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Supporting regions in the sustainable management of soil resources

Type of support / service available

JRC has developed a series of technical approaches to help regions assess the state of soil and key pressures acting on it. JRC can assist regions through technical assistance, training, analysis, modelling and study visits to support the development of competences.

Relevance for regional authorities

There is increasing recognition that soil condition underpins key societal challenges, such as food security, green growth and bioeconomy. Soil also regulates climate, hydrological and nutrient cycles while mitigating the effects of climate change through increased soil carbon sequestration. Furthermore, soils provide resilience against floods and droughts, buffer the effects of pollutants and preserve cultural heritage. Pressures on soil, due to competition for land or inappropriate land management choices, severely impact soil functions. Amplified by climate change, these pressures lead to degradation processes and, in extreme cases, the complete loss of the resource. Exacerbating factors include the poor awareness and undervaluing of the societal services and resilience provided by soil. It is therefore beneficial for a region to better understand the pressures on the land in order to limit a loss of critical soil-based functions and services.

Policy context

There is a new political momentum at both global and EU level for soil and land degradation related issues. The protection of soil functions are reflected in around 35 policy areas, most specifically through the EU's Soil Thematic Strategy ((COM(2006) 231, (COM(2012) 46)), the 7th Environment Action Programme and several Sustainable Development Goal (SDG) targets. Knowledge of the condition of, and changes to, soil functions and associated ecosystem services is also critical to EU policies on agriculture, climate, industrial emission and pollution control, sewage sludge and other waste disposal, plus biodiversity. Many regions are now considering soil functions within spatial planning with the goal to reduce land take and soil sealing (the concept of land degradation neutrality).

How to use

The **European Soil Data Centre**¹ provides access to several tools and procedures to assist EU regions assess the state of soil conditions and trends of pressures acting on them. In particular:

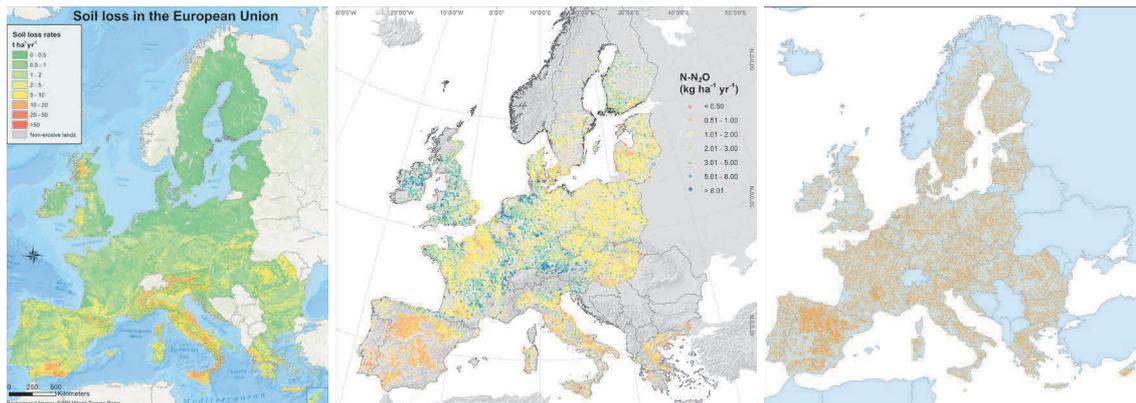
- **Monitoring of soil condition** and trends is lacking or outdated in many regions. The JRC has developed the soil component of the LUCAS Survey² that provides an insight in to how soil condition is affected by land use and land management policies. Regional authorities could either adopt the LUCAS methodology as a protocol for primary data collection, sampling and laboratory analysis or directly integrate the results of LUCAS data in to their policy making
- **To assess the scale and impact of soil erosion** at regional level the JRC has developed a high resolution soil erosion modelling platform to assess the vulnerability of loss of soil by water³ and wind⁴. Policy makers use the approach to set up regional scale assessments or utilise JRC data to assess the vulnerability to soil erosion in their regions

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

2. <http://ec.europa.eu/eurostat/web/lucas/overview>

3. <http://esdac.jrc.ec.europa.eu/themes/rusle2015>

4. <http://esdac.jrc.ec.europa.eu/themes/wind-erosion-susceptibility-soils>



From left-right: soil erosion by water, N₂O emissions from soils, LUCAS Soil sampling network.

- **To assess soil organic carbon fluxes in agricultural soils** the JRC has developed a detailed and high resolution modelling platform framework to assess soil carbon fluxes in relation to main management practices⁵. The tool can assess future soil carbon stocks with respect to a range of activities (critically, the approach also takes in to consideration, fertilizer regimes) and climate change scenarios. Support can be provided to develop regional applications.

Impact

Regional soils can be characterised with respect to their key functions and pressures acting on them. A significant output of this work is the ability to compare performance of specific regions to EU-wide norms or other regions which could be neighbours or in similar biogeoclimatic zones. The LUCAS Soil approach is being used as a formal EU SDG indicator, but it also assesses soil pollution, the impact of the CAP and soil carbon reporting in the context of Paris Climate Agreement. Soil erosion has high relevance to intervention measures established under the EU's Common Agricultural Policy (e.g. GAEC Measures). The JRC methodology has been selected to characterise soil erosion in the EU Sustainable Development Goals Indicator set.

5. <http://esdac.jrc.ec.europa.eu/themes/soil-organic-carbon-content>