



4 REASONS TO SAVE THE SOILS OF EUROPE

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#sustainability
 #commongood
 #ecosystemservices
 #ECI

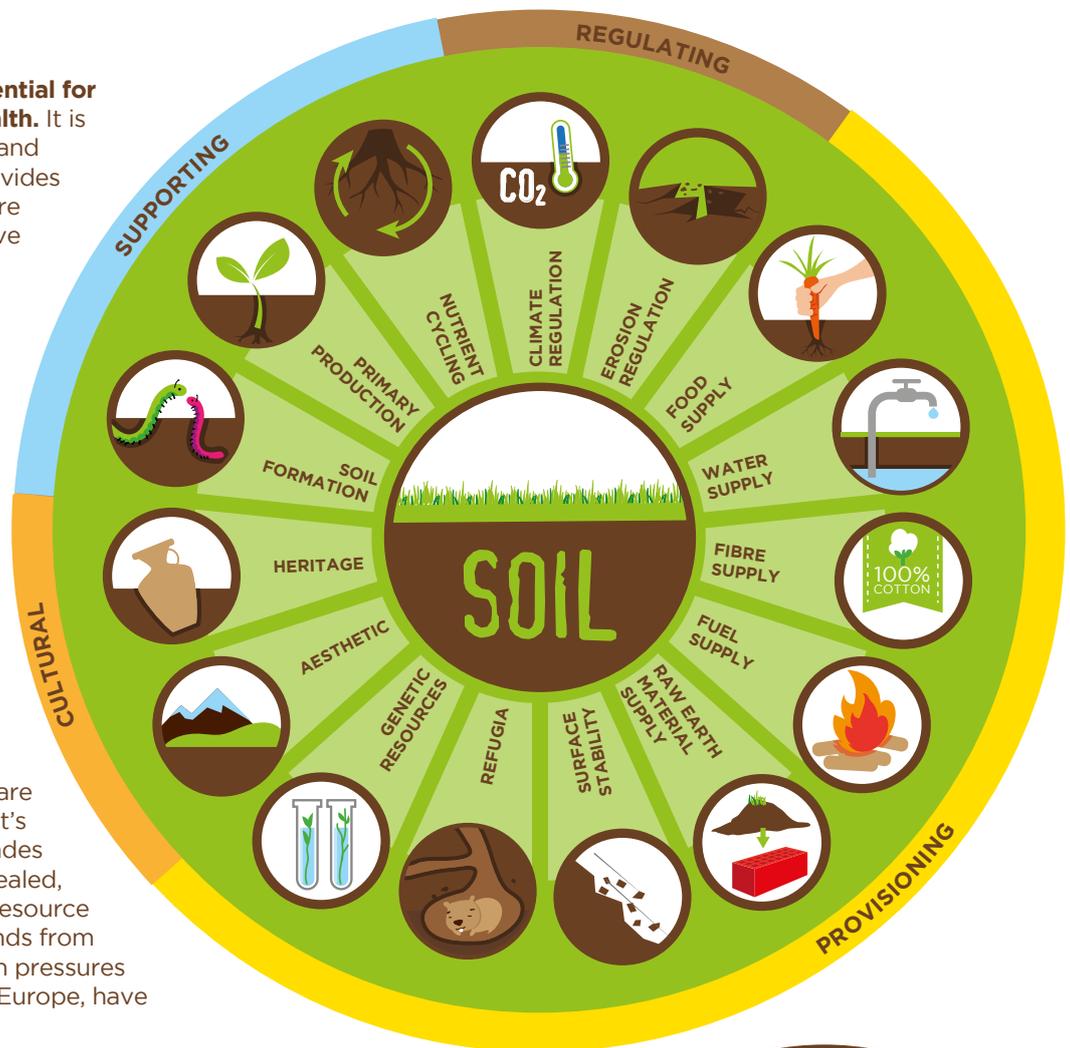
SOIL: A KEY RESOURCE FOR EUROPE

Soil is a living ecosystem, essential for human and environmental health. It is a vital, limited, non-renewable and irreplaceable resource that provides the welfare of current and future generations. Only recently we've been able to understand the connections between soil and broader sustainability concerns: without protecting the soil, it will be impossible to ensure food security, halt the loss of biodiversity, transition to a toxic-free agriculture, mitigate global warming and adapt to climate change.

When we discuss on global challenges, we fail to consider one of the most important resources of the Planet: soil. No wonder: it's a thin layer that lies below our feet, whose multiple functions are not obvious at first glance. That's the reason why in the last decades we have depleted, exploited, sealed, eroded and polluted this vital resource as a result of conflicting demands from most economic sectors. Human pressures on soil resources, especially in Europe, have reached a critical limit.

At present, no legislation at the European level focuses exclusively on soil conservation and protection. The efforts made to integrate soils into other policies and through national laws are still insufficient to reduce its degradation. There is the urgent need to adopt dedicated legally binding instruments covering the main soil threats which are present in the EU: erosion, sealing, organic matter decline, biodiversity loss and contamination. It's our duty to preserve the soil resource for the benefit of current as well as future generations.

"People 4 Soil" is a free and open network of European Civil Society Organisations, research institutes, farmers associations and environmental groups. **We are promoting a European Citizens' Initiative (ECI) targeted at introducing a specific legislation on soil protection and conservation.** This report provides a collection of issues and statistical data about the worrying state of soils in Europe, including four main reasons to protect it. Help us spread the message: let's give a right to soil!



Soil provides essential ecosystem services for human well-being

Ecosystem services are the benefits that people derive from ecosystems, manifest as supporting, provisioning (i.e. producing ecosystem goods), regulating, and cultural services; they are closely connected to human well-being and sustainability.



#landtake
#foodsecurity
#soildegredation
#agribusiness

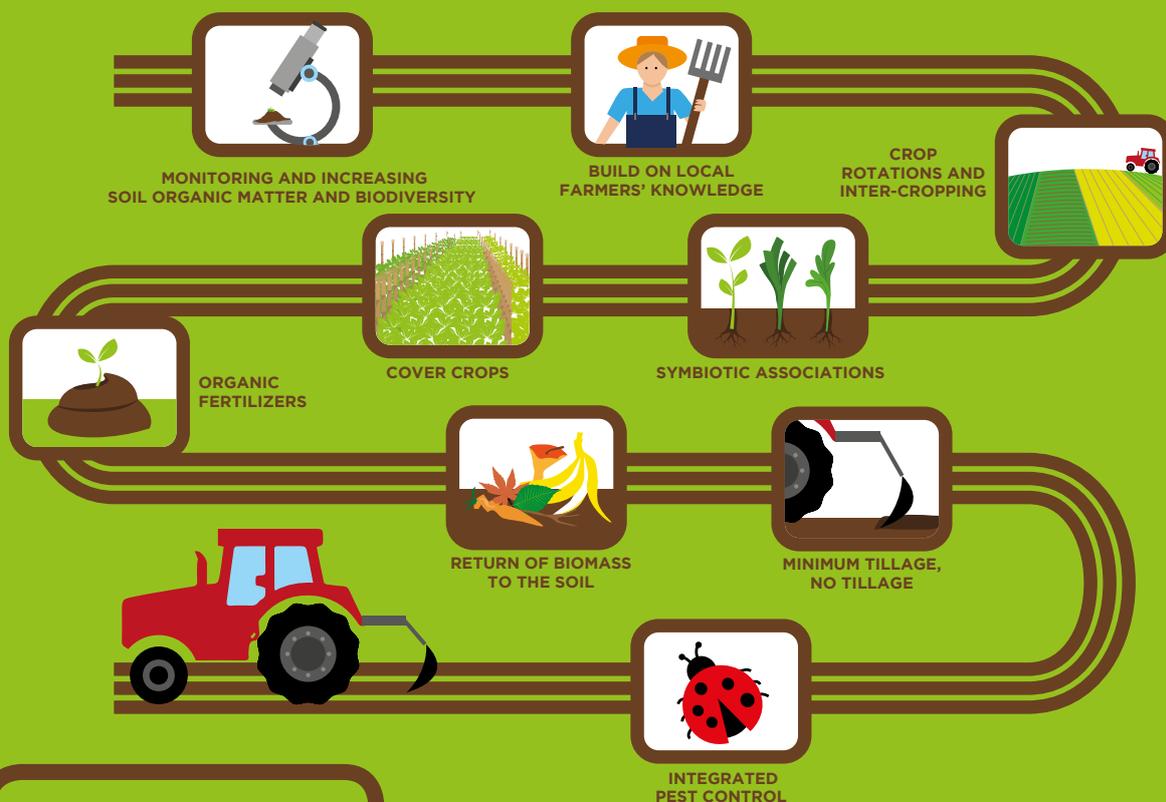
SOIL IS FOOD

The most acknowledged soil function is its support for food production. Healthy and fertile soils sustain the growth of food plants by providing nutrients, storing water and acting as the substrate in which plants anchor their roots. The current rate of soil degradation threatens the capacity of future generations to meet this basic need: without fertile soils, food security would be at risk.

Agricultural zones and, to a lesser extent, forests and semi-natural and natural areas, are disappearing in favour of the development of artificial surfaces. **Land take in Europe is the major threat to fertile soils:** since 1990 more than 1 million hectares has been permanently removed from agricultural production, the equivalent of approximately 500 football pitches every day!

In the last 50 years, improvements in farming technology have boosted food production. However, **the intensive agricultural systems** which rely on cultivation of large units using heavy machinery for all operations, wide use of chemicals and pesticides, crop monocultures **are antagonistic to the preservation of soil health** and have damaged soil structures and ecologies causing erosion, loss of organic matter and diffuse contamination.

By fostering the competitiveness of agribusiness and pushing non-food crops to meet the feed and fuel demand, **for many years EU policies have overlooked the main challenge for food security: the maintenance of soils' quality.** Many farmers have forgotten the importance of organic matter in our soils and started treating it like an infinite resource at our disposal. At the same time, most consumers have lost awareness that good quality food depends on fertile and healthy soils.



Diverse farming approaches promote sustainable soil management

Numerous and diverse farming approaches promote the sustainable management of soils with the goal of improving productivity, such as agroecology, organic farming and conservation agriculture. This systems are based on a wide variety of technologies, practices and innovations, including local and traditional knowledge as well as modern science.

KEY FACTS AND DATA

#landtake

 In Europe, settlement areas amount to nearly 200,000 km² – approximately the size of Great Britain (EC)

 Land take is around 1,000 km² per year in the EU – an area larger than the city of Berlin – or 275 hectares per day (EC)

 In the period 1990-2005 some 10,000 km of new motorways were built in the EU, while in the period 2007-2013 12,000 km were financed with 20 billion per year (EC)

 During 2000-2006, land uptake of arable and permanent crops increased to 53% compared to the previous decade (EEA)

 The total sealed soil surface area in 2006 was estimated to be around 100,000 km² or 2.3% of the EU's territory, with an average of 200 m² per citizen (EC)

 During the period 1990-2000, urbanisation of the coast grew approximately 30% faster than inland areas (EEA)

 Urban areas increase of almost 9% between 1990 and 2006. In the same period, the population increased by only 5% (EC)

 With the current trends of land take, within 100 years we would convert an amount of land comparable to the territory of Hungary (EC)

#foodsecurity

 It is estimated that 95% of our food is directly or indirectly produced on soils (FAO)

 By effect of demographic growth and changes in diets and incomes, demand for food is likely to grow by 70% until 2050 (FAO)

 Produced but uneaten food (food waste) uses up almost 1.4 billion hectares of land; this represents close to 30% of the world's agricultural land area (FAO)

 Sustainable soil management can lead to an average crop yield increase up to 58% (FAO)

 Since 1990 more than 1 million hectares has been permanently removed from agricultural production due to land take, the equivalent of approximately 500 football pitches every day (EC)

 The estimated loss of potential agriculture production resulting from land take is 400,000 tonnes of wheat per year, enough to provide 5 million people with bread (Gardi et al.)

 The loss of potential agricultural production due to land take in Europe for the whole period 1990-2006 was calculated at 6.1 M tonnes of wheat, a sixth of the annual harvest in France (Gardi et al.)

 More efficient use of water, reduced use of pesticides and improvements in soil health can lead to average crop yield increases of 79% (FAO)

#soildegradation

 Over 7% of cultivated land in Europe is estimated to suffer from moderate to severe erosion, approximately the entire surface area of Bulgaria (EC)

 45% of soils in Europe have a low or very low organic matter content (0-2%) (EC)

 Approximately 15% of the land surface in EU-25 experienced soil nitrogen surpluses from high fertilisers applications (EEA)

 It is estimated that 36% of European soils have a high or very high susceptibility to compaction resulting from the use of heavy machinery in agriculture (EC)

 In Southern, Central and Eastern Europe 8% of the territory currently shows very high or high sensitivity to desertification, corresponding to about 14 million ha (EC)

 The European Union is losing 970 million tonnes of soil per year due to water erosion, an amount equivalent to a one metre-depth loss of soil from an area the size of the city of Berlin (EC)

 1.15 million km², or 12% of Europe's total land area, are affected by water erosion. 420,000 km² are affected by wind erosion (EC)

 The current high erosion rates are of great concern because of the slow rate of topsoil renewal; it takes approximately 500 years for 2.5 cm layer of fertile topsoil to form under agricultural conditions (Pimentel et al.)

#agribusiness

 A significant factor in diffuse soil contamination is the over application of agrochemicals such as pesticides and mineral fertilisers (EEA)

 Total mineral fertiliser consumption in EU-27 mounted to 14 million tonnes in 2012 (EEA)

 Almost 99% of biofuels currently used in EU road transport come from food and feed crops (EP)

 GMOs are grown in 5 European member states (Spain, Portugal, Czech Republic, Slovakia and Romania) involving a total of 150,000 hectares of land (EC)

 To satisfy the high demand for meat, EU requires 36 million tonnes of soy a year to feed livestock, but only 4% is produced within EU. Soybean imports originate from third countries where the cultivation of GMOs is widespread (higher than 90%) (EC)



#biodiversity
#habitat
#greeninfrastructure
#Natura2000

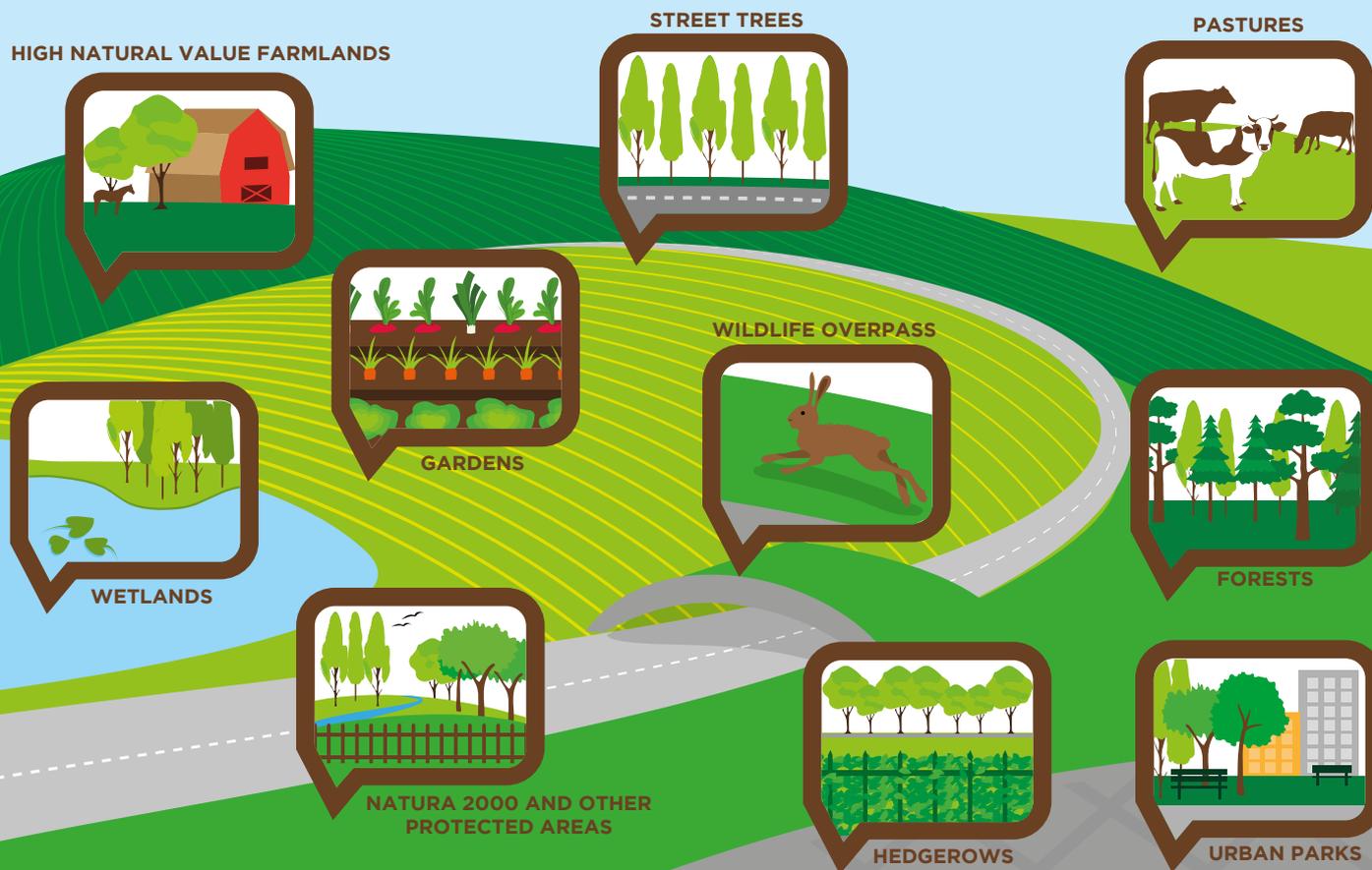
SOIL IS NATURE

Soil is one of the most diverse habitats on earth and one of nature's most complex ecosystems: it holds a myriad of different organisms, which interact and contribute to the global cycles that make life possible. In a handful of healthy soil, there is more biodiversity in just the bacterial community than you will find in all the animals of the Amazon basin! Scientists estimate that at least a quarter of species on the planet live within soil.

Soil is a biological engine where micro-organisms play a fundamental role in the decomposition of organic matter into nutrients available for plants, animals and humans. Together with larger organisms, such as earthworms, they contribute to the structure of the soil making it more permeable to water and gases: in other words, making it more healthy. In agriculture, chemical pollution by fertilizers and pesticides can destabilize the population dynamics of soil organisms, by affecting their reproduction, growth and survival.

Besides providing a habitat for the below-ground biodiversity, **soil is essential for the survival of most above-ground species.** Many animal species depend on soil for certain stages of their life, for example during their development (many insects), for breeding, nesting or as feeding habitat. Without healthy and vital soil, energy cannot flow from producers (plants) to primary consumers (herbivores) and then to secondary consumers (predators), irreparably altering the food chain.

Soil sealing leads to a slow death of soil communities, by cutting off all water and soil organic matter inputs to belowground organisms. The landscape fragmentation caused by infrastructures and urban sprawl can also result in reduction of size and persistence of wildlife populations: even if wide natural areas are protected under the Natura 2000 Network, most species still need to move between these areas in order to survive in the long term.



Soil is the physical base of the Green Infrastructure

Biodiversity generally increases according to the amount and diversity of vegetation, which in turns depends on the type and quality of the soil, the availability of green space and the connectivity between source areas. The aim of the GI is to promote ecosystem health and resilience, contribute to biodiversity conservation and enhance ecosystem services.

KEY FACTS AND DATA

#habitat #Natura2000



Around 27,000 sites have been included in the Natura 2000 network so far, covering around 18% of the total land area of the European Union (EC)



Agriculture (including intensification and abandonment) and modification of natural conditions (including land use changes) are the two most frequently reported pressures/threats to habitats and species, accounting for approximately 19% each (EEA)



Currently, only 21% of habitats and 28% of species protected under EU legislation are in a favourable state (EEA)



From 2007 to 2012, almost 40% of habitat assessments and 22% of species assessments have further deteriorated (EEA)



Since 1990, common farmland birds have declined by 30% in Europe. This has been linked to increased specialisation and intensification as well as habitat loss (EEA)



70% of animal species associated with cropland ecosystem are in bad, unfavourable or inadequate conservation status (EEA)



Land without vegetation can be eroded more than 100 times faster than land covered by vegetation (EC)

#greeninfrastructure



Natura 2000 lies at the very core of Europe's Green Infrastructure. It delivers many ecosystem services to society, the value of which has been estimated at €200-300 billion per year (EC)



56% of the European territory, due to natural factors and human pressures, did not qualify to form part of any Green Infrastructure network (EEA)



Over 1,000 "Natura 2000" sites in Europe are potentially threatened by the Trans European Network for Transport (BirdLife et al.)

#biodiversity



A typical, healthy soil might contain several species of vertebrate animals, several species of earthworms, 20-30 species of mites, 50-100 species of insects, tens of species of nematodes, hundreds of species of fungi and perhaps thousands of species of bacteria (FAO)



The total weight of microorganisms in the soil below a hectare of temperate grassland can be more than 5 tonnes, like a medium-sized elephant (EC)



A handful of soil may contain more than 10 billion microorganisms - comparable to the number of people on Earth! (EC)



Microorganisms are the main decomposers, responsible for over 90% of the mineralisation occurring in soils and able to decompose any kind of natural substrate (Lavelle & Spain)



Soils without earthworms can be 90% less effective at soaking up water (FAO)



#wellbeing
#landscape
#contamination
#hydrogeologicalrisk

SOIL IS HEALTH

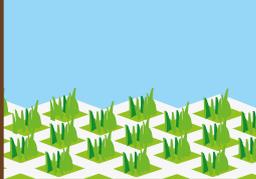
It is widely demonstrated that urban green areas contribute to the well-being and health of the population. Thus **an intensive degree of sealed areas, without green spaces of sufficient quality, can reduce the quality of living** and may also degrade the landscape. Renewal of abandoned and contaminated sites of urban areas (brownfields) can offer the double advantage of limiting soil sealing on green land while at the same time increasing park and garden areas within the urban boundaries.

Soil contamination can heavily affect human health. Local contamination occurs where intensive industrial activities, inadequate waste disposal, mining, military activities or accidents introduce excessive amounts of contaminants in the ground. In Europe, around 250,000 sites may need urgent remediation. Besides, diffuse soil contamination by nutrients, pesticides and heavy metals can be caused by agriculture, atmospheric particulate deposition and flooding events.

Soils act also as a major platform for water purification, which is necessary for drinking water supply. Moreover, soil is a critical component in regulating flooding through the storage of rainfall: sealing and compaction of permeable soils results in a more rapid delivery of rainfall to the stream network. In addition, also landslides are triggered by man-made activities on soil such as slope excavation and loading, road and buildings construction, open-pit mining and land use changes (e.g. deforestation).

The amazing diversity of soil organisms is an important source of chemical and genetic resources for the development of pharmaceuticals and antibiotics. On the other hand, disturbed soil ecosystems can release harmful pathogens and may lead to more polluted soils or less fertile crops, all of which can indirectly affect human health, for example through intoxication by contaminated food or massive migrations.

Daily choices for your (and soils') health

 <p>BUY FROM LOCAL FARMS OR FARMERS MARKETS WHENEVER POSSIBLE</p>	 <p>JOIN OR START A LOCAL FOOD BUYING GROUP</p>
<p>REDUCE MEAT AND DAIRY CONSUMPTION</p> 	<p>REDUCE, REUSE, RECYCLE</p> 
 <p>CHOOSE ORGANIC AND FRESH FOODS</p>	 <p>BE AN INFORMED CONSUMER</p>
 <p>AVOID THE USE OF CHEMICALS IN ORCHARD AND BACKYARD</p>	 <p>MAKE COMPOST AT HOME</p>
 <p>USE PERMEABLE PAVEMENTS FOR YOUR GARDEN</p>	 <p>PLANT NATIVE TREES</p>



What we decide to do – or not do – has direct consequences on the environment. Taking steps to preserve soil is an important part of following a healthy and environmentally responsible lifestyle. What is good for nature, is good for us!

KEY FACTS AND DATA

#wellbeing



Approximately 75% of the European population currently live in urban areas, and by 2020 it is estimated that this figure will increase to 80% (EEA)



The average population density of Europe is around 188 people per km², which is relatively high compared to other continents (Australia: 8,3, North and South America: 114, Africa 87) (UN)



Nearly a third of Europe's landscape is highly fragmented (EEA).



Over the past 20 years, the new cars have been fourfold compared to new babies (EC)



Suburban areas with mature trees are 2 to 3°C cooler than newly-built suburban areas without trees (EC)



A tree captures an estimated 100 grams net of fine dust per year on average (EC)

#contamination



Over 200 years of industrialisation have caused soil contamination to be a widespread problem in Europe (EC)



Throughout Europe soil contamination affects almost 250,000 sites, and is expected to continue growing (EEA)



Potentially polluting activities are estimated at nearly 3 million sites across the EU (EEA)



On average, 42% of the total expenditure on the management of contaminated sites comes from public budgets (EEA)

#hydrogeologicalrisk



Some particularly heavy storms can cause soil losses of 20 to 40 tonnes/ha, which is 20 to 40 times greater than natural soil renewal (EC)



A fully functioning soil can store as much as 3,750 tonnes of water per hectare or almost 400 mm of precipitation. In other words, one cubic metre of a porous soil can hold between 100 and 300 litres of water (EC)



With natural groundcover, 25% of rain infiltrates into the aquifer and only 10% ends up as runoff. In highly urbanized areas, deep infiltration is only 5% while over one-half of all rain becomes surface runoff, increasing the risk of flooding (EC)



Trees reduce runoff by 60% across the whole plot, grass reduce runoff by 98% (EEA)



Since 2000, floods in Europe have caused at least 700 deaths, the displacement of about half a million people and at least €25 billion in insured economic losses (EEA)



More than 630,000 landslides have been recorded in EU (EC)



Annual national expenditures for the management of contaminated sites are on average about €10.7 per capita (EEA)



Waste disposal and treatment is the main source of soil contamination (38%), followed by commercial and industrial activities (34%) (EEA)



Heavy metals and mineral oil accounts to around 60% of the contaminants affecting soil in Europe (EEA)



Costs for remediation projects usually fall in the range €50,000 to €500,000 (EEA)



#climatechange
#landfootprint
#accesstoland
#stewardship

SOIL IS FUTURE

Soil is a key element of the climate system. It is the second largest carbon store, or 'sink', after the oceans. Depending on the region, climate change might result in more carbon being stored in plants and soil due to vegetation growth, or more carbon being released from soil into the atmosphere. In both cases restoring key ecosystems on land, and a sustainable use of the soil, is crucial to mitigate and adapt to climate change.

Our demand for agricultural land outside Europe is growing, and not only to meet the demand of the growing population: loss of productive soils due to erosion, sealing or desertification needs to be compensated by the transfer of production abroad. But increasing dependency on agri-alimentary imports causes social and environmental implications due to increased land pressure abroad, and increase vulnerability of EU.

On farmland, ploughing the soil is known to accelerate decomposition of organic matter. In order to keep carbon and nutrients in the soil, researchers suggest reducing tillage, farming with complex crop rotations, using so-called 'cover crops' and leaving crop residues on the surface of the soil. Overall, **the adoption of appropriate farming and forestry practices offers enormous potential for restoring the soil and removing CO2 from the atmosphere.**

Despite national differences, some trends prevail throughout the EU countries: land concentration, decrease of the farming population, disconnection between agricultural land value and its market price, difficulty of young farmers to access land and competition between food, fibre and fuel. But at the same time, **a number of civic initiatives are promoting new ways of managing the land and protecting the soil.**



KEY FACTS AND DATA

#climatechange



TOP

At global level, soils contain more organic carbon than is held in the atmosphere (760 billion tonnes) and in vegetation (560 billion tonnes) together (EC)



Greenhouse gas emissions from agriculture, forestry and fisheries have nearly doubled over the past 50 years, and could increase an additional 30% by 2050 without greater efforts to reduce them (FAO)



There are about 70-75 billion tonnes of organic carbon in European soils, equivalent to 275 billion tonnes of CO₂ (EC)



A release of just 0.1% of the carbon now contained in European soils would be equal to the annual emissions of 100 million cars (EC)



The largest emissions of CO₂ from soils in EU are resulting from land use change and especially drainage of peatlands and amount to 20-40 tonnes of CO₂ per hectare per year (Schils et al.)



GHG emissions from agriculture in EU accounted for 10% of total GHG emissions (EEA)



The widespread adoption of sustainable soil management practices in agriculture would help sequester between 50 and 100 million tonnes of carbon per year (EC)



The conversion of natural to agricultural ecosystems usually causes depletion of 50 to 75% of the previous soil carbon pool (EC)

#landgrabbing #landconcentration



While in the EU there are some 12 million farms, the large farms (100 hectares and above) that only represent 3% of the total number of farms, control 50% of all farmed land (ECVC)



1% of agricultural businesses control 20% of agricultural land in the European Union and 3% control 50% (EESC)



In Romania up to 10% of agricultural land is now in the hands of investors from third countries and a further 20-30% is controlled by investors from the EU. In Hungary one million hectares of land was acquired in secret deals using capital primarily from EU. In Poland 200,000 hectares have already been acquired by foreign investors, mainly from EU countries (EESC)

#landfootprint



38% of the land (138 million ha) required to satisfy the demand for products in Europe is located in other regions of the world (SERI)



The EU-27 appropriates land from all over the world to meet their demand: 52 Mha from Asia, 31 Mha from Latin America, 25 Mha from Africa, 15 Mha from North America, 8 Mha from Oceania and 7 Mha from other Europe (SERI)



The majority share of land requirements is used for feed crop production (69.3 million hectares) (SERI)



The average European consumes three times the amount of land as the average Chinese person (0.6 ha and 0.2 ha respectively) (SERI)



10 Mha of Africa's total cropland is for consumption in EU countries. This quantity is potentially enough land to feed more than 65 million people suffering from food shortage (Yu et al.)



The consumption of one kilogram of beef requires up to 420m² of land per year. By contrast, the consumption of an equivalent amount of protein based on plants requires only between 2 and 3m² land use per year (SERI)



50% reduction across all types of meat and animal products would reduce Europe's arable land footprint for these products from currently around 70 million hectares to around 35 million hectares (FAO)



By 2020, an extra 4.7 to 7.9 million hectares of new land – an area up to the size of Ireland – is estimated to be converted to agricultural use globally in order to meet additional biofuels demand in the EU27 (IEEP)



The global land occupation footprint of food waste, which is the total hectares used to grow food ends up being wasted, was about 1.4 billion hectares in 2007, an area larger than the surface of Canada (FAO)



There are over 1.7 million hectares of uncultivated arable land available within the EU (EC)

ACRONYMS

EC European Commission
 ECI European Citizens' Initiative
 ECVC European Coordination Via Campesina
 EEA European Environment Agency
 EESC European Economic and Social Committee
 EP European Parliament
 EU European Union
 FAO Food and Agriculture Organization of the United Nations

GHG Greenhouse gases
 GI Green Infrastructure
 GMO Genetically Modified Organism
 IEEP Institute for European Environmental Policy
 SERI Sustainable Europe Research Institute
 UN United Nations

REFERENCES

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Let's give a right to soil!

**SIGN THE EUROPEAN
CITIZENS' INITIATIVE**

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