WORKING GROUP

Italian Ministry of the Environment and Land Protection

Italian Agency for Environment Protection and Technical Services

Environmental Protection Agency of the Veneto Region

Study Centre Val d'Ossola

Catholic University of Milano

Joint Research Centre

European Soil Bureau Network

Partners for pilot areas:

Piemonte (I) Soil Bureau - Forestry and Environment Institute (IPLA)

Rhône-Alpes (F) SIRA (Soil Info Rhône-Alpes) - Chamber of Agriculture Rhône Alpes

Lombardia (I) Soil, planning and sustainable development Structure - Regional Agency for Agricultural and Forestry Development (ERSAF)

Switzerland (CH) Swiss Federal Research Station for Agroecology and Agriculture

Veneto (I) Soil Observatory - Regional Environmental Protection Agency (ARPAV)

Austria (A) Department of Terrestrial Ecology - Federal Environment Agency (UBA)

Friuli Venezia-Giulia (I) Soil Bureau - Regional Agency for Rural Development (ERSA)

Slovenia (SLO) Center for Soil and Environmental Science - University of Ljubljana

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The Soil in the Alpine Convention

Soil protection is one of the main issues that has been put forward by the Alpine Convention. A "Protocol on Soil Protection" has been approved by the member states (Bled, 16/10/98), where the need for preservation of soil functions like food production, storage and filter for groundwater, habitat and gene pool has been stressed and soil erosion and compaction have been identified as the most urgent degradation processes to be faced.

Furthermore, the recent European Commission Communication "Towards a thematic strategy for soil protection" (April 2002), that sets the ground for a proposal for soil monitoring legislation, outlines eight main threats that undermine soil long-term availability and viability. Some studies have been conducted in order to assess the intensity of these degradation processes, at small scale (1:1,000,000), based on the only harmonised database at present available at European level, but the lack of more detailed soil data and assessment at field scale has been stressed.

To set up effective land protection measures, to preserve the landscape and the soil functions, there is thus the need to improve knowledge and comparability of data and of the assessment tools. The Soil Protection Protocol of the Alpine Convention promotes cooperation among member states, particularly in setting up soil databases, soil monitoring networks through harmonisation of existing data (art. 5) and comparability of assessment criteria.

To develop an observation system for the alpine territory a working group SOIA (Observation and Information System of the Alps) has been set up within the Alpine Convention and several projects have been approved. In this framework Italy has been proposed as leader country to work out the "Ecopedological Map of the Alpine Territory" (Luzern 30/10/00).

A Soil Information System for the Alpine Territory

The identification of harmonised procedures for soil data collection, storage and evaluation for application purposes is a necessary step to improve exchange of knowledge and experience among different regions, different countries and among experts of different disciplines and end users. There is an urgent need for comparable information on soil and other environmental features (geology, geomorphology, vegetation, land use etc.), together with hazard assessment and quality indicators, in order to develop an effective tool for soil protection policies.

The only soil database covering the Alps was established in the framework of the multi-scale European Soil Information System (EUSIS) and is available at the European Soil Bureau (ESB - Joint Research Centre - Ispra (VA) Italy - www.jrc.it).

The Alpine Soil Information System will be organized with a participatory approach, according to the principles of the INSPIRE European initiative (INfrastructure for SPatial InfoRmation in Europe, http://inspire.jrc.it), which promotes the availability of harmonized geographic information. It will be implemented and updated through a network of regional and national institutions which own and manage soil data in the Alpine member states.
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A SOIL INFORMATION SYSTEM FOR THE ALPINE TERRITORY

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THE PROJECT

The project wants to establish a first step in designing an integrated Alpine Ecopedological Information System that can provide information to operational end users, land managers that operate at different levels and soil scientists together with experts of other disciplines (in particular those using soil information for environmental and agricultural applications).

Project activities are:
• choice of pilot areas (about 200 km²), one for each partner, within the territory of the Alpine Convention, according to their relevance with respect to soil related issues;
• definition of a common format for data exchange;
• testing of the exchange format in sample areas;
• filling in the exchange format and updating;
• working out a first draft of “Ecopedological Map of the Alps” by means of available harmonised data (European Soil Database at scale 1:1.000.000, Ecopedological Map of Italy 1:250.000 scale).

In the future the purpose is to involve all the countries of the Alpine Convention that in this first phase could not be contacted due to limited budget. The tested procedures can be used to build up, with a participatory approach, a harmonised information system, as a tool to answer soil related issues (sustainable soil management, soil quality, degradation and consumption) at different levels, regional, national and European.

State of the art of the project and related documents are available at the net (http://eusoils.jrc.it/projects/alpis/mainAlpine.html).

GOALS

The main purpose of the project is to create a useful network among regional and national institutions which own and manage soil data, in order to achieve the setting up and updating of a shared soil database for the Alps, according to SOIA’s tasks and INSPIRE principles. Briefly the project aims are:
• enhance exchange of harmonised soil information;
• develop common procedures to allow data exchange, updating and evaluation for some application purposes;
• give an overview of available information on alpine soils.

SPATIAL DATA FORMAT

To harmonise data in a common spatial infrastructure a pixel format is very useful. By means of a reference grid, a set of regular cells is defined. These pixels are to be interpreted as elementary mapping units with associated attributes. This kind of format allows an easy flow of data on soil, which can be easily integrated with other environmental and territorial information. The standard European reference grid is used, according to INSPIRE principles. The pixel size has been set to 1 km for pilot areas and 10 km for the entire alpine territory; these sizes seem to be the most suitable, considering the extent of the areas and the variability of the environmental features.

Pixels are:
• easy to be filled and updated;
• useful to support a multiscale approach (bottom-up);
• suitable to represent output data for environmental reporting (policy relevant information, indicators);
• easy to be integrated with other environmental indicators on different layers.
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1 km grid

10 km grid
DATA EXCHANGE FORMAT

Since the European Soil Database at scale 1:1,000,000 is the only available example of an harmonized database for the entire alpine territory its structure has been taken as a reference point in order to develop an exchange format which could be shared among all partners.

The format concerns main soil and environmental features such as physiography, land use, topsoil and subsoil texture, drainage, rootable depth, parent material and World Reference Base classification (WRB).

A section of the exchange format requires information about metadata, that is to say information about data sources, collection and evaluation procedures used by each partner.

The shared format can be thought as a tool for further application purposes, such as evaluation of erosion risk and carbon stock of alpine soils, meant to support planning decisions.

The partners are asked to suggest improvements and changes in the format structure basing proposals on their own knowledge and on the experience achieved testing the common format in their sample area.

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Example of metadata description table

<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
<th>SIZE</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PX-ID</td>
<td>Pixel identification number (INSPIRE)</td>
<td>9</td>
<td>4525_2618</td>
</tr>
<tr>
<td>AGLIM1</td>
<td>Code for dominant limitation to agricultural use of the STU</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IL</td>
<td>Depth class of a presence of an impermeable layer within the STU</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ROO</td>
<td>Depth class of an obstacle to roots within the STU</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TEXT-TOP-DOM</td>
<td>Dominant topsoil textural class of the STU</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>TEXT-SUB-DOM</td>
<td>Dominant subsoil textural class of the STU</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PAR-MAT-DOM-AR</td>
<td>Code for dominant parent material of the STU</td>
<td>4</td>
<td>6122</td>
</tr>
<tr>
<td>WR</td>
<td>Dominant annual average soil water regime class of the the STU</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>WRB-FULL</td>
<td>Full soil code of the STU from the World Reference Base (WRB) for Soil Resources</td>
<td>6</td>
<td>CMskdy</td>
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<tbody>
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<td>PX-ID</td>
<td>Pixel identification number (EXAMPLE)</td>
</tr>
<tr>
<td>PARENT MATERIAL</td>
<td>Geological Map (1:250 000, 1:100 000 scale) and soil survey</td>
</tr>
<tr>
<td>SOIL CLASSIFICATION</td>
<td>WRB, 1998</td>
</tr>
<tr>
<td>NO SOIL</td>
<td>Corine Land Cover, 1996</td>
</tr>
<tr>
<td>ORGANIC CARBON CONTENT</td>
<td>Soil Map (1:250 000 scale). Weighted average of all STUs in the pixel</td>
</tr>
<tr>
<td>BULK DENSITY</td>
<td>Soil survey</td>
</tr>
<tr>
<td>SOIL EROSION RISK ASSESSMENT</td>
<td>Soil Map (1:250 000 scale), DEM (30 m). Weighted average of all STUs in the pixel</td>
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