Harmonization of regional soil information: a tool for Sustainable Soil Management

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INTRODUCTION

Soil degradation processes, called threats, are identified in the Thematic Strategy for Soil Protection and Proposal for a Framework Directive (COM 2006, 231 and 232); at the same time the need for an harmonised approach and methodology for identifying risk areas is stressed.
Since comparability of information on soils is limited, the Italian Institute for Environmental Protection and Research financed and started the SIAS project (Sviluppo Indicatori Ambientali sul Suolo – Development of Environmental Indicators for Soil). The project involves Regional Soil Survey Services, some Research Institution (CRA-RPS, CRA-ABP) and the European Soil Data Center (ESDAC, at the EC DG JRC, Ispra).
The main goals of the project are:

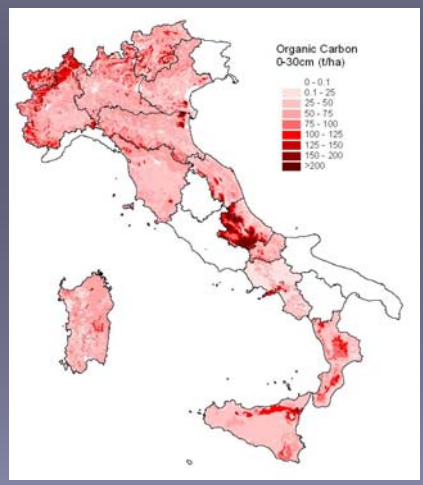
- to provide a national technical tool to support soil protection for two of the main threats for European soils (erosion and organic matter decline) according to the Soil Thematic Strategy and the proposal for a Soil Framework Directive.
- to provide consistent information about soil, together with harmonized assessment tools, by means of the exploitation of local expertise (the most suitable level dealing with soil knowledge management).
- to create a partner network that can be the ground for future cooperation.
- to assure a more homogeneous setup of national strategies for soil conservation in agreement with regional policies

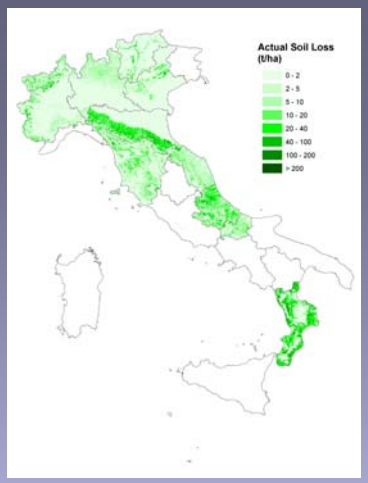
MATERIALS AND METHODS

SIAS Project has been developed using 1-Km reference grids (built following the recommendations of INSPIRE Directive) and a related database containing data and metadata. The grid was provided by ESDAC in ETRS89 Lambert Azimuthal Equal Area projection and it was divided into regional grid sections.
The database stores information for each pixel concerning the two indicators, pixel coverage and information quality.
Great effort has been set in the definition of shared data quality indicators, both as quantitative indexes of data availability in the pixel (number of available observations, number of analyzed observations, scale of available soil maps) and specific confidence levels for each indicator in each pixel.
Organic carbon stock, expressed in t/ha, has been calculated for three different layers, 0-30 cm, 0-100 cm and holorganic layer following the international recommendations (IPPC, 2003).
Concerning soil loss the exchange format asked to specify the method used to assess both potential and actual soil loss in each pixel. Most regions applied USLE/RUSLE model. Anyway all input variable layer (land cover, climate, morphology, soil characteristics, etc.) are described in the metadata section of the exchange format.

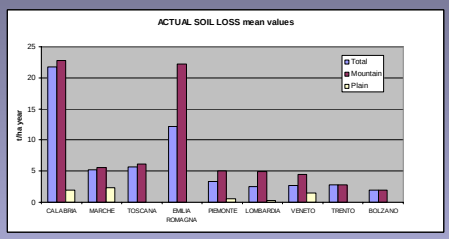
RESULTS

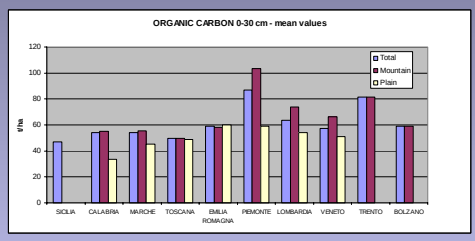
So far SIAS Project has collected indicator data of 14 out of 20 Italian regions, some regions have only recently joined the project. The approach to organic carbon stock has been different for each region or even for different areas of the same region, depending on data availability and observation density. Anyway, according to the first results, average organic carbon content of topsoil (0-30 cm section) in plain areas ranged from 34 to 60 t/ha, with the lowest values in southern Italy and the highest ones in the north (see figure and graph on the right).





Differences in soil erosion assessment among regions are mainly related to rainfall erosivity (R) and land cover (C).
The first results highlight that only mountain and hill areas are interested by actual soil loss (see figure on the left and the graph below). Alpine areas, mostly covered by forests and pastures, are characterized by the absence or by very low values of erosion rates. Instead, hilly cultivated landscapes show high values of soil loss (especially in central Italy). Average values ranged from 2 to 5 t/ha in the Alps, and from 6 to 23 t/ha in central Italy (Appennines).





CONCLUSIONS

The current stage of the project concerns harmonization among regions to gain a better comparability of results, smoothing out anomalies due to different assessment methodologies. The technical and scientific coordination group is dealing with collecting, merging and harmonizing first regional results obtaining a national pattern of the two indicators, in order to provide an effective and validated national tool.
Anyway, the project applies for the first time and for the whole country the bottom-up approach in the management of soil data, involving the local expertise which guarantees up to date information and reliable data assessment.
It could lead to the first harmonized set of soil indicators to support decisions of policy makers at national level. Moreover project results can be used at European scale, to be part of a European database, managed by the European Soil Data Center (ESDAC at the EC DG JRC, Ispra) through EIONET.
Finally, the partner cooperation net that has been created, can be the startup for other initiatives.

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