in 1989; WDCs are operated for the benefit of the international scientific community. The *WDC for Soils* provides a focus for soil-related collections and information services as custodian of global soil information. An important aspect is the WDC data rescue program, safeguarding older data sets which may be at risk of loss or deterioration, and digitizing old data sets. Both analogue and digital data are acquired, maintained and analyzed. In addition to metadata-based searches, our on-line data sets can be accessed through tabular HTML lists that provide direct access to the data, documentation and project-related webpage's. Our collections of soil monoliths and reference materials are stored at the ISRIC premises in Wageningen; these may be studied on-site. A selection of our monoliths is on display in the World Soil Museum. Following the ICSU General Assembly in Maputo, Mozambique, in 2008 the WDC system will be incorporated into the new *ICSU World Data System (WDS)*.

ISRIC is investing in restructuring of its ICT infrastructure to improve access to its databases. ISRIC's major data holdings are being consolidated in a centralized and user-focused database containing only validated and authorized data with a known and registered accuracy and quality. Access to the data will be through newly developed web services meeting user expectations and using accepted standards. Improvement of the ISRIC web site will attract new and returning visitors by offering them relevant functionality, content and data for their work and interests. Our global projects serve to catalyze these process.

ISRIC World Soil Information Database is maintained by ISRIC library. The database contains 25.000 country related (full text) reports and (digitized) maps. The subject emphasis is on soil data, but related geographic information on geology, geomorphology, land use and land suitability are also collected. The database offers search facilities using Google map like techniques. ISRIC will continue to digitize the collection of maps and country reports and offer them on the internet for global use. In order to expand the collection we look for collaboration to digitize soil science related maps and country reports and make them available on-line (<http://library.wur.nl/isric>).

ISRIC coordinates the *GlobalSoilMap.net* project that was launched at a symposium in January 2009. This global project aims to digitally map the world's soil resources by developing practical, timely, cost-effective services to map soil properties. It builds on recent advances in digital soil mapping, remote sensing, and spatial statistics. Significant steps have been made to develop the required partnerships and institutional agreements. The African component (AfSIS) is underway, collecting and compiling soil data to develop preliminary digital soil maps for selected countries.

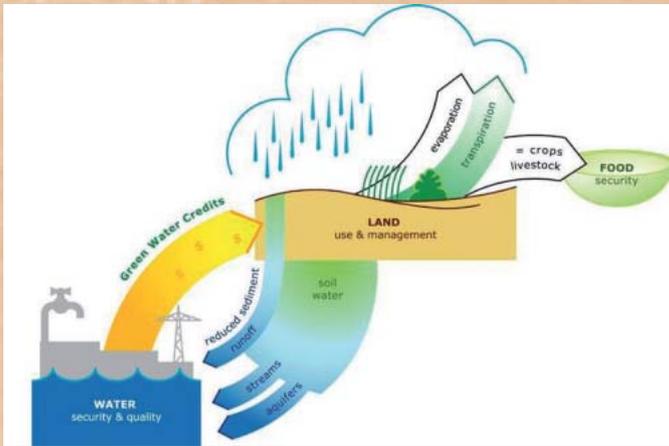
By coordinating the *e-SOTER* project consortium, ISRIC is advancing its efforts to contribute to a global 1:1 million scale soil and terrain database towards quantitative mapping of landforms, soil parent materials and attributes using legacy soil data, DEMs and remote sensing techniques. New digital soil mapping techniques will be used in selected pilot areas at a working scale of 1:250 000. A method to obtain an artifact-free SRTM, a procedure to create physiographic units from SRTM DEMs using SOTER landform criteria and a RS method to map soil parent material attributes relevant for soil formation were developed in 2009.

Good use of soil information

The availability of land and soil information allows ISRIC to engage in a multitude of global research and development projects.

Improved farm level soil and water management in upstream portions of river basins directly benefits farmers through improved production. It also generates downstream benefits such as more water with less sedimentation for increased hydropower generation or for irrigation. These benefits are currently not recognized and not rewarded. Green Water Credits is a concept that links different actors in a watershed and provides an investment mechanism for payment of ecosystem services. A proof of concept has been accepted in Kenya and multiple stakeholders have engaged in an effort to implement the concept.

Degradation of soils deteriorates the production base. ISRIC has strongly contributed to the development a quantitative and qualitative methodology to assess soil degradation at



Sustainable soil-water management upstream benefits both agricultural productivity and downstream water users. Credit flows warrant the sustainability of the system.

national (LADA) and global (GLADA) levels, and a database that describes local processes driving degradation (WOCAT). The combined use of these products supports assessment of degradation and identification of measures for recovery (DESIRE). ISRIC is further specifying the definition of marginal and degraded lands for the European Commission. The GLADA approach is being applied in Turkey to identify the most effective locations for land rehabilitation. A PhD student supports improvement of the methodology.

One of the most pressing global issues in soil management is how to return to the soil one third of the excess carbon dioxide now in the atmosphere as a result of land use change over the last century. ISRIC is a partner in the GEF co-funded Carbon Benefits Project (CBP, 2009-2012), led by the United Nations Environment Programme (UNEP-DEWA). The CBP will provide scientifically rigorous, cost-effective tools to establish the net carbon benefits of sustainable land management interventions in terms of protected or enhanced carbon stocks and reduced greenhouse-gas emissions. ISRIC will provide global soil information for carbon stock assessment across the range of world climate zones, soil types and land use as required for, at a minimum, IPCC Tier I, or national scale, level inventory assessments using the CBP system in data poor regions.

Phosphorus is an essential element for life. Unlike carbon, oxygen, nitrogen and hydrogen, it does not cycle between

plants and soils and the air. It is mined, processed, applied to the soil as fertilizer and some of it is ultimately lost as runoff into lakes, streams and, finally, the ocean. Phosphate mines may be exhausted in the near future. ISRIC has initiated research to better understand the availability and dynamics of soil phosphorus.

Governance, partners and advocacy

ISRIC has a managing board with representatives from Wageningen UR that ensures collaboration with research groups from a range of disciplines within Wageningen UR. An International Scientific Advisory Council (ISAC) reflects, discusses, and advises on our activities viewed from an international perspective.

ISRIC has established strong international alliances. This ensures high quality scientific output, enhanced impact of our efforts in development and in policy formation.

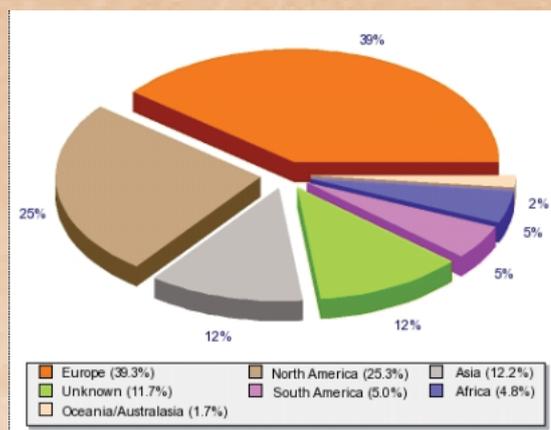
With partner institutions, ISRIC has begun a process to engage global soil institutes in a task on Global Soil Data within the Global Earth Observation System of Systems (GEOSS). The task will make both area-class soil information as well as soil property predictions available through the GEOSS portal, facilitating exchange of soil information among science communities of earth systems and communication to high-level policy makers. ISRIC acts as the point of contact of the task.

In 2009, our activities received worldwide exposure on several radio stations, newspapers and scientific magazines; including the New York Times, NRC Handelsblad, Die Zeit and Nature. Our Museum was visited by over 1000 visitors, including 30 groups from all major Dutch Universities and also from Germany, UK, Surinam, and the USA. Our monoliths were requested for expositions at Naturalis (Leiden) and at van Hall (Leeuwarden), and part of our exhibition is continuously travelling. We have continued to train and lecture in Wageningen and institutions in the Netherlands.

ISRIC continued to provide services to the International Union of Soil Science (IUSS) as the Deputy Secretary General and IUSS webmaster. ISRIC was present at various influential conferences and seminars.

Publications

ISRIC staff act as editors of several scientific journals, including *Geoderma*, *Outlook on Agriculture*, *Pedosphere*, and *Agriculture Ecosystems and Environment*. Our publications, including peer reviewed journal articles, reports and conference contributions can be found through our website.



Source of on-line visitors by continent (May 2006- Dec. 2009)

Web services

The ISRIC website plays a key role in our data dissemination. In 2009, 51 427 users visited our website, in comparison to some 40 815 in 2008 and 31 432 during 2007. Some 64% of the requests for digital datasets came from Europe and North America, while some 22% arose from Africa, Asia and South America (Fig. 1); these figures exclude requests for materials hosted at JRC-IES and stored in the ISRIC - World Soil Information Database.

Requests for on-line data sets originated from a wide range of user groups, mainly universities and colleges (34%), students (27%) and national and international research institutes (17%).

Our data holdings are being used and for many purposes, mainly at the regional to global scales at which WISE and SOTER operate: agro-ecological zoning, assessments of crop production, assessments of impacts of soil degradation on food supply, soil vulnerability to pollution, modelling of soil organic carbon stock and changes, soil gaseous emission potentials, and payments for environmental services.

Additionally our scanned map collection and our on-line library holdings are frequently accessed and downloaded.

Staff

ISRIC has nine senior scientists, three scientists, six support staff for collections, database and website management and project administration. David Dent and Otto Spaargaren retired in 2009. We welcomed four new colleagues, Ruth Krause (project management), Bob MacMillan (science coordinator), Johan Leenaars (legacy data officer) and Johanna Martinez (fund raising officer). Laura Batlle Bayer joined us for a scholarship on 'soil carbon dynamics'. Together with scholars and visiting scientists we have a team of 24 people at ISRIC, excluding support on financial and human resource affairs from Wageningen UR.

Accounts and results for 2009

Balance sheet		Profit & loss account			
Assets	fixed assets	€ 5,147	Turnover	base funding	€ 1,200,843
	current assets	€ 279,950		research projects	€ 818,637
	liquid assets	€ 1,388,827		Total income	€ 2,019,480
	Total assets	€ 1,673,924			
Liabilities	capital	€ 673,649	Expenses	Personnel costs	€ 1,408,898
	current liabilities	€ 1,000,275		General costs	€ 210,896
	Total liabilities	€ 1,673,924		Material expenses on research	€ 324,697
			Total expenditure	€ 1,944,491	
			Net result	€ 74,989	

ISRIC – World Soil Information is an independent foundation with a global mandate for collecting, storing, processing and disseminating soil information in support of global research and development.

ISRIC obtained its mandate at the UNESCO General Conference in 1964, and has been supported by the Netherlands Government since 1966. ISRIC is the ICSU-

designated World Data Centre for Soils. It coordinates a number of global soil programs through grants from major institutions and donors. ISRIC has collaborative agreements with a range of institutions including FAO, JRC, UNEP, CDE.



Eroded landscape near Kisongo, Arusha, Tanzania. The soils derived from weathered volcanic materials are sensitive to erosion if not protected by maintaining an effective ground cover. The valleys are

cropped with maize and hill slopes and crests are used for extensive grazing. Deep gullies have developed in recent years in response to overuse.

Additional information may be obtained through www.isric.org.

contact:

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