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our soils

Soil is a largely non-renewable natural resource which plays a vital role in the life of our planet and all living beings. It helps regulate the water, carbon, phosphor and nitrogen cycles. Because of its position as an "interface" with other environmental compartments and the functions it performs, the soil is an **ecosystem** that delivers numerous services: it sustains life, providing a habitat for plants, animals and human activity; it produces biomass and provides raw materials; it regulates the hydrological and biogeochemical cycles; it preserves cultural values, constituting an archaeological-historical archive and is a fundamental part of the landscape (Thematic Strategy for Soil Protection COM 231/2006).

Soil constitutes an undeniably precious resource, a **common asset** that cannot be reduced to a sole function, be it production or human settlement, therefore it is vital we "use it" in a way that is compatible with its conservation.

The fertile nature of the soils of the Emilia-Romagna plain is one of the environmental conditions that have favoured the growth and prosperity of local populations.

Specialised agriculture, industrialisation and urban expansion from the post Second World War period to the present day have increasingly intensified the anthropogenic pressure on regional soils, above all on the plain, making them susceptible to degradation. Today we are witnessing a progressive deterioration in soil quality caused by **a decline in organic matter** resulting from a significant reduction in cattle farming, formerly the principle source of soil enrichment. There is also a considerably high risk of widespread **contamination** by fertilizers and pesticides used in agriculture and atmospheric emissions from industrial and anthropogenic activities which are subsequently deposited on the soil. These phenomena are compounded by an increase in the loss of soil due to **sealing**, namely the covering of soil surface with concrete or asphalt as a result of urban development and infrastructure construction; this severely impairs soil's ecological function as a carbon sink and its capacity to regulate water runoff and the groundwater recharge. It is estimated that between 2003 and 2008, some 15,700 hectares of soil (the equivalent of the municipality of Bologna) has been sealed, nearly all of it on the plain. Lastly, **water erosion** affects over 2,000 square kilometres of regional land, to varying degrees, compounding the risk of landslides, a phenomenon favoured by the declining population and abandonment of agriculture in mountain regions.

The role of the **Geological, Seismic and Soil Survey** is to produce and update knowledge on regional soils, to improve understanding of soil behaviour and promote appreciation of its value. Sharing awareness of the role and function of soil is our way of protecting it.

soils on the internet

the soils of Emilia-Romagna
The website provides data and information on the soils of Emilia-Romagna, availing of Google Earth and the Google Earth plugin. Users can view a range of soil maps at various scales, derived thematic maps and maps of chemical and physical properties of soils.
The Regional Catalogue of Soils is also available.

soil maps of Emilia-Romagna region
This is an interactive website which allows integrated consultation of various information layers such as the soil map at 1:50,000 scale, derived thematic maps, land use maps, geological maps and point data (soil analyses, heavy metal point data, shallow water table measurement sites). Aerial photographs taken between 1944 and 2011 are also available as background, along with a selection of historical maps.

the soil on social media
The Facebook page "RER - Che terra pesti - The earth beneath your feet" and the related Twitter profile, provide information, videos, images and a whole range of fascinating facts designed to educate users about the soil and the environment.

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2015

the soil

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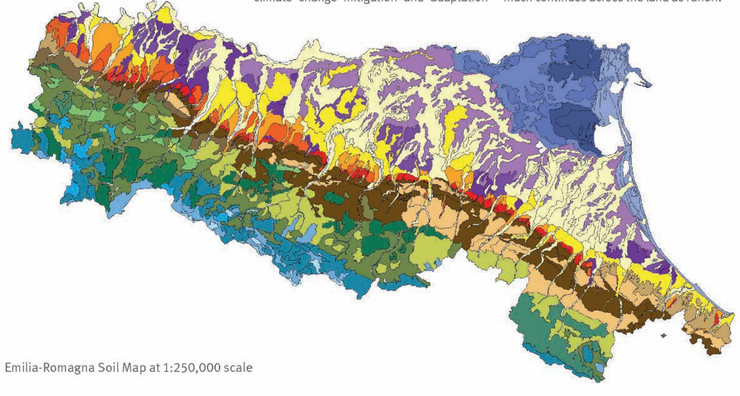
knowledge

studies and mapping

The main aim of activities centred around acquiring, processing and sharing data on regional soils is to develop an extensive shared knowledge system which highlights the value of this precious resource, identifies the threats to which it is exposed and promotes responsible use. All the data organized in the soil information system are processed and represented in a series of thematic maps and are available on the Survey website. The main field of application of this knowledge is agricultural planning, which ranges from farm management to regional planning. The **water and gravitational erosion risk map**, produced as supporting cartography for the implementation of the Regional Rural Development Programme (2007-2013), provides an important framework for evaluating the effectiveness of measures aimed at supporting sustainable agriculture in the region. **Maps of physical-chemical properties** of soil provide the basis for land suitability maps which identify the most suitable soil for different crops. The **map of organic matter content** is the reference document for regional policies for climate change mitigation and adaptation which take into account the soil in the overall balance of carbon emissions and monitoring soil changes over time.

Maps of pedogeochemical and background content of heavy metals provide a valuable tool, supporting the assessment of sustainable use of waste materials on agricultural soils and evaluation of contamination phenomena. The **Hydrologic Soil Groups map** of the Emilia-Romagna plain estimates the soil contribution in the water balance of a catchment basin, that is how much rainwater infiltrates the soil and how much continues across the land as runoff.



Emilia-Romagna Soil Map at 1:250,000 scale

data

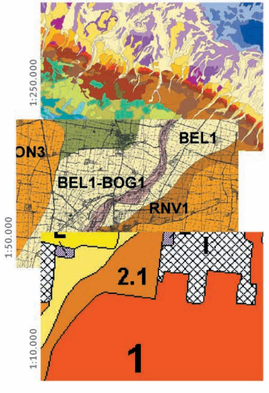
the soil information system

The soil information system, set up in the Eighties to support territorial planning activities, has produced information for the entire region which has enabled the Survey to draw up maps currently available in printed and digital formats at various scales. These include the soil map at **1:250,000** scale which gives a summary representation of the regional soils; the map at **1:50,000** scale illustrates the soils of the plain and hills, while the **1:10,000** map shows the distribution of soils present in some experimental farms. The soil maps continue to be updated today.

The information in the various detail levels is consistent and complementary, thus allowing shifts from one scale to another, e.g. from detailed to general, during processing of data. The soil and thematic maps can be consulted online on the Internet, where users will also find the Soils Catalogue, with descriptions of the main characteristics, soil agronomic behaviour and considerations on agricultural management.

These data are stored and elaborated in a **spatial information system** that links together numerous alphanumerical (databases) and geographical (GIS) archives. The database contains approximately **36,000 sample points**, complete with corresponding data from laboratory analyses (chemical, physical, mineralogical and micromorphological properties), the description of soils, of Soil Mapping Units at different scales and of individual polygons at scale 1:50,000, as well as environmental monitoring data (heavy metal content and other types of pollutants).

The database also contains data produced by other services and agencies in particular the Regional Council Agriculture Department, with which the Survey has been working closely for many years.



tools

monitoring the resource

The Emilia-Romagna plain is where soils most at risk of deterioration brought about by human activity are found. The **decline in organic matter content**, a trait common to the majority of Mediterranean countries with a high degree of specialised farming, is the focus of analyses and specific monitoring.

According to with the Thematic Strategy for Soil Protection (COM 231/2006) and the Millennium ecosystem assessment (MEA, 2005) we are studying **soil consumption**, focusing on the consequences of this phenomenon on the loss of ecosystem services performed by the soil: **1**) habitat services; **2**) storing services; **3**) regulation of hydrological and biogeochemical cycles; **4**) archaeological-historical heritage and fundamental part of the landscape.

partnerships

Soil is a **common asset** yet largely privately owned. Its management is split between various often competing domain experts, representing different viewpoints. Working closely with those who are responsible for soil planning, is essential if we wont to preserve soil quality in addition to quantity. In particular, the Survey **works with** the Regional Council Agriculture and Environment Department to promote guidelines for **sustainable soil management**. Furthermore it collaborates with the Regional Environmental Protection Agency to check on application forms of management of excavated soil and rocks and with the Regional Land Planning Department regarding soil consumption.