The factory of life
Why soil biodiversity is so important
Soil biodiversity

- Over **1000 species** of invertebrates may be found in a **single m²** of a European beech forest.
- Many of the world’s terrestrial insect species are soil dwellers for at least some stage of their life-cycle.
- A **single gram** of soil may contain **millions of individuals** and several **thousand species** of bacteria (Torsvik et al., 1994).
- 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 and actinomycetes.
- Soil contains the organism with the largest area. A single colony of the honey fungus Armillaria ostoyae covers **8.9 km²**
Soil biodiversity

3 Functional Groups

**Microbial decomposers** (transformers and decomposers): responsible for carbon transformation through the decomposition of plant residues and other organic matter, and for the transformation of nutrients (e.g. nitrogen, phosphorus, sulphur)

**Biological regulators**: responsible for the regulation of populations of other soil organisms, through grazing, predation or parasitism, including soil-borne pests and diseases.

**Ecosystem engineers**: responsible for maintaining the structure of soil by the formation of pore networks and bio-structures, and aggregation, or particle transport.
Changing the mindset for soil protection

We need the evidence to shift the political mind - from perceiving soil as static, inert, productive machine... 

...to a living complex ecosystem that delivers many functions
Soil protection and the SDGs (1)
Soil protection and the SDGs (2)

“Many land-related responses that contribute to climate change adaptation and mitigation can also combat desertification and land degradation and enhance food security. These options include sustainable food production, improved and sustainable forest management, soil organic carbon management, ecosystem conservation and land restoration, reduced deforestation and degradation, and reduced food loss and waste."

“Examples of response options with immediate impacts include the conservation of high-carbon ecosystems such as peatlands, wetlands, rangelands, mangroves and forests. Examples that provide multiple ecosystem services and functions, but take more time to deliver, include afforestation and reforestation as well as the restoration of high-carbon ecosystems, agroforestry, and the reclamation of degraded soils. Ecosystem-based adaptation can, in some contexts, promote nature conservation while alleviating poverty and even provide co-benefits by removing greenhouse gases and protecting livelihoods.”

“While land can make a valuable contribution to climate change mitigation, there are limits to the deployment of land-based mitigation measures such as bioenergy crops or afforestation. Widespread use at the scale of several millions of km2 globally could increase risks for desertification, land degradation, food security and sustainable development.”
Key messages:

- **Land take** and **soil sealing** continue, predominantly at the expense of agricultural land, reducing its production potential. While the annual rate of land take and consequent habitat loss has gradually slowed, ecosystems are under pressure from **fragmentation** of peri-urban and rural landscapes.

- The EU 2050 target of **no net land take** is unlikely to be met unless annual rates of land take are further reduced and/or land recycling is increased (**land recycling** accounts for only 13 % of urban developments in the EU).
Key messages:

• **Intensive land management** leads to negative impacts on **soil biodiversity**, which is the key driver of terrestrial ecosystems’ carbon and nutrient cycling. There is increasing evidence that **land and soil degradation have major economic consequences**, whereas the cost of preventing damage is significantly lower.

• European policy aims to develop the **bioeconomy** but while new uses for biomass and increasing food and fodder consumption require increasing agricultural output, land for agricultural use has decreased.

• This leads to **growing pressures on the available agricultural land and soil resources** which are exacerbated by the impacts of climate change.

• The **lack of a comprehensive and coherent policy framework for protecting Europe’s land and soil resources** is a key gap that reduces the effectiveness of the existing incentives and measures and may limit Europe’s ability to achieve future objectives related to development of green infrastructure and the bioeconomy.
EU Soil Thematic Strategy COM(2006)231


• Overall objective: protection of soil functions and sustainable use of soil, based on:
  • Prevention of soil degradation
  • Restoration of degraded soils

• Four pillars of which three non-binding

• 2012 Report from the Commission on the implementation of the Strategy COM(2012)46
The new European Commission

- “Europe must lead the transition to a **healthy planet** and a new digital world.”
- “Europe to strive for more by being the first **climate-neutral** continent.”
- “**Climate change**, **biodiversity**, **food security**, **deforestation** and **land degradation** go together.”
- “We need to **change the way we produce, consume and trade**. **Preserving and restoring our ecosystem** needs to guide all of our work. We must set **new standards for biodiversity** cutting across trade, industry, agriculture and economic policy.”
- “**Preserving and restoring our ecosystem needs to guide all of our work**. Our environment, our natural jewels, our seas and oceans, must be conserved and protected.”
The European Green Deal (11.12.25019)

- EU Climate Law
- 2030 Biodiversity Strategy
- Circular Economy Action Plan
- Farm to fork strategy
- Zero pollution strategy
- Just transition instrument
- Green financing strategy
- Sustainable Europe Investment Plan
- Digital agenda
- Sustainable Europe Investment Plan
- Green financing strategy

European Green Deal
Biodiversity loss and the degradation of ecosystem services continue in the EU and globally.
A Biodiversity Strategy for 2030

• Set the EU ambition for the global post-2020 biodiversity framework (CBD COP15 - 5-10 October 2020 in Kunming, China)

• Put forward EU own commitments to lead by example in the global negotiations

“Europe will work with its global partners to curtail biodiversity loss within the next five years. I want us to lead the world at the 2020 Conference of the Parties to the Convention on Biological Diversity, just as we did at the 2015 Paris Climate Conference.”

President von der Leyen
2030 Biodiversity Strategy

Key elements related to soil being considered in the Biodiversity Strategy:

- Protect the most fertile soils from sealing
- Increase the surface of agricultural land under sustainable soil management practices
- Increase erosion prevention measures
- Reduce the volume of pesticides that are residual in soil
- Reduce nutrients’ pollution in soil
- Reduce, prevent and remediate soil pollution
- Increase the protection of soil carbon stocks in grasslands, forests and wetlands
- Increase soil organic carbon (4pour1000 initiative)
- Contribute to ‘no net land take’ by 2050 (EU target) and ‘Land Degradation Neutrality’ by 2030 (SDG target)
- Reduce soil-based invasive alien species
- Reduce the presence of anti-microbial resistance in soil