

The Soil Monitoring and Resilience Directive:

Scientific Response Document

SUMMARY

On the 5th July 2023, the European Commission presented its proposal for a new **Directive for Soil Monitoring and Resilience** (COM(2023) 416). This letter provides a **shared scientific evaluation** of the proposal which has been co-signed by scientific organisations across the European Union. We support that the proposal focuses on three main pillars: 1) the monitoring of soil health, 2) promotion of sustainable soil management practices, and 3) reducing risks related to contaminated land.

We **welcome this proposal for a Directive** as crucial means to legally protect soils as an essential part of the ecosystem. Nevertheless, we have concerns regarding the level of ambition with respect to sustainable soil use and soil health indicators, and the level of protection of sites with soil contamination. We also note that there are no legal provisions for compensation measures are included in the draft of the soil monitoring law.

As **60-70%** of Europe's soils are presently considered **unhealthy**, and in light of their continued degradation, we hope this evaluation and our recommendations for improvement will support the further development and discussion of the proposed Directive to ensure that the Directive is underpinned by the most recent scientific evidence on soil health. Finally, we would like to emphasise the importance of the Soil Mission and associated Horizon Europe, EJP Soil as well as relevant national research projects in delivering the urgently needed scientific and societal underpinning for this proposed Directive.

RECOMMENDATIONS FOR STRENGTHENING THE PROPOSED SOIL MONITORING DIRECTIVE

1. Monitoring soil health

Observations:

The Soil Monitoring and Resilience Directive clearly defines soil health in terms of its capacity to deliver ecosystem services: *“soil health’ means the physical, chemical and biological condition of the soil determining its capacity to function as a vital living system and to provide ecosystem services (article 3(4))”*. In doing so, the proposed Directive puts forward a much needed structured and harmonized approach to the monitoring of soils, for soil health, across Europe. Thus, facilitating better cooperation between Member States and European monitoring to this purpose.

The proposed Directive states that all Member States are now required to monitor the indicators defined in Annex 1 (article 7(1)), where the approach has been to adopt *“a minimum indicator set based upon measurements that are already commonly measured in Member States and used in literature, to facilitate uptake and as a ‘best practice’ approach”*.

We understand that from a data perspective, the definition of a standardized minimum dataset for soil health will facilitate data sharing and learning across Member States. However, in addition, it is vital that indicators are also **fit-for-purpose** and therefore we strongly recommend the development of a wider **flexible indicator framework** which provides Member States with additional soil health indicators pertinent to their specific context. We propose the following improvements:

Recommendations:

A. Need for improvement of soil biodiversity indicator.

The indicator for assessing soil biodiversity proposed in Annex 1, is the basal respiration of microorganisms. This is a very basic soil biological measurement which is extremely sensitive to temporal, temperature and moisture variations and as such does not provide a good measure the soil biodiversity. Annex 1 also proposes that Member States are to choose further biological indicators. We propose that as this Directive will provide the opportunity for large scale data collection, and that the proposal requires Member States to include at least three more biological indicators by e.g.; 2025 (or 2 years after the law is in force). Otherwise, the description of the biological soil health is not possible.

B. Indicators should focus on ecosystem services and associated soil functions.

The present focus in Annex 1 on threat mitigation, instead of also including indicators that directly evaluate ecosystem service capacity, misses an important opportunity to explicitly measure and communicate the benefits of sustainable soil management practices for human and planetary health. The inclusion of indicators on ecosystem services would provide improved insight and relevance for multiple stakeholder groups, including consumers. By incorporating indicators which are focused on the provision of ecosystem services, the indicators will be better aligned with the regenerative aspirations of other EU Green Deal strategies and business initiatives. The Directive should then specify that an **obligatory reassessment** of indicators is required before the next iteration with the inclusion of **indicators that evaluate the capacity of a soil to support the delivery of ecosystem services and associated soil functions** (5 years following the ratification of the Directive).

C. The 'One out – all out' principle is too stringent.

The Directive employs the 'One out, all out' principle (art 9(2b)), which means that if a soil scores 'unhealthy' in one category, the soil is considered unhealthy. The use of a single indicator measurement (soil property) for a soil threat, with a single threshold value, can often provide a misleading result, when further contextual information is not collected. Furthermore, the one-out-all-out principle is focused only on soil threats and does not consider the capacity of soil to also support several ecosystem services. It is important to note that past and current contexts matter when measuring thresholds, this is acknowledged in the Directive by the definition of the Soil Health Districts guided by soil, land use and climate homogeneity. Any historical legacy takes a long time to work through the system in soil systems. It is critical to acknowledge relative improvements in trends, rather than fixed one-size-fits-all approach. Examples of two approaches which commonly exist for assessment of soil health are the: (i) traffic light system, or (ii) multi-indicator value scoring system.

2. Sustainable soil management principles

Observations:

The second pillar of the proposal concerns principles for sustainable soil management, stipulated in Annex III of the Directive. As laid down in article 10, it is up to the Member States to define specific soil management practices that adopt these principles. The principles are clear and, if indeed adopted, likely effective. Important notions are that 1) soil management practices are context specific (e.g., depending on land use, climate, soil types) and 2) it is just as important that when the right practices are chosen they are also properly implemented.

A mix of actions are needed to ensure that the right practices are applied correctly, including awareness raising, knowledge and competences, (financial) incentives and obligations. This is the basis of the Living Lab approach proposed by the Soil Mission Board and should be used to provide context specific examples of management practices for this second pillar.

Recommendations for improvement:

A. Need for further direction on sustainable soil management.

Presently, it is not clear how these sustainable soil management practices should be developed by Member States. We propose further elaboration on the development of the framework to link practices to the principles outlined in the proposed Directive.

B. Management practices should be context-specific.

Member States need to consider the applicability of practices for different environmental (climatic) and soil conditions. We propose a living database of practices should be made with information about the effects of the practices on various ecosystem services and soil threats but also with information on the applicability of practices in costs/benefits, knowledge and competences. The database should be context specific for combinations of soil type, land use and climatic conditions and can be supplemented with new information from research as available. Member States can have the flexibility to select appropriate practices from the database implementation.

C. Obligations need to be clear and binding for successful take-up.

The proposed Directive is weak on its obligations to implement improvements in the defined management practices. It does not specify whether or how a landowner is obliged to use these practices. If targets are not met in the soil health assessment a clear action plan is needed to work on the shortcomings and will this require a specific set of practices over and above general soil management for soil health. Clear and binding obligations are needed to promote successful take-up.

D. Need for intermediate steps and realistic objectives.

The present proposal focuses on the target of 100% healthy soils across Europe by 2050. However, it is important to define intermediary objectives that should be reached by a set point on the horizon. Earlier experiences with for instance the Water Framework Directive show the importance of setting clear intermediate targets to ensure effective implementation.

3. Contaminated Sites

Observations:

We welcome the clear definition of ‘contamination’ and ‘risk’ and the stronger obligation for Member States to identify and deal with contaminated sites. Yet, to protect human and environmental health, we need stronger insurances that past contamination is adequately dealt with, and that present and future contamination is prevented.

Suggestions for improvement:

A. Need for monitoring beyond heavy metals to manage historic, present and future risks.

The proposed obligatory monitoring for contamination is limited to heavy metals. This is a missed opportunity regarding citizen concerns and health and environmental concerns from other soil contaminants. Therefore, we recommend that contaminated soil site investigations should also include: chemical hazards like organic pollutants such as polycyclic aromatic hydrocarbons, volatile organic pollutants, pesticides, pharmaceutical residues and persistent organic pollutants like the highly toxic fluorinated chemicals called ‘PFAS’ or ‘Forever Chemicals’, and physical hazards like plastics (nano, micro to macro), and biological hazards like pathogens.

B. Defining ‘acceptable levels’: risk assessment approach harmonization across EU.

The proposal states that the risks of contamination should be kept to “acceptable levels, taking account of the environmental, social and economic impacts” (article 12(1)). Due to a wide range of risk assessment tools in MS, currently the result of the evaluation of risks in similar conditions differs widely. This calls for an improvement in the consistency of risk assessment tools for human health and ecological risk-based soil quality assessment and screening values. This does not mean a universal list but the technical part of risk-based soil health assessment should be based on a similar approach.

We propose that the Directive should draw on available science to define what ‘toxic-free in 2050’ (preamble, par 16) would look like. This is dependent not only on concentration, but also exposure, and cumulative effects on human health, soil ecosystems and associated ecosystem services. Defining clear acceptable and measurable levels is also a key prerequisite to enable proper enforcement at both the national and EU levels.

C. Stronger accounting of diffuse and chronic sources of contamination.

The presence of harmful contaminants is not limited to the vicinity of industrial point sources only, as they can originate from a variety of omnipresent sources (medicines, pesticides, anthelmintics, hormones, etc.), can spread across large distances, can be persistent (stay active and do not break down for a very long time in the environment) and may accumulate in the human body or in environmental organisms where they have a total sum impact. We therefore recommend that the Directive should make a distinction between local and diffuse pollution and include systematic monitoring and risk assessment of diffuse pollution. Furthermore, post-registration monitoring of pesticides, veterinary drugs and other contaminants are needed to verify the effectiveness of the regulation of potential risks these contaminants may pose to the soil ecosystems and functioning.