

Achieving soil health, wishful thinking? Wetlands International recommendations to improve the EU Soil Monitoring and Resilience Directive

Improving the Soil Monitoring Law for the climate, biodiversity and food security, benefitting wetlands including peatlands

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With the [proposal for a Soil Monitoring Law](#)¹ published on 5 July 2023, the European Commission has aimed at delivering a Soil Health Law, which was foreseen under its 2030 EU Soil Strategy, and whose main objective is to achieve healthy soils by 2050. The proposed Soil Monitoring and Resilience Directive (the Soil Monitoring Law, SML) is a step forward to improve soil health within the European Union. However, it falls short of concrete measures to enable the legislation to achieve its intended goals. The 2030 EU Soil Strategy aimed for organic soils to help meet the climate neutrality objective and to contribute to climate adaptation. But the Soil Monitoring Law proposal regrettably gives limited attention to wetlands and peatlands, if any at all, which is concerning given the significant contribution of peatlands to climate change mitigation.

Europe has [lost half of its wetlands](#)² in the past 300 years, including peatlands, of which [more than 50 percent are degraded](#)³. The abundance of water is a key characteristic of these ecosystems, as well as the soil that forms in these circumstances. **The naturally water-saturated organic soils of peatlands are particularly in need for monitoring, protection and restoration.** More than half of Europe's peatlands are drained, mainly for agricultural use. While drained peatlands account for 3 % of Europe's agricultural land, they are responsible for 25 % of EU agricultural and land use GHG emissions.⁴

To protect and enhance soil health in Europe, adaptations to land management (e.g. reduction of tillage) or changes in land use have been implemented in some regions. However, the loss of soil fertility, impacting biodiversity and food security, is a Europe-wide problem that needs tackling at European level. Nature-based

¹ European Commission, Proposal for a directive of the European Parliament and the Council on Soil Monitoring and Resilience, COM(2023) 416 final, https://environment.ec.europa.eu/publications/proposal-directive-soil-monitoring-and-resilience_en

² Weston, Phoebe (2023): Half the wetlands in Europe lost in past 300 years, researchers calculate. <https://www.theguardian.com/environment/2023/feb/08/world-wetlands-europe-lost-study-aoc>

³ Greifswald Mire Center 2021: Protecting and Restoring Peatlands – Targets and Recommendations for Peatlands in the EU Biodiversity Strategy. [https://www.greifswaldmoor.de/files/dokumente/Infopapiere Briefings/2021 EU Restoration Targ Peatlands Policy%20brief.pdf](https://www.greifswaldmoor.de/files/dokumente/Infopapiere%20Briefings/2021_EU_Restoration_Targ_Peatlands_Policy%20brief.pdf)

⁴ Moore: *Wiederbefeuchtung gegen den Klimawandel, 2011 (in German)*. <https://tinyurl.com/ymx9b75d>

solutions improving soil health present the ability to simultaneously address multiple challenges and deliver multiple benefits, making them effective solutions to the most pressing environmental challenges facing the EU and beyond.

Healthy peatlands accumulate organic material and therefore store carbon, which makes them a strong natural solution to mitigate climate change. In this paper, we will refer to organic soils constituting peatlands, including degraded and drained peatlands. While peat is always organic soil, not all organic soils are peat. This depends on their content of organic matter, which differs depending on the definition. For this reason, we recommend to include a common definition for peat in the proposal as well, which gives Member States a clear guideline for monitoring and describing their soil.

With this policy paper, Wetlands International Europe assesses the proposed legislation, focusing on the potential impacts on wetlands, including peatlands' organic soils, and supporting investments in nature-based solutions to improve soil health in the EU. Wetlands International Europe supports an ambitious Soil Monitoring Law, and advocates for:

- **Increasing the legislation's ambition** and give it the means to achieve the EU 2050 healthy soil objective and other overarching Green Deal policy objectives;
- **Recognising the pivotal role of nature-based solutions**, such as healthy peatlands and soil sponges functions, for achieving soil health and fostering climate change mitigation; the legislation should also support sustainable management practices based on nature solutions and address unsustainable practices on wetlands and peatlands soils;
- Improve the monitoring of organic soils by including **specific soil descriptors for organic soils in (wet) peatlands**;
- **Securing adequate financing** of the legislation thanks to public and private funds.

Matching the ambitions and means for EU healthy soils by 2050

Article 1 - Objective and subject matter

The Commission's proposal aims to put in place a framework to provide data on soil health and has an overarching goal to ensure healthy soils by 2050. The Directive notably lays down measures to monitor, sustainably manage and tackle contaminated sites.

However, these measures cannot accomplish the overarching goal of the legislation, as they lack prescribing requirements to improve the quality of soil. There are no binding targets or strategic planning to improve soil quality, nor consequences for non-compliance, should prescribing elements be adopted in the legislation. In contrast, the European Commission's proposal for a Nature Restoration Law, presented in June 2021, included binding targets for restoration of ecosystems in the EU. A similar approach should be adopted in the SML, particularly as the Commission recognizes the complementarity of both texts, with targets and timelines to be achieved with quantitative and qualitative targets to achieve soil health in the EU.

Healthy wetland and peatland soils are fulfilling essential ecosystem services and act as natural-based solutions for filtering water or storing carbon. The contribution of nature-based solutions to soil health, such as the rewetting of peatlands, must be recognized and their development facilitated by this legislation. In the case of wetlands and peatlands, healthy soils cannot be reached without certain restoration measures, such as rewetting, which is a prerequisite to restoration.

Recommendations

- **Adapt this legislation to truly achieve soil health**, as was initially intended with a Soil Health Law. The current framework for monitoring is not sufficient to deliver on the legislation's objectives to achieve soil health by 2050;
- **Add binding targets and timeline for achieving the SML's objectives** and consider them as a core element of this legislation. These targets should provide Member States with a clear roadmap for a stepwise approach, and a timeframe for achieving improved soil health by 2050;
- **Clearly recognize contributions from nature-based solutions such as rewetting and peatlands** to achieve health of organic soils formed under anoxic conditions in wet peatlands. Aligned with the EU Soil Strategy, the SML should facilitate the development of nature-based solutions and give them a central role to achieve the proposed legislation's objectives, and maximise ecosystem services rendered to society. Protective natural features, landscape features, river restoration, floodplains, etc must be considered.
- **Set mechanisms in case of lack of implementation and non-compliance.** Additionally to adapting the subject matter of the legislation, the inclusion of binding interim targets is key to monitor progress on the objectives of the legislation. This must be coupled with consequences in case of lack of implementation and non-compliance to ensure the proposal's effectiveness. These measures will provide the necessary incentives for Member States to prioritise soil health.

To achieve soil health, enable adequate restoration and management through nature-based solutions

General comments

To achieve healthy wetland and peatland soils, the connection between the different types of wetlands that form a wetscape must be taken into account. Wetscape is a blend of the terms wetland and landscape and refers to the scale of a landscape that includes wet areas like rivers, lakes, floodplains, and peatlands. They are interconnected, by water retention regimes, carbon storage processes, biodiversity habitats, nutrient retention, etc., which makes it necessary to take not just a certain wetland, but the wetscape into account, when applying sustainable management measures.

As stated in Annex III, (g), soil protection should be ensured “by the creation and maintenance of adequate landscape features at the landscape level”. This can include wetlands and peatlands as natural based solutions for soil protection such as removal of excess nutrients. However, healthy wetlands and peatlands provide not just Ecosystem Services for soil health, but for nature and society as a whole. Therefore, we propose to adapt management measures as an [landscape approach](#)⁵, which involves considering natural, social and economic aspects and especially focuses on an ecosystem-based management, which recognises the importance of maintaining ecological processes and biodiversity within the landscape.

⁵ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (2019): Landscape Approaches.
<https://www.giz.de/en/downloads/giz2020-0174en-landscape-approaches-background-paper.pdf>

Recommendations

- Establishing soil districts, as guided by Article 4, would **benefit from a landscape-oriented approach** in managing wetlands and peatlands. This approach should incorporate essential parameters like geomorphology, soil quality, vegetation, and land use to preserve and restore ecosystem services that enhance both soil health and human well-being in wetscapes.

Include monitoring measures for soil mapping

Article 6 - Soil health and land take monitoring framework

Article 6 describes the framework for regular monitoring based on “soil districts”, as Member States shall monitor soil health and land take in each soil district.

Knowing where peatlands are located is essential for their monitoring and management. In frequently used definitions, peatlands are determined based on the thickness of their organic topsoil horizon and its content of soil organic matter. When determining the organic soils of peatlands, it is therefore particularly important to have measurements of the soil horizons (which are particular layers of soil).

In the Commission’s proposal, Member States may conduct in-situ sampling of soil to monitor soils. However, none of the sampling criteria would enable to determine the soil types where measurements are conducted. Measurements for generating data about soil types should also be included. In particular, observing soil horizons with a soil corer is a feasible low-cost measure for this purpose. This data would form the basis for informed policy decisions and accountability. This mapping effort serves as a foundational step, providing a clear understanding of peatland distribution and conditions, which would be beneficial for the implementation of EU legislation such as Common Agricultural Policy (CAP), land use, land-use change and forestry (LULUCF), the upcoming NRL, etc. It supports targeted, coherent policies for environmental sustainability, climate change mitigation, and biodiversity preservation.

Recommendation

- The **data derived from the legislation should serve to improve the mapping of peatlands** with their specific properties different to mineral soils. Monitoring of soils must be **accompanied by the mapping of peatlands**, to improve the existing knowledge on peatlands data. Although there is sufficient data to act on the restoration of peatlands, knowing the locations of peatlands is crucial to implement targeted management measures;
- Already existing data sources, such as the EU soil database (ESDB), should be included and improved through the implementation of the SML.

Recognise the importance of wet organic soils when setting soil health descriptors

Article 7 - Soil descriptors, criteria for healthy soil conditions, land take and soil sealing indicators

To assess soil health, the proposal lists different elements that Member States will have to monitor and assess: soil descriptors, criteria for healthy soil condition, as well as land take and soil sealing indicators.

Healthy peatlands form peat (organic soil) which absorbs CO₂ from the atmosphere and stores carbon in the soil. Safeguarding and improving organic soil health is [crucial for climate and biodiversity](#)⁶. Besides, healthy organic soils fulfil other crucial ecosystem services, such as water retention, which helps mitigate floods; or filtration of excess nutrients and therefore enhancing water quality, which has an influence on overall soil health, not only of organic soils.

Given wetlands and peatlands' importance for soil health, and due to their large degradation in the EU, these criteria should include factors relevant to assessing and improving the health of wet and organic soils.

The proposal's Annex I lists elements to assess soil health. Annex I lists criteria that must be established at EU (Part A) or National level (Part B). Annex I, Part A, lists four descriptors, among which the descriptor "Loss of Soil organic carbon". This descriptor is key to measuring the health of peat soils and we welcome its inclusion. However, the criterion for healthy soil conditions of organic soils referred in the proposed Nature Restoration Law is not adequate to monitor Soil organic carbon (SOC) in organic soils. The Nature Restoration Law takes as references Articles 4.1, 4.2 (restoration of terrestrial, coastal and freshwater ecosystems) and Article 9.4 (restoration of agricultural ecosystems), where the NRL sets its targets for restoring organic soils, specifically peatlands. This reference is problematic because:

- The NRL again refers to the Habitat Directive to determine good health. In general, we welcome this approach since it addresses the complexity of different peatlands and their needs. However, it does not focus on soil and **overlooks SOC values**;

Loss of soil organic carbon	Soil Organic Carbon (SOC) concentration (g per kg)	- For organic soils: respect targets set for such soils at national level in accordance with Article 4.1, 4.2, 9.4 of Regulation (EU) .../... ⁺	No exclusion
		- For mineral soils: SOC/Clay ratio > 1/13; Member States may apply a corrective factor where specific soil types or climatic conditions justify it, taking into account the actual SOC content in permanent grasslands.	Non- managed soils in natural land areas

Figure 1: Screenshot of Annex 1, Part A descriptor for SOC concentration

We call for the implementation of a descriptor to adequately monitor SOC in organic soils in the SML. The Nature Restoration Law is an insufficient reference for this, since it does not provide values to assess soil health according to SOC.

To have a reference for SOC values and do justice to the importance of peatlands' soils and implement the corresponding management measures, the proposal lacks a clear definition of peat soil. For instance: "Peat is defined as sedentarily accumulated material of which at least 30 % (dry mass basis) is soil organic matter. The

⁶ UNEP (2021): Safeguarding the soil that sustains us: Protecting Peatlands. <https://www.unep-wcmc.org/en/news/safeguarding-the-soil-that-sustains-us-protecting-peatlands>

presence or absence of vegetation is irrelevant to the definition of peatland”.⁷ Soil organic matter can be converted to SOC depending on [SOM/SOC ratios](#)⁸, that can vary depending on the type of peatland. A benefit of using soil organic matter as a proxy for SOC is that the loss of ignition methods (LOI) used to estimate soil organic matter are relatively cheap.

Recommendations

- Add a definition of peat to be able to address peatlands’ health to Article 3 of the proposal;
- **The Part A descriptor “Loss of Soil Organic Carbon” must be adapted and improved.** A Soil Organic Carbon descriptor is necessary to determine soil health as part of Annex I of SML, which will contribute to assess and monitor wetlands and peatlands soil health, by collecting data on their carbon levels. The reference to criteria set under Nature Restoration Law does not include clear values of soil organic carbon concentration; since SOC (g per kg) acts as a descriptor for soil health, we recommend to **provide reference values** not just for mineral soils, but also for organic soils in this legislation.
- Raising water levels on drained peatlands can significantly improve their soil health. The **main driver of peat / organic soil degradation is drainage** and the resulting reduction of the organic horizon through the process of decomposition, which also causes CO₂ emissions. In contrast, a healthy peatland grows by accumulating dead organic material and thereby sequesters carbon. **The proposal must include a new soil descriptor that reflects peat degradation** in Part B, represented through the depth of the organic top soil horizon. This will be aligned with some of the principles listed for sustainable soil management (Article 10).
- To measure Soil biodiversity in a relevant way for peatlands, the SML should **require descriptors to monitor and address soil biodiversity for wet soils in Part C**. Currently, only *soil basal respiration in dry soil* is included as an obligatory descriptor.

Part A: soil descriptors with criteria for healthy soil condition established at Union level			
Aspect of soil degradation	Soil descriptor	Criteria for healthy soil condition	Land areas that shall be excluded from achieving the related criterion
Loss of soil organic carbon	Soil organic carbon concentration (g per kg)	Consider criteria such as those proposed by: Lourenco, Mauro et al. ⁹ This review lists different definitions of peat, including SOC values.	no exclusion

⁷ Tanneberger, F., Tegetmeyer, C., Busse, S., Barthelmes, A., et al. (2017): The peatland map of Europe. <https://doi.org/10.19189/MaP.2016.OMB.264>

⁸ Klingenuß, C., Roßkopf, Walter, J., Heller, C., Zeit, J. (2014): Soil organic matter to soil organic carbon ratios of peatland soil substrates. <https://doi.org/10.1016/j.geoderma.2014.07.010>

⁹ Lourenco, Mauro et al. (2022): Peat definitions: A critical review. <https://doi.org/10.1177/03091333221118353>

Part B: soil descriptors with criteria for healthy soil condition established at Member States level			
Peat subsidence	Depth of organic top soil horizon in cm	Consider criteria such as those proposed by: Lourenco, Mauro et al. ¹⁰	Areas without organic topsoil horizon
Part C: soil descriptors without criteria			
Loss of biodiversity	<p>Member States may also select other soil descriptors for biodiversity such as:</p> <ul style="list-style-type: none"> - metabarcoding of bacteria, fungi, protists and animals; - abundance and diversity of nematodes; - microbial biomass; - invasive alien species and plant pests. <p>[Since we acknowledge the current complexity of this monitoring, a review clause should be included to assess the feasibility of measuring this criterion as obligatory, as soon as analytical methods are available;]</p>		

Figure 2 Recommendations how to improve the Annex 1 descriptors for monitoring soil health.

Address unsustainable practices on wetlands and peatlands soils

Article 10 - Principles for Sustainable Soil Management

By setting principles for sustainable soil management, the Commission aims to give Member States flexibility to apply principles to maintain or enhance soil health, with consequences notably for their CAP strategic plans. However, Member States have so far failed to adopt safeguarding measures to peatlands, as half of Europe's wetlands are lost and more than half of its peatlands are degraded. Intensive agriculture is [linked](#)¹¹ with being the primary reason for peat subsidence in Europe.

To prevent further deterioration, sustainable management practices must be implemented. For peatlands, the imperative is to stop drainage-based activities and rewet them. Without rewetting, peat is degraded through decomposition and is therefore not just lost, but also releasing GHG.

Among the practices for sustainable soil management, the transition to paludiculture, a wet agriculture on (formerly drained) peatlands, presents an opportunity to reconcile agricultural use with peatland restoration. Paludiculture is the productive land use of wet and rewetted peatlands that preserves the peat soil and thereby minimises CO₂ emissions and subsidence. Paludiculture can play an important role in climate change mitigation,

¹⁰ Ibid.

¹¹ The Guardian, "Intensive farming is the biggest cause of bird decline in Europe, study says", May 2023, <https://www.theguardian.com/environment/2023/may/15/intensive-farming-is-biggest-cause-of-bird-decline-in-europe-study-says>

fostering biodiversity and preserving habitats for various species. Additionally, paludiculture offers the possibility of economic benefits – while the technique still needs to be developed at a large scale; including opportunities for sustainable agriculture, eco-tourism, and certification of emission reductions.

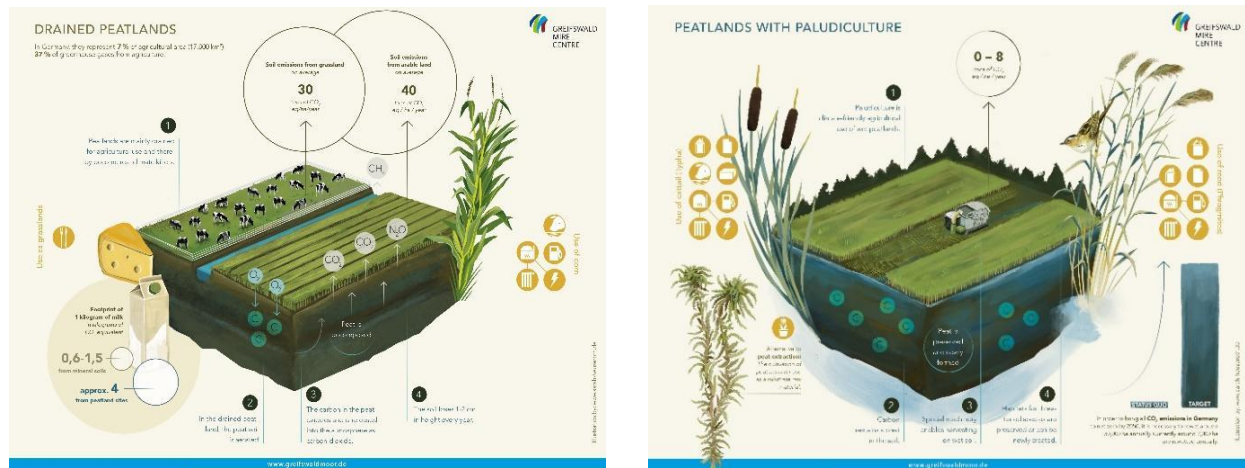


Figure 3 & 4: Greifswald Mire Centre, drained peatlands and peatlands in paludiculture. Credit: Sarah Heuzeroth.

A paradigm shift in agriculture and forestry on peatlands is needed to reduce our climate and biodiversity impacts. Paludiculture has not yet been sufficiently implemented in the CAP and the still existing financial support for drainage-based activities on peatlands does not provide farmers with sufficient incentives for a transition to sustainable management practices.

Annex III of the Commission’s proposal provides that sustainable soil management practices “ensure optimised water levels in organic soils so that the structure and composition of such soils are not negatively affected”. In order to establish a sustainable and enduring management approach for soils affected by water regimes, sustainable practices must not only manage and monitor the soil, but also manage and regulate water in the wetlandscape. This is because when peat is exposed to oxygen due to low water levels, the process of decomposition starts in the former anaerobic layers, which leads to degradation and CO₂ release. Water levels up to soil surface can prevent the loss of peat soils and safeguard their health and their ecosystem services. In the case of degraded peatlands, this requires restoration activities, including rewetting, with a landscape-scale approach.

Recommendations

- **We welcome the inclusion of the sustainable management principle** in Annex III, g) incentivising a landscape-scale approach, i) incentivizing to raise water levels to surface level for organic soils. Any drainage-based activities on wetlands should be excluded from being considered as a sustainable management practice;
- To truly achieve its objective for healthy soils by 2025, pressures on soils must be substantially diminished. **The legislation should prescribe a list of unsustainable management practices, such as drainage-based activities**, that Member States should aim at ending, based upon phase-out plans (such as phasing-out certain drainage based-activities by 2050; banning new peat extraction permits by 2030 and banning all peat extraction activities by 2050, etc.);
- In addition to the recognition of sustainable soil management principles under the SML, **restoration measures and agricultural practices (paludiculture) on wet peatlands should be supported by**

setting financial incentives to farmers and land-owners, notably under the CAP, and thanks to carbon removal certification fit for the restoration of wetlands and peatlands. This requires to:

- **Implement restoration measures from the NRL** for wetlands to achieve soil health for the soils influenced by these. A sustainable management of water dependent soils must be accompanied by nature restoration measures including , for peatlands, rewetting;
- To achieve healthy organic soils, the **implementation of paludiculture can lead towards a sustainable management of peatlands**. The CAP as well as a Carbon Removal Certification Frameworks could set the financial incentives to farmers and land-owners for this transition.

Wetlands as nature-based solutions for risk reduction measures

Article 15 - Risk assessment and management of contaminated sites

Nature-based solutions use natural processes to restore the original degraded and contaminated soil resources and improve sustainability. Healthy wetlands fulfil important ecosystem services that regulate and impact their environment. Due to anoxic conditions, healthy wetlands and peatlands play a unique role in reducing nutrient excess through the process of denitrification. Especially in agricultural areas, natural or restored and functional wetlands and peatlands besides rivers can significantly help in achieving better water quality and therefore reduce contamination caused by intensive fertilisation.

We welcome the recognition that wetlands act as “Biofiltration, biotreatment wetlands, and biobeds” in their environment (in Annex V), and advocate for the implementation of nature-based solutions to tackle soil contamination thanks to wetlands and peatlands. Establishing paludiculture, especially as buffer zones nearby rivers, can improve water quality through filtering of nutrients and toxins from the soil. In this way, agricultural area is not lost and even mitigates excess nutrient input from agriculture. Furthermore, due to their high water retention capacity, wetland soils act as [natural sponges](#),¹² which helps prevent and mitigate flooding events.

Recommendation

- Prioritise and **promote nature-based solutions such as [wetland buffer zones](#)**¹³ to prevent and mitigate soil contamination and floods, notably thanks to wetlands and peatlands restoration initiatives

Enable adequate financing, with a mix of public and private funds

Article 17 – Union financing

Within the EC’s proposal, Article 17 outlines two primary financial mechanisms for implementing the SML: (1) leveraging established Union financing programs such as the CAP, and (2) engaging private capital facilitated by initiatives like the Carbon Removal Certification Framework (2022/0394(COD)).

Indeed, redirecting CAP payments away from drainage-based land-use practices towards sustainable alternatives that better align with hydrological principles of wetscapes – such as paludiculture - is likely to be a

¹² Wetlands International Europe, Natural Sponge effects in german middle mountains. <https://europe.wetlands.org/publications/natural-sponge-effects-in-the-german-middle-mountains/>

¹³ Greifswald Mire Center (2021): Wetland buffer zones for nutrients retention and cleaner waters. https://update23.greifswaldmoor.de/files/dokumente/Infopapiere/Briefings/2021_factsheet_Wetland%20buffer%20zones_final.pdf

key tool for increasing soil health in these environments. However, it is evident that public funding alone has been insufficient for preserving widespread soil health and we anticipate it will remain inadequate in the near future. Accordingly, we advocate for creating conditions that channel private finance towards management actions which maintain or increase SOC-stocks, as envisaged by the Carbon Removal Certification Framework.

According to the Commission, the soil health certification proposed by this legislation would have two effects on carbon removals:

- 1) it would improve soil health, and incidentally, its capacity to absorb and store carbon;
- 2) it would increase the value of the carbon removal certificate.

Concerns around emission trading revolve around the risk of greenwashing, the shift in attention from cutting emissions towards offsetting and the permanence of locked carbon. Notably, the immediate benefit of most carbon farming techniques is the preservation of existing carbon stocks for the duration of which management is in place rather than direct and permanent removal of atmospheric carbon. While these techniques are essential mitigation tools and vital for safeguarding the extensive carbon pools of wetscapes, it is essential to differentiate between removal and reduction units for credibility and informed decision-making. This way, buyers can accurately consider the impact of their investments and align them with their sustainability objectives (e.g. net-zero vs. climate positive) while claims made by companies can be contrasted with their actual environmental contributions. Engaging in the trade of emission reduction certificates as a complementary source of finance for wetlandscape restoration is a pragmatic approach for generating additional and immediate incentives for promoting soil health at scale.

The SML aligns with the idea that sustainable management should be financially enabled and rewarded by blended finance of public funds and through a voluntary carbon certification market.

Recommendations

- Base the soil health certificates on strong criteria to avoid greenwashing and differentiating between removals and emission reductions;
- In its current state, the SML does not integrate organic soils and therefore peatlands to a sufficient extent. Certifying carbon farming in peatlands through Carbon Removal Certification is not acceptable under the current soil health criteria of this proposal, since it would not be able to improve peat soil health. This entails a high risk of greenwashing through CRFC.



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