

Joint Research Centre

The European Commission's in-house science service

Facts & figures about the JRC

Established in 1957
Around 3 000 scientific and technical personnel
7 scientific institutes
1 370 publications in 2014

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JRC mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

Serving society
Stimulating innovation
Supporting legislation

Science for sustainable soil management

Soil is critical to life on Earth. It is the basis of agricultural development by providing the medium for food, feed and fibre production. It also delivers essential ecosystem functions such as nutrient cycling, purifying water and buffering the effects of pollutants while also preserving cultural heritage. Soil is a non-renewable resource. As it takes 100 years to form 1 to 2 cm of soil under permanent grasslands in temperate climates, soil should be carefully managed to sustainably meet the demands and pressures of a growing population. However, in many parts of Europe, competing pressures on land use are consuming and degrading the soil which leads to the loss of its life-critical functions.

European and global soil management

Given its multi-functionality, soil data and information play a crucial role in the development and implementation of EU and international policies related to a wide variety of issues, such as food security, agriculture, climate change, water, nature conservation, development policy, health and sustainability.

As the Commission's in-house science service, the Joint Research Centre (JRC) provides evidence-based scientific and technical support to policies, including those that deal with soil and land management. Through collaboration with the broader soil science community, the JRC collects, analyses and synthesises data and knowledge on the state of soils from across the EU and beyond to provide focused assessments of soil resources on a European and global scale, and the pressures that may cause their degradation.



The soil in profile: by digging down into the ground to a depth of 1 or 2 metres, soil layers, or 'horizons' can be seen that have different colours, physical structures and chemical characteristics, reflecting local soil farming processes.



The JRC has contributed to the development of policies ranging from the EU Thematic Strategy for Soil Protection, the Common Agricultural Policy to the EU Biodiversity Strategy, the Bioenergy Directive and the INSPIRE Directive. Soil data from the JRC have been used to support numerous EU and international initiatives. Through the development of new indicators, for example, susceptibility to wind erosion, and development of methods for the integrated assessment of land degradation, the JRC supports global multilateral agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD).

Soil and food security

The most generally recognised function of soil is to support food production. Arable farming (the cultivation of field crops) is primarily dependent on the condition and characteristics of soil. In many parts of the world, including the EU, inappropriate land management has led to land degradation through erosion, nutrient mining, compaction of the soil, soil sealing due to growing urbanisation, salinisation, landslides and the reduction of soil organic matter. These types of pressure threaten global food security.



In Africa, 500 million hectares of land have been affected by soil degradation since 1950, and 75% of all agricultural soil has been degraded. The collapse of soil functions is the primary cause of desertification and, eventually, famine. In this context, international efforts are urgently needed to ensure the availability of sufficient fertile and healthy soils for current and future generations. In 2013, the JRC published the first ever Soil Atlas of Africa to highlight these issues and raise awareness of the need for action with regard to the sustainable management and use of soil.



The JRC Soil Atlas series has been developed in collaboration with soil scientists and researchers from all over the world.

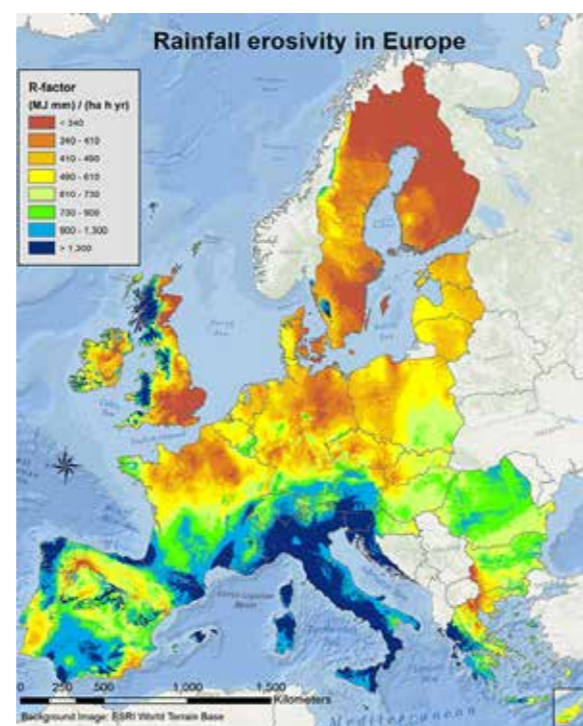
On 20 December 2013, the 68th session of the United Nations General Assembly adopted a resolution which declared 2015 the first ever International Year of Soils (IYS).

In parallel, the JRC supports the Food and Agriculture Organization of the United Nations (FAO) through the establishment and operation of the Global Soil Partnership for Food Security and Global Change (GSP), which aims to maximise economic and social welfare without compromising

the sustainability of vital environmental systems. The JRC chairs the GSP's Intergovernmental Technical Panel on Soils, and leads the global action plans on policy, education, awareness raising, outreach and investment.

Mapping soil vulnerability

The JRC uses advanced modelling techniques, indicators and scenario analyses to provide soil information to end users in relation to the major threats to soil, as identified in the EU's Thematic Strategy for Soil Protection. It provides estimates of the overall extent and economic impact of soil erosion by water and wind, develops European maps of soil salinisation and compaction, and forecasts crop yields and floods. The JRC also works on the harmonisation of methods to map areas prone to landslides in Europe. In addition, the JRC develops indicators and reference materials to assess soil contamination, for instance from domestic and industrial sewage sludge.



This map on the erosive force of rainfall across the EU shows that rainfall is more likely to cause soil erosion in the Mediterranean and Alpine regions than in Northern Europe.

<https://ec.europa.eu/jrc/en/news/rainfall-one-of-the-main-drivers-of-soil-erosion>

Soil biodiversity

Soil is a vibrant habitat in its own right: about 25% of all living creatures are believed to live underground. A teaspoon of soil can contain several billion bacteria from thousands of different species. Soil biota drives most ecosystem services. To raise awareness about the need to protect soil biodiversity, the JRC has set up an international group of experts to develop a global inventory that highlights the diversity of soil biology and the potential threats to biodiversity from factors such as land use change, habitat disruption, intensive use, invasive species, soil compaction, erosion and pollution. In 2010, the JRC published the first European Atlas of Soil Biodiversity to support the inclusion of soil as a specific habitat within the UN Convention on Biological Diversity. The JRC is currently working on the Global Soil Biodiversity Atlas.

Soil data management

JRC scientists gather information through various scientific networks and data collection activities. For example, in Europe, the JRC engages with Member States through dedicated networks of scientists (the European Soil Bureau Network) and policy makers (EIONET-Soil). Regular exchange is maintained with international organisations and countries in other parts of the world. In parallel, the JRC coordinates the collection of harmonised soil data from more than 22 000 sites from across the EU as part of Eurostat's Land Use/Land Cover Area Frame Survey (LUCAS) on land use and land use change.

Information provided by the European Soil Data Centre (ESDAC) is used by the JRC to carry out modelling and scenario analyses of the key ecosystem services delivered by soil. ESDAC, established in 2005 in collaboration with Eurostat, is the thematic portal for soil-related data, while additional material, including assessments, can be obtained from the JRC's EU Soils Portal.

<http://esdac.jrc.ec.europa.eu/>
<http://eussoils.jrc.ec.europa.eu>

Soil awareness raising

The EU Soil Thematic Strategy draws attention to the lack of public awareness about the importance of soil, and the need to improve the sharing of knowledge on best practices. The JRC seeks to address this issue through a multilingual resource base of educational material on the role of soils in society, which is available to policy makers, land managers, teachers and the general public.

With partners such as the European Land and Soil Alliance and the FAO, the JRC coordinates, promotes and undertakes awareness-raising activities on soil across Europe, and has established a working group on public awareness and educational initiatives for soil.

Beyond the European Soil Partnership, the JRC leads the development and implementation of education and awareness-raising activities on a global level, and was a key player in the establishment of the UN's International Year of Soils and annual World Soil Day, designated as December 5th.



Through colourful maps and illustrations, the atlases explain in a simple and clear manner the diversity of soils across different continents, and stress the need to manage them in a sustainable manner.



The JRC soil exhibit at the European Science Open Forum in Copenhagen in June 2014.

At the core of the JRC's awareness-raising efforts is its Soil Atlas series, developed in collaboration with soil scientists and researchers from all over the world. The series includes the Soil Atlases of Europe, the Northern Circumpolar Region, Africa and Latin America. The Global Soil Biodiversity Atlas is in preparation for end 2015.

<http://eussoils.jrc.ec.europa.eu/library/maps/maps.html>

What is soil?

Soil is a mixture of mineral particles, organic matter, water, air and living organisms that together is considered to be the "skin of the earth". A typical mineral soil will contain around 45% mineral matter, 20-30% water, 20-30% air and around 5% organic matter.

