Protection of Soils and new developments in the European Soil Data Centre

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1. Soil Thematic Strategy and Soil Threats
2. European Soil Data Center Developments
3 Components ( Adopted by Commission 22/9/2006):

- **DIRECTIVE** establishing a framework for the protection of soil risk from erosion, compaction, salinisation, decline of soil organic matter, landslides, contamination, sealing and loss of soil biodiversity

- **COMMUNICATION** on the Thematic Strategy for Soil Protection: Why further action is needed?

- **IMPACT ASSESSMENT Report**: Analysis of economic, social and environmental impacts

http://ec.europa.eu/environment/soil/index.htm

The strategy is one of 7 Thematic Strategies that the Commission has presented. The other strategies cover air pollution, the marine environment, waste prevention and recycling, natural resources, the urban environment and pesticides.
 ACTIONS AND MEANS of the Soil Thematic Strategy

• Still to be implemented (blocking minority in Council: DE, F, UK, NL, AT):
  – Framework legislation with protection and sustainable use of soil as its principal aim;

• Already in the implementation phase:
  – Integration of soil protection in the formulation and implementation of national and Community policies;
  – Research supported by Community and national research programmes;
  – Public awareness of the need to protect soil.
Threats to soil as identified in COM(2002) 179:

- Sealing
- Erosion
- Organic matter decline
- Compaction
- Salinisation
- Landslides
- Contamination
- Decline in soil biodiversity
IRENA indicator 23 - Soil erosion

Integrating large spatial data for European assessments:

• CORINE Land Cover
• High Resolution DEM
• European Soil Database
• MARS climate data
Integrating large spatial data for European assessments - Data Modelling
Organic carbon content (%) in the surface horizon (0-30 cm) of soils: total 71 GtC in EU

National Soil Organic Carbon stocks (0-30cm) in Gt.
Where can we lose or gain SOC in Europe?

The potential of agricultural soils to gain organic carbon

The potential of agricultural soils to lose organic carbon

Map information:
- Spatial coverage: 27 Member States of the European Union where data are available.
- Source: Land-Cover and Land-Use Database.

Bibliographic information:
- Authors: Vladimir Dobrovsky, Brno, Czech Republic.
- For more information: Vladimir Dobrovsky, European Commission, Joint Research Centre, Institute for Environment and Sustainability, Land Management and Natural Hazards Unit, European Commission, Institute for Environment and Sustainability, Land Management and Natural Hazards Unit.
Salinisation, Compaction

- **Salinisation**: Saline and Sodic Soils in the European Union
- **Compaction**: Soil’s natural susceptibility is based pedotransfer rules (logical connections between relevant parameters)

2 major sources in order to delineate areas at risk of salt accumulation in Europe:

- The European Soil Database (ESDB, 2004)
- The map of salt affected soils in Europe compiled by Szabolcs (1974).

**Input Parameters**: Attributes of the European soil database:

- Soil type, texture, soil water regime, depth to textural change and the limitation of the soil for agricultural use.
Soil Sealing in Europe: Dataset at 20x20m

“Connected” to Food Security:
- Agricultural productivity loss (EU 20) estimated in 4.5 milions of tonnes of wheat
- More than 8,000 Km² of agricultural land have been lost between 1990 and 2000

pH: Quantitative map and Data of estimated soil pH values across Europe

Compilation of 12,333 soil pH measurements from 11 different sources, and using a geostatistical framework based on Regression-Kriging
The single focal point for soil information, data and expertise at European level; it integrates and hosts soil data from EU Member States and neighbouring countries. Its information is of relevance to EU policies and stakeholders. ESDAC covers the complete data production cycle, from raw data collection to the final integrated assessment of European soil resources.
“ESDAC will be one **node in a system consisting of distributed data nodes**: as a soil data node, it will hold soil data at European level, while other soil data nodes at regional, national or global level will focus on data of different scales.”
**Metadata Catalogue:**
Catalogue of soil related data, services, applications, documents and projects at EU level

**ESDAC Map Viewer:**
Web application for the viewing of subset of available soil data
Interoperable with EFDAC
The European Soil Portal, which forms part of ESDAC, is a major website that includes references to soil data and information from all over the world.
Soil Portal Structure

62 major updates in 2009

Soil Bureau

Data

Documents

European Soil Portal

Applications

Utilities

Projects

Themes

Threats

62 major updates in 2009
Some key elements ..... 

✓ Usability and easy-to access

✓ Simplicity

✓ Interaction with the users (Mailing list of 1,300 users) and constant updates both in the contents and in the layout

✓ Service oriented approach where data are not allowed to be distributed due to copyright issues

✓ Integration with other Communities (Soil Science Societies, Soil Related bodies)

- Major International soil-related Organisations and Initiatives are listed
- 230 Soil related bodies (National and Regional Organisations) in 41 Countries
- 47 Soil Science societies
ESDAC Information Providers

European Soil Data Centre (ESDAC)

- **European Commission** (EU funded soil related projects)
- **Member States** (e.g. in the context of SFD)
- **EIONET, EEA, ETC**
- **Collaborative research** (e.g. EuroGeoSurveys, FAO, ISRIC)
- **Data from specific in-house JRC actions** (e.g. ESDB, SOTER)
- **Data from related JRC and EC actions** (e.g. Lucas soil, Biosoil)
- **Network of soil centres** (e.g. European Soil Bureau Network)
Data and information Sources

- Integrating large spatial datasets using data Models (PESERA, Organic Carbon, Compaction, .......)
- LUCAS : Land Use/Land Cover Area Frame Survey
- Collaboration with the Member States and especially with our Networks:
  - European Soil Bureau Network (ESBN)
  - EIONET
The Samples have been sent to a Laboratory for analysis

Coarse fragments
Particle size distribution
Clay content
Silt Content
Sand Content
pH(CaCl2)
pH(H2O)
Organic carbon
Carbonate content
Phosphorus content
Total nitrogen content
Extractable potassium content
MULTISPECTRAL Properties (With diffuse reflectance measurements saturation)
Cation exchange capacity

- 44,000 Bags
- 22,000 Samples
- 500 Surveyors, Equipement
- 25 Countries
- 11 Tones
- European Soil Archive (JRC)

1.000.000 Points

Photo-interpretation

250,000 Points

Sampling

Stratum | Points
---|---
Arable | uuuuuu
Water | xxxxxx
Artificial | YYYYYY
Woodland | zzzzzz

Survey

Compute statistics

Image 2000

Ortho-Photos

44,000 Bags
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25 Countries
11 Tones
European Soil Archive (JRC)
Two of the main soil threats in European soils are soil erosion and decline in soil organic matter.

The EEA and the European Commission - DG Environment have identified soil erosion and decline in soil organic matter as priorities in relation to the collection of policy relevant soil data at European scale.

JRC organises through EIONET a data collection exercise with the objective of creating European-wide datasets for actual soil erosion and soil organic carbon (OC).

Technical guidelines and grid files for the collection of soil OC and erosion data have been distributed to EIONET members.

- Data from EIONET member countries will be collected according to a grid-based approach
- Each country has assigned a number of grid-cells (covering the country territory) and for each cell, the country is expected to provide a number of data according to a format according to Technical Specifications

JRC was able to compile a list of lead institutions for soil in EIONET member countries
Collaboration Agreement No 31576

- European Commission and Swiss Federal Council
- Signed 18/12/2009 between Mr. Hordijk (JRC) and Mr. karlaganis (FOEN)

Highlighted points:
- New approaches can be identified and developed in the field of soil monitoring and exchange of soil data and information, thus working to the mutual benefit of both organizations in the achievement of their objectives.
- Both Parties recognize strong complementary assets between their facilities and their development of procedures and methods for data collection, quality assessment and control, data management and storage, data distribution to external users.
- The Parties have expressed their mutual desire to co-operate in the field of sustainable land use, climate change mitigation and environmental degradation monitoring.
Objectives of the Agreement

- To develop and evaluate methods, processes and techniques for soil monitoring and to exchange information in order to implement the link between the European Soil Data Centre hosted at JRC and the National Soil Data Centre hosted at FOEN.
- To develop new and updated assessments of soil erosion and mass movements in the Alps
- To share scientific expertise and experience soil compaction, soil contamination
- To complete a full evaluation of the soil organic carbon pool in Switzerland in order to update the current estimates in JRC
- ................
How to fulfill the objectives?

- Joint identification of soil monitoring and data interoperability issues of common interest, including both measurement systems and modeling approaches.
- Joint participation in the execution of on-going programmes, projects......
- Exchange scientific and technological information......
- Support the training of scientists and staff through visits, seminars, lectures as well as exchanges of staff and other personnel
- ........................................................................................................

- Soil Erosion in the Alps may be the first step:
  - JRC may host a PostDoc
  - Soil erosion experts in JRC can collaborate with the hosted PostDoc
  - JRC will provide necessary material(H/W, S/W) and Data
JRC implements a new Soil Erosion map for Europe

- RUSLE is used as a model
- Data Requirements
  - Corine Land Cover 2006
  - Rainfall: Request for detailed data (15 minutes interval for some stations)
  - DEM 90m if there is no better at national level
  - Soil Data: European Soil Database in case there are no local data. Interest in Soil Texture and Organic Carbon.

- Contact Point: Claudio Bosco
Subscribe to Eusoils E-mailing list: send me an E-mail (panos.panagos@jrc.ec.europa.eu) and receive our Monthly Newsletter

Reinforce collaboration with your contact points in
- European Soil Bureau Network (Reto Giulio Meuli)
- EIONET (Fabio Wegman)

Work together towards the objectives of the Collaboration Agreement

Soil Atlas of the Northern Circumpolar Region