The Institute for Environment and Sustainability

EUROPEAN SOIL DATA CENTER (ESDAC) AND THE EU THEMATIC STRATEGY FOR SOIL PROTECTION

Beata Houšková - Luca Montanarella – Marc Van Liedekerke

Land Management and Natural Hazards Unit
Institute for Environment & Sustainability
JRC TP 280 Ispra (VA), 21020 Italy

1st Conference of the CS Soil Science Societies-Roznov 07
What is ESDAC and why it was established

- ESDAC – European Soil Data Centre; part of environmental centers
- Established (end of 2005) according to decision between: EC-DG ENV, DG JRC, EUROSTAT and EEA – Go4
- Environmental centers – primary data contact point for DG ENV as scientific and technical support
Requirements on data collection and quality

- The collected data fit DG ENV's requirements;
- Data collection is organized in an efficient way;
- The necessary quality assurance is performed;
- All relevant existing data are accessible to other Go4 parties;
- The metadata are part of database created according to given rules.
Metadata standards for ESDAC

Spatial data
- INSPIRE principles
- ISO 19 115

Non-spatial data (raster, point)
- Dublin core
INSPIRE: **IN**frastructure for **SPatial** **Info**rmation in **Europe**

**Principles**

- Data should be collected once and maintained at the level where this can be done most effectively;
- It should be possible to combine seamlessly spatial data from different sources and share it between many users and applications;
- Spatial data should be collected at one level of government and shared between all levels;
- Spatial data needed for good governance should be available on conditions that are not restricting its extensive use;
- It should be easy to discover which spatial data is available, to evaluate its fitness for purpose and to know which conditions apply for its use.
ISO 19115:2003

Definition

• mandatory and conditional metadata sections, metadata entities, and metadata elements;
• the minimum set of metadata required to serve the full range of metadata applications (data discovery, determining data fitness for use, data access, data transfer, and use of digital data);
• optional metadata elements - to allow for a more extensive standard description of geographic data, if required;
• a method for extending metadata to fit specialized needs.
Dublin core - interoperable online metadata standards

- **Simple Dublin core**
  1. Title
  2. Creator
  3. Subject
  4. Description
  5. Publisher
  6. Contributor
  7. Date
  8. Type
  9. Format
  10. Identifier
  11. Source
  12. Language
  13. Relation
  14. Coverage
  15. Rights

- **Qualified Dublin core**
  Subsequent to the specification of the original 15 elements. Uses controlled and general vocabulary.
  1. Collection
  2. Dataset
  3. Event
  4. Image
  5. InteractiveResource
  6. MovingImage
  7. PhysicalObject
  8. Service
  9. Software
  10. Sound
  11. StillImage
  12. Text
Possible sources for soil and soil related information in ESDAC

• JRC in-house and commissioned soil research activities;
• results from activities within the European Soil Bureau Network (ESBN);
• results from EU funded soil related projects;
• results from collaborations with other organizations (e.g. EuroGeoSurveys, ISRIC, FAO);
• data on contaminated sites through EIONET;
• data from Member States (e.g. reporting data in the context of the future Soil Framework Directive)
Preliminary outline of potential soil data providers to the European Soil Data Centre (ESDAC)

“A Single Focal Point for Policy Relevant Soil Information”
Data in ESDAC

In total – 49 datasets:

- Spatial
- Raster
- Point
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<tr>
<th>Project</th>
<th>Description</th>
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<td>OCTOP soil organic carbon</td>
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<td>PESERA: Pan-European Soil</td>
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Examples of spatial data in ESDAC

Euroasian soil database
WRB, 1998
Examples of spatial data in ESDAC

Circumpolar Soil database
Examples of Raster data in ESDAC

Eurasian soil database at 1 km x 1 km and 10 x 10 km resolution

SOIL GEOGRAPHICAL DATABASE OF EURASIA
Full soil code of the STU from the World Reference Base (WRB) for Soil Resources.
Examples of Raster data in ESDAC

PESERA: Pan-European Soil Erosion Estimation Risk Assessment

Soil erosion estimates (t/ha/yr) by applying the PESERA GRID model at 1km x 1km
Examples of Raster data in ESDAC

Organic Carbon Content on Topsoils 0-30cm

The data are in GRID format (1km x 1km)
Examples of point data in ESDAC

Soil profiles within the Basin: 7879 points, in total 9016.

**Purposes**
Data for Flood Risk Assessment Project.

**Soil properties**
On horizon and profile level: soil type, horizon type, texture, humus content, depth to obstacle for roots

**Projection used**
The ETRS89 Lambert Azimuthal Equal Area. GRS80 ellipsoid.
Soil Thematic Strategy

Article 1: Subject-matter and scope

Soil defined as the top layer of the earth’s crust situated between the bedrock and the surface, excluding groundwater.

Soil functions to be protected:
1. Biomass production, including in agriculture and forestry;
2. Storing, filtering and transforming nutrients, substances and water;
3. Biodiversity pool, such as habitats, species and genes;
4. Physical and cultural environment for humans and human activities;
5. Source of raw materials;
6. Acting as carbon pool;
7. Archive of geological and archeological heritage….
Why EU Level of intervention?

- Soil degradation affects other environmental areas
- Distortion of the functioning of the internal market
- Transboundary impact
- Food safety
- International dimension
Three necessary steps of Strategies


STS adopted by the European Commission on 22nd of September 2006
History of the Step 1- Communication: the Thematic Strategy for Soil Protection

- **December 1998**: the European Soil Forum of EU member and candidate countries as well as Norway and Switzerland – to investigate the status of European Soils and Soil Conservation


- **April and May 2004**: The Working group’s final reports have been published
History of the Step 1-Communication: the Thematic Strategy for Soil Protection

- Open stakeholder consultation was organized over the internet.
- The questionnaire consisted of general questions concerning soil information and second part of the questionnaire was focused on soil threats: http://ec.europa.eu/environment/soil/pdf/results_citizens.pdf.
- ESBN 2006: the report “Common Criteria for Risk Area Identification according to Soil Threats”.
The present of the Step 1-Communication: the Thematic Strategy for Soil Protection

The Communication tasks:

• Why further action is needed to ensure a high level of soil protection;
• Sets the overall objective of the Strategy;
• Explains what kind of measures must be taken;
• Establishes a ten-year work program for the European Commission.

• The common principles for protecting soils across the EU.

• It will be delegated to the EU Member States to set up soil protection in an effective way together with the decisions on its sustainable use.

• All these activities are considered to be country specific.
Step 3: The Impact Assessment

• Two sections:
  The economic, social and environmental impacts of the proposed measures.
Five major threats (risk area identification)

1. Erosion
2. Organic matter decline
3. Salinisation
4. Compaction
5. Landslides
Common criteria of risk identification for five major soil threats in Europe

- **Identification** of factors/hazards related to the threat ("external" factors);
- **Characterization** of the receptor relevant to the threat ("internal" soil factors);
- **Performance specification**, model selection (with data requirements).

*ESBN 2006: the report “Common Criteria for Risk Area Identification according to Soil Threats”.*
ACTIONS AND MEANS

Four main pillars of EU Soil Policy

1. **Framework legislation** with protection and sustainable use of soil as its principal aim;

2. **Integration** of soil protection in the formulation and implementation of national and Community policies;

3. **Research** supported by Community and national research programmes;

4. **Public awareness** of the need to protect soil.
Common approach Member States for addressing the 5 threats: Framework legislation (1)

- **COMMON CRITERIA** set in Directive
- **Model or empirical MONITORING**
- **RISK ACCEPTABILITY**
- **Risk Area IDENTIFICATION**
- Member States establish a **TARGET** for Risk Area
- Member States adopt **MEASURES** to achieve target
- **REPORT** to Commission
Framework legislation (2)

Contamination

Common DEFINITION in Directive

Common LIST OF POTENTIALLY POLLUTING ACTIVITIES in Directive

Member States establish an INVENTORY of contaminated sites

Soil Status Report

MECHANISM FOR « ORPHAN SITES »

Member States adopt a NATIONAL REMEDIATION STRATEGY

REPORT to Commission
# Good agricultural and environmental condition referred to in Article 5

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<th>Issue</th>
<th>Standards</th>
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<tr>
<td>Soil erosion:</td>
<td>- Minimum soil cover</td>
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<tr>
<td>Protect soil through appropriate measures</td>
<td>- Minimum land management reflecting site-specific conditions</td>
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<td></td>
<td>- Retain terraces</td>
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<td>Soil organic matter:</td>
<td>- Standards for crop rotations where applicable</td>
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<tr>
<td>Maintain soil organic matter levels through</td>
<td>- Arable stubble management</td>
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<td>appropriate practices</td>
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<td>Soil structure</td>
<td>- Appropriate machinery use</td>
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<tr>
<td>Maintain soil structure through appropriate</td>
<td></td>
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<tr>
<td>measures</td>
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<td>Minimum level of maintenance:</td>
<td>- Minimum livestock stocking rates or/and appropriate regimes</td>
</tr>
<tr>
<td>Ensure a minimum level of maintenance and</td>
<td>- Protection of permanent pasture</td>
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<tr>
<td>avoid the deterioration of habitats</td>
<td>- Retention of landscape features</td>
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<td></td>
<td>- Avoiding the encroachment of unwanted vegetation on agricultural land</td>
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3 - Research

• **Processes** underlying soil functions (e.g. soil’s role in global CO₂ accounting and in the protection of biodiversity),

• Spatial and temporal **changes** in soil processes,

• Ecological, economic and social **drivers** of soil threats,

• **Factors** influencing soil eco-services,

• Operational **procedures and technologies** for soil protection and restoration.

• **Soil biodiversity**
4 - Awareness raising

- Wide distribution of the Soil Atlas of Europe, and maintenance of the soil web site http://eusoils.jrc.it for open access to policy relevant soil information in Europe,
- Continuation of the European Summer School on Soil Survey to provide specific training to young researchers,
- Encouragement of initiatives such as the European Manifesto on Earth Heritage and Geodiversity,
- Integration of soil knowledge and protection aspects in Community-funded information and training events,
- Soil management awards, where appropriate,
- Initiatives within the UNCCD, particularly in 2006, International Year of Deserts and Desertification.
Overall objective

- **Preventing** further soil degradation and preserving its functions:
  - when soil is used and its functions are exploited, action has to be taken on soil use and management patterns, and
  - when soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source.

- **Restoring** degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.
Steps of STS

- **First step:** The Soil Thematic Strategy aims to the delineation of risk areas on the basis of existing monitoring schemes in member countries.

- **Later steps:** An harmonized monitoring approach.

- **A future task for the European Soil Bureau Network:**
  the creation of common guidelines. As a first contribution, the Revised Manual of procedures for creating the georeferenced soil database of Europe (Finke *et. al.*, 2003) will be published during 2007.
EU Policy Issues Addressed by IES ...

GMES
Kyoto Protocol
Emission Trading
EU Global Development Policies
Fuel Directives
Emissions from Road Transport
Clean Air for Europe (CAFE)

Water Framework Directive
Marine Thematic Strategy
Flood Risk Management

European Flood Alert System

Development Technical Body

Soil Thematic Strategy
Forest Focus

Scientific Coordination Body
Thematic Urban Strategy
INSPIRE

Technical Coordinator

Renewable Energies & Electricity Efficiency

ENERGY STAR Technical Coordinator
Management of Natural Resources

Environmental Technology Action Plan (ETAP)

Radiation Environmental Monitoring

European Information System Operator
Environment and Health
http://eusoils.jrc.it
Thank you for your interest!