

Soil-based Business models

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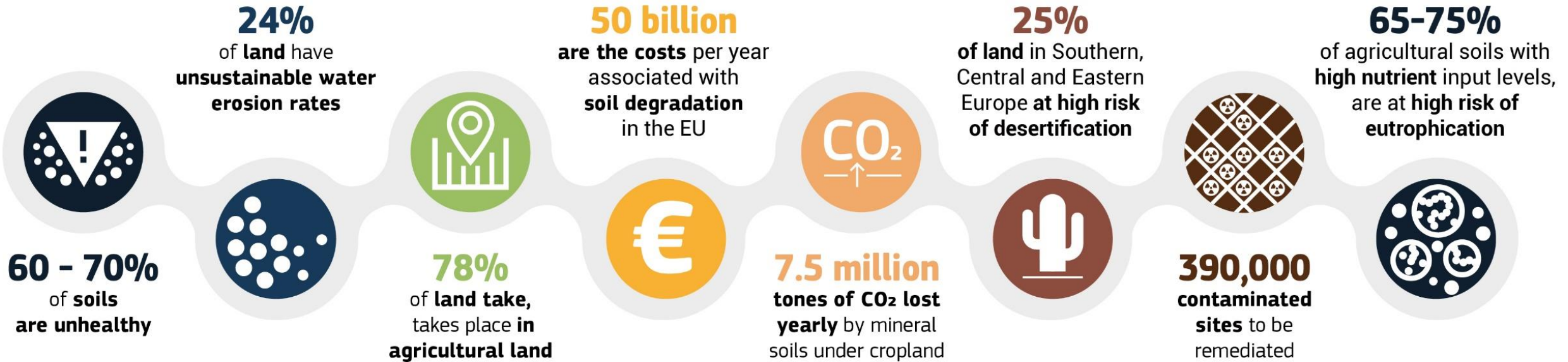
Increase EU Competitiveness: A new priority for the European Commission



*Ursula von der Leyen (Feb. 2025),
based on Draghi report (Sep, 2024)*

Soil Degradation in the EU

The time to act is now!



Source: Proposal for the Soil Monitoring Law (2023)

erosion } SOIL THREATS
desertification }
sealing land take compaction }
loss of biodiversity pollution }
organic matter decline salinisation }

According to latest estimates **known costs of soil degradation:**
41-73 Billion Euros (Panagos et al., 2025).

Soils and competitiveness

95% of the world's food is produced from soil

Healthy soils are critical for global food security and agri-business competitiveness

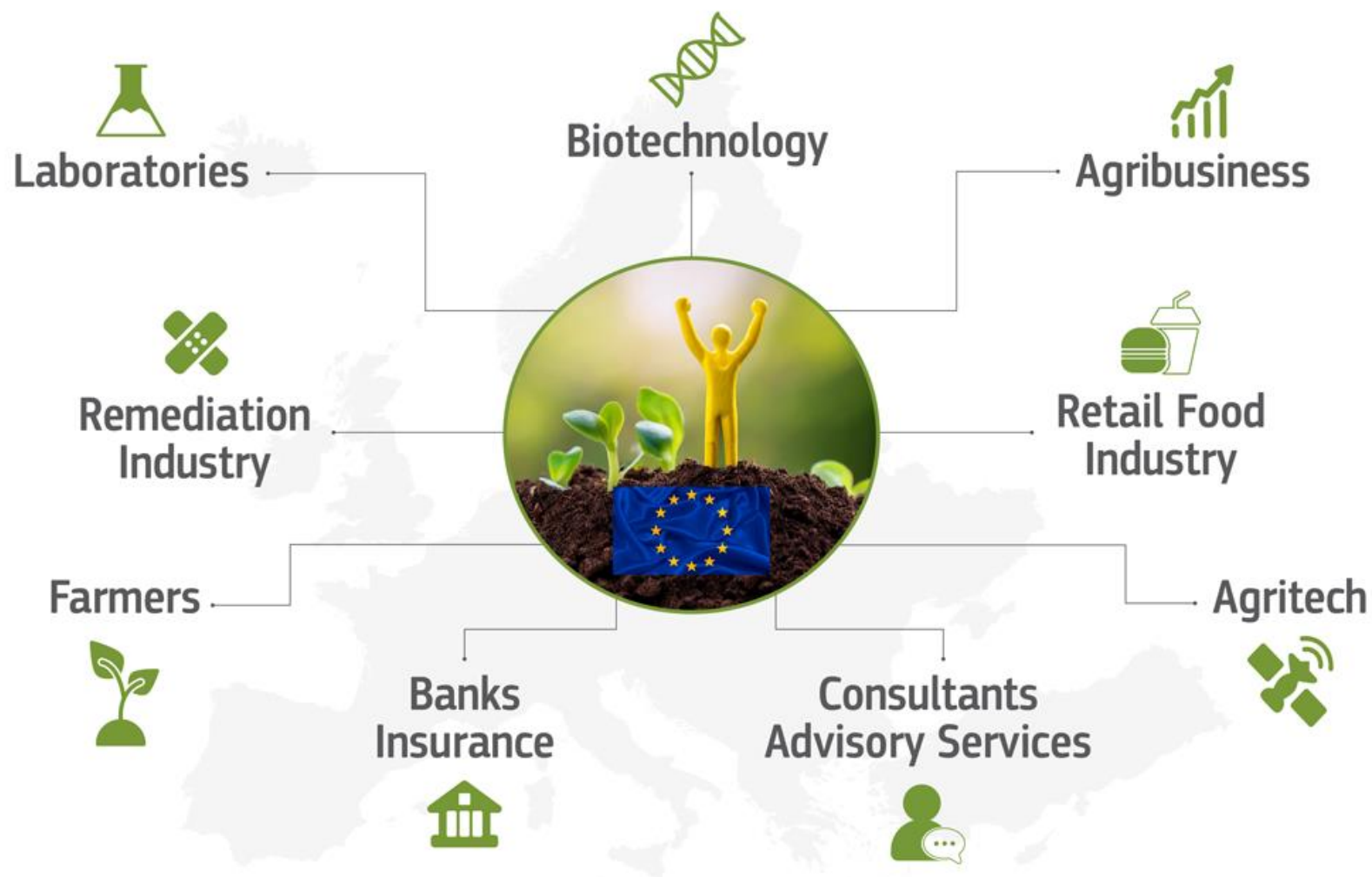
Healthy soils underpin farm productivity through improved nutrient cycling, enhanced water-holding capacity and resilience to climate stress

Global food industry and agricultural industry shows an increasing interest to support changing the farming practices. Why?

- **To ensure reliable supply (stability in market)**
- **New market demands**
- **Value chain products**

5th EUSO Stakeholder Forum

Healthy Soils for Competitiveness



12th June 2025

Online

400 participants

14 Speakers

Interaction with Industry & private sector

Nestle, Rabobank, Bayer, Syngenta, Valgo, Soil Carbon Industry Alliance, Generare, Novamont, Eurofins, SoilCapital, ImpactHub

How healthy soils may increase EU competitiveness?



9 business models in three areas of action

Decarbonization and Competitiveness	Closing Innovation Gap	Reducing Excessive Dependencies and Increasing Security
	Remediation	
Banking & Insurance	Banking & Insurance	
	Biotechnology and Biodiversity	Biotechnology and Biodiversity
	Agritech Solutions	Agritech Solutions
	Biofertilizers & Pesticides	Biofertilizers & Pesticides
Circular Economy	Circular Economy	Circular Economy
Carbon Farming	Carbon Farming	Carbon Farming
	Laboratories	
Regenerative Agriculture	Regenerative Agriculture	Regenerative Agriculture

Example 1: Remediation of contaminated sites



2.8 million contaminated sites, 340,000+ requiring remediation of pollutants (from DDT to PFAS)

Classical **methods** for removing the pollutants are based on **biodegradation** (e.g. hydrocarbons), **chemical reactions** (oxidation, reduction of heavy metals), **thermal desorption**, or other physical pathways **like venting and multiphase extraction** (solvents, gasoline)

In recent years, companies performing remediation have been **increasingly asked to create fertile soils by adding compost or natural organic matter** (e.g., algae, food waste)

When sites or polluted areas have been remediated, **the economic benefit may be, once again, exponential** as the value of regenerated land would increase

Soil Remediation market in the EU is valued around **€8.5 billion**, with an **annual growth rate of 5%**

Example 2: Biotechnology and Soil biodiversity

Soil microbes are remarkable producers of substances that may improve human health and well-being (*rapamycin, first isolated in 1972 in soil samples from Easter Island (Rapa Nui), is a powerful immunosuppressant, with anti-cancer and anti-aging potential, largely used in hospitals worldwide*)

The majority of naturally occurring antibiotics used in human and veterinary medicine have been derived from **microorganisms that live in soil, including fungi and bacteria**

Up until now, 500 approved drugs (e.g., anticancer, anti-infective, immunosuppressant) have been discovered by only scratching the surface **of 3% of microbial chemistry**

In the future, there is a need to scale up a **decentralized discovery engine that sources and investigates microbial diversity from diverse ecosystems across the continent**, enabling the commercialisation of existing technologies to close the innovation gap

Microorganisms can be precious ally for bioremediation of diffuse pollution because of their metabolic and enzymatic activities



Example 3: Carbon Farming



Use of conservation tillage, catch crops, cover crops and increasing landscape features



Restoration, rewetting and conservation of peatlands and wetlands



Forest Management and Reforestation according to ecological principles



Agroforestry and other forms of mixed farming



Precision farming and more efficient use of fertilizers



Blue carbon: coastal wetlands

7.5 million tons of CO₂eq /yr is lost from the soil

55 Mt CO₂eq /yr sequestered might generate **6 billion euro**, (expectedly 100 euro /tonCO₂eq)

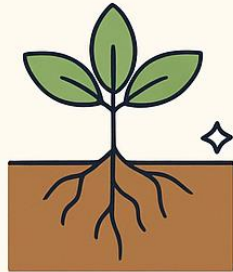
The **Carbon Removals and Carbon Farming (CRCF) regulation** is the first EU framework for certifying carbon removals in a voluntary market

CRCF is a business model with high economic potential (almost to 13 billion Euros opportunity) involving many actors and can be an attractive for farmers, certificating authorities, auditors, software/hardware development

Example 4: Regenerative Agriculture



SOIL COVERAGE



KEEP LIVING ROOTS

REGENERATIVE AGRICULTURE



MINIMAL SOIL
DISTURBANCE



CROP
DIVERSITY



INTEGRATED
LIVESTOCK

Regenerative agriculture that prioritizes soil health and ecosystem services, is considered to have the potential to **transform the agri-food sector and contribute to a more regenerative, climate-resilient food system**

Regenerative agriculture practices may **improve soil health and thereby enhance farmers' yield resilience against weather events, while lowering fertiliser and irrigation costs** and thereby reducing external dependencies

The change of farming to this new business model, requests that farmers invest upfront investment (2000 to 5000 euro ha⁻¹ - **9 years return period**)

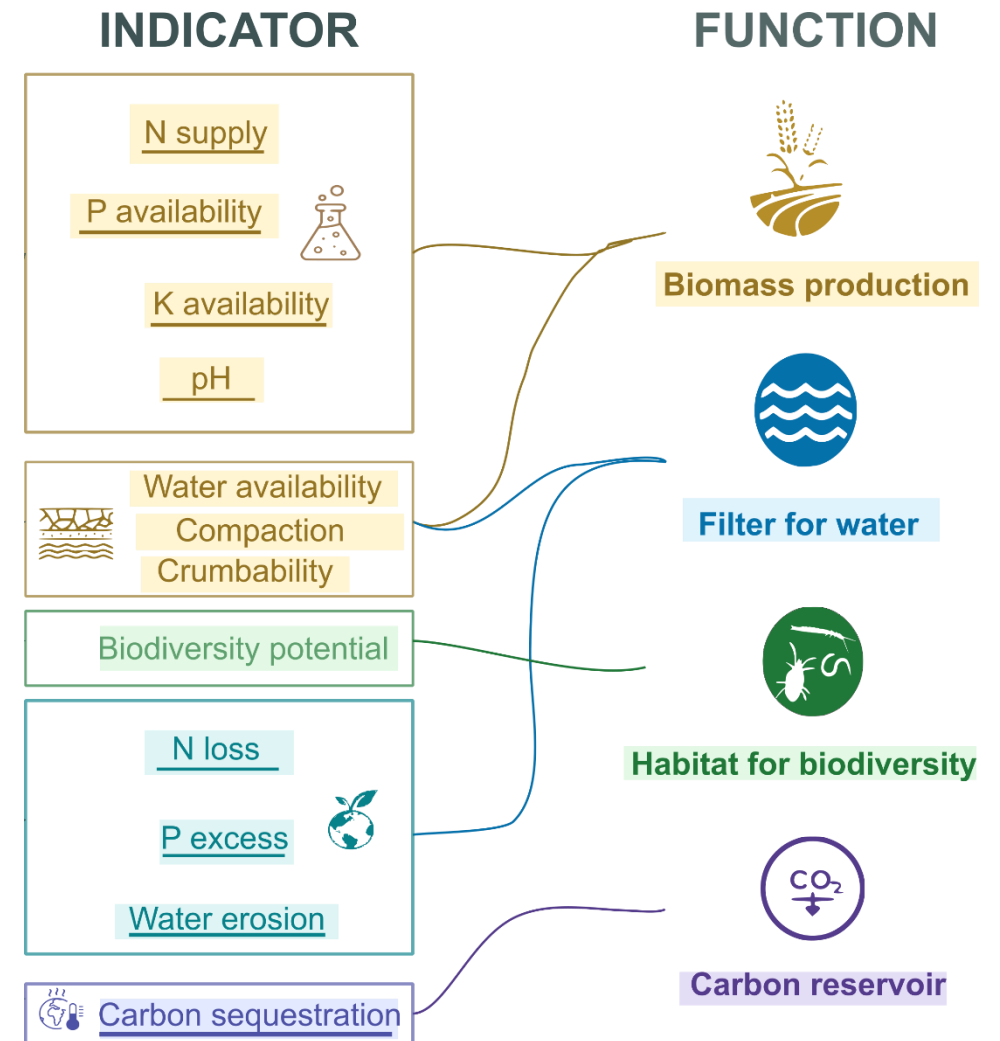
Regenerative agriculture is **in infancy in the EU** due to a combination of policy, economic, cultural, and structural barriers.

Example 5: Banking Sector

The financial sector (the example of Rabobank) offers **specialized loan or insurance programs** for farmers, which often take into account farming practices or even the quality and fertility of the soil

More favorable interest rates, discounts or repayment terms for farmers who use sustainable agricultural practices that promote soil health

The Open Soil Health Assessment Framework (Bodemindex) is an example to enable farmers, agricultural organizations, and other stakeholders to assess the sustainability of their soil management practices and make data-informed decisions to optimize soil health



Obstacles - Barriers

Regenerative agriculture is still in its infancy in the EU due to combination of policy, economic, cultural and structural barriers

Upfront investment from farmers in new machineries, seeding and other interventions

2,000-5,000 Euros per ha (payback period of 9 years)

Farmer's profit and need of financial support

Technical support and training for the transition to regenerative agriculture (depending on local conditions)

Open data and digital transformation

Market incentives

Better loans (lower interest rates, long term pay back period) for farmers adopting Regenerative agriculture

Carbon farming as a volunteer business model

Blended finance: incorporation of public and private funds

Policy incentives through the CAP Eco-schemes

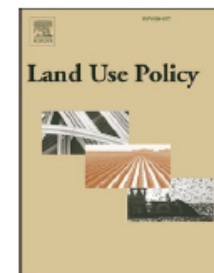
Added value sustainable products : Market to pay more for sustainable products



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol



Healthy soils as a booster to EU competitiveness

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Our role in enabling competitiveness

ROI = Return of Investment?

Return of investment

Sustainability indicators, ...



Digitalisation
Simplification
Interoperability

Region of Interest

global overview, ...



Geographical expansion
Regional diversity
Intercomparison

Risk of investor

Early warning system, ...

hybrid **MODEL**



Innovation
Data Science
Artificial Intelligence

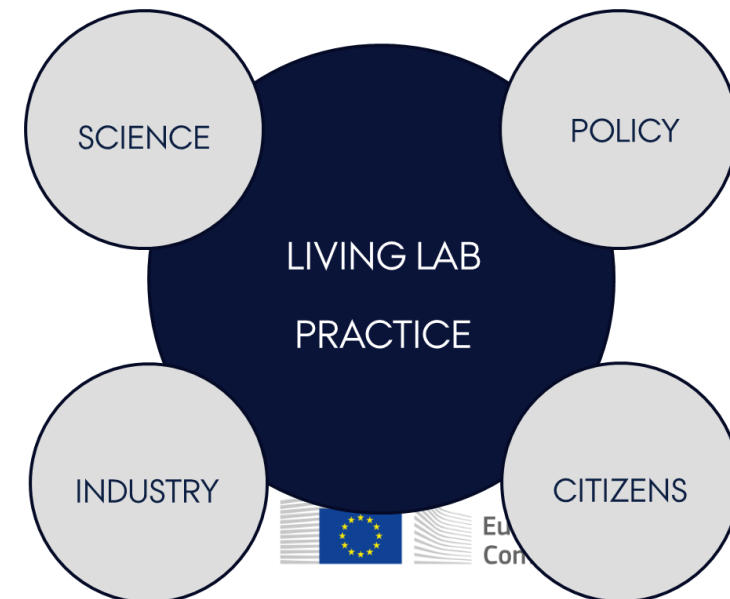
Living Labs for supporting Green transition

Collaborative environments for developing and testing innovations in real-life conditions through co-creation by diverse stakeholders (eg. farmers, researchers, municipalities, business, citizens, foresters, etc)

Focus on management practices to improve soil health

Adoption of sustainable management practices by inspiring land owners

Places for demonstration, training and communication



EU Soil Observatory helps



digging up soil facts

SOILS HOST LIFE: Soils host **59%** of life on earth and delivers up to **€11 trillion** in ecosystem value every year!

SOILS FEED: **95%** of the world's food is produced by soil and it supplies **98%** of EU daily calories.

DEGRADED SOILS: **62%** of EU soils show signs of degradation and the full extent may be even worse!

SOILS COST: The EU loses over **50 billion euros** annually due to degradation - but restoring it could yield **6x the return!**

800 km² SEALED SOILS: Europe paves over **800 km²** of soil every year - that's **6 San Siro stadiums** lost daily to urban expansion!

SOILS STORE CARBON: Globally soils store more carbon than all plants and the atmosphere - agricultural topsoils in the EU store **9.3 billion tonnes** of organic carbon but they have **lost almost 1% in the last decade!**

EU Soil Observatory (EUSO)
esdac.jrc.ec.europa.eu/euso



Thank you

Contacts



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