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Policy discussion note

Soil health and why it needs Europe-wide protection

Wageningen University & Research (WUR)
This note is based on an interactive workshop with input from 17 experts of all Science Groups of Wageningen University & Research.

The majority of soils across Europe are in poor condition as a result of unsustainable human activities. This has serious consequences for the health of people, the environment we live in and the ecosystems of our planet. The proposed EU Soil Health Law aims to protect soils to prevent further deterioration. Here, we explain 1) why soil health is vital for all life on earth, 2) how the European Soil Health law can help protect soil health, and 3) how WUR's scientific approaches to soil health can help to effectively implement soil health policy. This policy discussion note is intended for policy makers and professionals interested in protecting soil health and upcoming soil health policy in Europe. By describing how fundamental soil health is to human and planetary health, we also hope to inspire more people to support efforts aimed at protecting soil health.

Introduction

Some 60-70% of soils in the EU are not considered to be in good condition, due to issues like soil degradation, excess of nutrients and pollution. This poses threats to the healthy functioning of ecosystems. Healthy soils underpin many of the benefits that functioning ecosystems provide to humans, such as providing nutritious food, animal feed and timber; a healthy environment that supports healthy humans; and the regulation of climate. Apart from the uses that healthy soils provide us humans, soils have intrinsic and natural value on their own, like providing a habitat for the existence of all the living organisms it supports. Human activities that over-prioritise certain functional demands (e.g. food production) at the expense of others (e.g. water regulation or support of biodiversity) at the local field scale can lead to trade-offs at the landscape or regional level (e.g. through cumulative effects, and/or pollution transport), leading to reduced soil health and ecosystem functioning. Soils, therefore, need to be multifunctional to be healthy, providing a balance of ecosystem services at the landscape level for future generations.

To address the widespread and continued degradation of Europe's soils, the EU has developed plans for a 'Soil Health Law', which should bring soil on the same legal footing as air and water. In its recent 'Soil strategy', the EU has already set key objectives to restore the European soils, along with specific regulatory strategies to achieve these aims. The proposed EU Soil Health Law, due July 2023, is expected to, among others, set out definitions for healthy soils and establish monitoring requirements at the EU level and for Member States. The new law is about maintaining and improving ***soil health***, which means that they are in a ***good chemical, biological and physical condition and can deliver a range of ecosystem services***.

1) Why are healthy soils so important for all life on Earth?

Soils form the basis for ecosystem functioning. The living and non-living parts of the soil interact in a delicate balance. These interactions form the basis for healthy, functioning ecosystems that help safeguard the health of people, other organisms, and ecosystems on the planet. Some important benefits of healthy soils include:

- Maintaining plant health, leading to increased crop productivity and crop quality,
- Preventing that contaminants can affect food safety and human health,
- Sequestering carbon from the atmosphere to mitigate climate change,
- Regulating droughts, floods and other climate extremes that are occurring more frequently due to climate change,
- Preventing soil degradation, such as landslides, erosion and desertification,
- Supporting soil biodiversity and providing habitats for the existence of all the living organisms it supports,
- Bringing cultural values to societies.

2) Why is a European law to safeguard soil health needed?

Protecting soil health in Europe requires an ambitious, Europe-wide, and cohesive law.

- The law needs to be ***ambitious***, because the widespread and continued decline of soil health clearly suggests that the current voluntary efforts alone are insufficient – legally-binding safeguards are required.
- The law needs to be ***Europe-wide***, because soil degradation and contamination are cross-border issues – soil sediments and contaminants are often transported across large regions by wind and water.
- And finally, soils need their own ***cohesive*** law to ensure that all aspects of soil health – biological, physical and chemical – are managed in an integrated fashion.

While selected issues concerning soil health are already addressed by other EU laws (e.g. the Nitrates Directive and the Sewage Sludge Directive), these laws remain fragmented and are not focused on soil protection as such. Furthermore, key threats to soil health such as erosion, soil compaction and sealing are presently not addressed in the existing laws, signalling the need for more robust and comprehensive legal protection.

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While other proposed laws such as the Sustainable Use of Pesticides Regulation, the Sustainable Food Systems framework law and the Nature Restoration Law may all play an important role in promoting soil health, in light of soils' cross-cutting nature, a piecemeal approach lacks the potential to be effective at capturing the holistic approach needed to managing soil health. Instead, the Soil Health Law can provide strong roots for effective soil protection, working in harmony with other EU laws, as detailed further below.

What is needed to make this law successful for protecting soils?
The upcoming European Soil Health Law needs to balance sufficient levels of ambition with the necessary discretion to implement effective local solutions for soil health. This requires legally binding regulations at EU and Member State level. At the EU level, regulations should include the setting of explicit goals and targets with respect to (soil-based) biodiversity and ecosystem functioning, while allowing for local context-specificity. It should also align with other existing and proposed EU laws, including on the sustainable use of pesticides and the Common Agricultural Policy. For example, the Soil Health Law can support the amended proposal for sustainable use of pesticides, which would set legally binding targets at EU level to reduce the use and risks of pesticides by 50% by 2030 and, in the long run, a healthy environment in the EU. Then, the Soil Health Law can support joint action that builds critical momentum across siloes and triggers the transformations needed for more sustainable and healthy futures.

At the Member State level, the route towards healthy soils is likely to differ among countries. For this reason, the Directive should allow sufficient flexibility for regional and local actors to take on a bridging role in delivering contextualised and clear measures to manage transition risks, responsibility, monitoring, enforcement and reporting, and finding fair and equitable solutions for the transition towards sustainable soil health. Establishing science-based indicators for measuring and monitoring soil health is an ongoing challenge. At the same time, there is no time to lose for soils. Therefore, no further delay should be warranted at EU level, since the proposed law can be supported by scientific frameworks that ensure effective soil protection given local contexts.

3) How can WUR's scientific and locally-contextualised approach support effective implementation of the EU Soil Health Law?

Establishing appropriate indicators for assessing soil health at different scales and regions in Europe is a complex puzzle that needs collective input and collaborative support from scientists across Europe. It is essential to avoid a centrally determined general 'measurement directive' with long lists of soil health indicators that are prone to cherry-picking, long debates on validity, and are too laborious to apply at farm level. Appropriate measures are highly context specific and depend on a range of social-ecological characteristics, soil type, landscape and management practices differing across Member States.

Scientists of Wageningen University & Research have been working – together with stakeholders – on developing clear and flexible, science-based frameworks and societal engagement processes that allow local actors to develop strategies for managing and monitoring different ecosystem services on their land, leading to healthy soils. These frameworks (e.g. https://soilhealthbenchmarks.eu/) characterise measures at least according to both the biophysical characteristics of the landscape, and its social aspirations and constraints (e.g., desired soil functions, levels of farmer ambition, readiness). The frameworks aim to increase the amount of healthy and significantly improved soils by 75% by 2030. Such transdisciplinary frameworks, where knowledge for improving soil health is co-created with diverse stakeholders, are vital for the future of next generations.

The transdisciplinary approach of WUR to contribute to the transformative change that is needed to create sustainable and just societies for future generations includes the topic of soil health. WUR scientists across a range of science disciplines are working on:
- Developing context-specific indicators and targets to quantify soil health goals and to evaluate soil management practices in the context of soil health, soil contamination and ecosystem functioning.
- Providing state-of-art knowledge on how to develop strategies for measuring and monitoring soil health across various Member States' and regional contexts and evaluate the implications of these strategies in different landscape contexts, and how this translates to higher levels (e.g. national, regional, global).
- Conducting ex-ante and ex-post law and policy analyses to reveal levers and lock-ins for transformative change towards healthy soils.
- Informing the public about the critical importance of healthy soils for the functioning of the planet and its people, based on the latest scientific insights.
- Organising dialogues in society that explore what healthy soils need across spatial scales and context; and how multiple ecosystem services can be weighed at the landscape level.

This note is based on an interactive workshop with input from experts of all Science Groups of Wageningen University & Research: Agrotechnology & Food Sciences Group (AFSG; Nico van den Brink), Animal Sciences Group (ASG; Aart van der Linden, Jantine van Middelkoop), Environmental Sciences Group (ESG; Arjan Budding, Rachel Creamer, Pieter Jong, Jan Peter Lesschen, Dienke Stomph), Plant Sciences Group (PSG; Aska Goverse, Janjo de Haan, Tess van de Voorde), Social Sciences Group (SSG; Gonne Beekman), Wageningen Food Safety Research (WFSR; Esmer Jongedijk, Milou van de Schans), led by Liesje Mommer, Jeanne Nel (ESG & Wageningen Biodiversity Initiative) and Edwin Alblas (SSG).

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