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Subject:	Proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law) - General approach

I. INTRODUCTION

1. On 5 July 2023, the Commission transmitted to the European Parliament and the Council the proposal for a Directive on Soil Monitoring and Resilience (Soil Monitoring Law). The Commission presented its proposal and the accompanying impact assessment to the Working Party on Environment (WPE) on 27 July (videoconference) and on 6 October 2023.

2. The proposal aims to put the EU on a pathway to healthy soils by 2050. It makes soil health monitoring obligatory, initiates the gradual implementation of sustainable soil management and addresses situations of unacceptable health and environment risks due to soil contamination. It is part of a larger legislative package on "Ensuring resilient and sustainable use of EU's natural resources". The proposal is in line with the 2021 EU Soil Strategy, an important component of the European Green Deal and of the EU Biodiversity Strategy for 2030 for tackling the climate and biodiversity crises.

3. In the European Parliament, the file was referred to the Committee on the Environment, Public Health and Food Safety (ENVI), which appointed Martin Hojsik (Renew, Slovakia) as rapporteur. The European Parliament adopted its position on 10 April 2024.

4. The European Economic and Social Committee delivered its opinion on 25 October 2023. The opinion of the Committee of the Regions is scheduled for adoption on 19 June 2024.

5. The proposal was discussed at Agriculture and Fisheries Council on 18 September 2023 and an exchange of views was held at the Environment Council on 18 December 2023. At working party level, the proposal was discussed during the Spanish and Belgian Presidencies and good progress has been achieved.

6. The Committee of Permanent Representatives examined the Presidency proposal for a General Approach on 29 May 2024. Most delegations supported the Presidency's approach, while a few expressed concerns on specific issues, including data confidentiality in the context of disclosure of sampling data, deadline for the first soil measurements, some technical requirements for field sampling in areas with high level of rock content and the impact of the directive on renewable energy projects and on mining.

7. Consequently, the Presidency introduced a few adjustments in the compromise text for a General Approach but did not include suggestions that would change the delicate balance achieved during the negotiations. In particular, the changes were made in Article 8(2a)(Measurements and methodologies), Article 19(4a) (Information to the public) and Annex II, point 2 (Field sample survey).

II. MAIN ELEMENTS OF THE PRESIDENCY COMPROMISE TEXT

8. The Presidency compromise text amends the Commission's proposal on several aspects. It aims at addressing the concerns of delegations, while maintaining the right balance between the necessary flexibilities and the need to preserve the objectives and integrity of the proposed Directive. The main elements of the compromise are set out below:

a) Soil health monitoring and assessment (Articles 4-9 and related definitions, annexes and recitals) and sustainable soil management (Article 10 and Annex III)

The Presidency introduced several new concepts and clarifications to the Commission proposal to achieve a balance between recognition of the existing data and monitoring systems and reaching a certain level of harmonization.

The monitoring framework (Article 6)

The Presidency text clarifies the administrative structure relevant for the soil health monitoring framework. The concept of 'soil unit' is introduced within the 'soil district', with fairly homogenous soil characteristics, based on minimum EU-defined parameters, including the soil types and land use, but leaving Member States sufficient flexibility to use more detailed equivalent data, if available, and take into account additional parameters such as climate, environmental zones or river basins. The concepts of 'soil district' and 'competent authorities' are clarified to provide a necessary governance structure to ensure that the Directive's obligations are fulfilled.

The Presidency text offers flexibility as regards the level at which the monitoring framework should be established and specifies that soil health should be monitored at soil unit level and soil sealing and destruction at district level. The monitoring framework may be adapted by Member States for outermost regions, taking into account their specific characteristics.

Measurements and methodologies (Article 8)

The Presidency text provides additional clarifications and flexibilities with regard to the methodologies for determination of sampling points and for the sample survey. Soil descriptors and associated methodologies were also reworked in order to better reflect existing practices and align with other existing requirements whenever possible. Furthermore, the Presidency text also clarifies the organisation of collaboration between Member States and the Commission on determination of the sampling points and, where relevant, of the sampling by the Commission. Additional flexibilities regarding soil measurements include the possibility to use existing data and monitoring networks, to reuse equivalent data and/or derogate from a monitoring cycle for soil descriptors evolving over longer time-period. To ensure the representativity and comparability of the soil measurements the Presidency also proposes to include minimum requirements for quality control of laboratories analysing soil samples.

The assessment of soil health (Articles 7 and 9)

To address the requests of Member States for more flexibility and the need to adapt to local circumstances, the Presidency proposes to replace the principle ‘one out all out’ by a double value system: (i) non-binding sustainable target values to reflect the long-term objectives of the proposal and (ii) operational trigger values, set at Member States level for each soil descriptor, to allow prioritization and gradual implementation of measures leading to healthy soil condition. Additional flexibilities were included, for instance leaving to Member States the decision to define the conditions for soil to be considered healthy, providing the possibility to adapt the target values to soil type, local soil conditions and climatic conditions and exclude certain soils with specific natural characteristics from meeting the relevant criterion.

To address the concerns of several delegations, the Presidency proposes to move the descriptor on soil erosion from Annex I, Part A (soil descriptors with criteria for healthy soil conditions established at EU level) to Annex I, Part B (soil descriptors with criteria for healthy soil conditions established at Member State level), which would give Member States flexibility to define the maximum sustainable value for this descriptor.

The Presidency text also no longer includes the provision on a voluntary soil health certification as it gained no support from delegations.

Sustainable soil management (Article 10)

The Presidency text clarifies the guiding nature of the sustainable soil management principles listed in Annex III allowing Member States to define their own list of positive and negative practices while taking into account existing programmes, plans, targets and measures listed in the Annex IV.

b) Land take / soil sealing and soil destruction (Articles 6, 7, 8, 9, 11 and related definitions, annexes and recitals)

To address this complex topic the Presidency proposes a staged approach by tackling as first step the most visible, impactful and easy to monitor aspect of land take, focusing on soil sealing and soil destruction, while maintaining an aspirational long-term objective for land take in the 2030 Soil Strategy to contribute to the No Net Land Take by 2050. The proposed framework is based on three main aspects: (i) monitoring of the soil sealing and soil destruction indicators through remote sensing at district level, with Copernicus products as a minimum common base, supplemented by national inventories where relevant (Article 6(5), Annex II, Part C); (ii) input for the assessment of soil health through identification of the impact on the loss of ecosystem services and of the potential contribution to soil health improvement through de-sealing and renaturation (Article 9(4)); (iii) effort-based mitigation principles to mitigate and offset the impact of soil sealing and destruction on the soil's ability to provide ecosystem services (Article 11, recitals 30d, 30e).

As many delegations requested further refinement of Article 11 and the related recitals 30d and 30e, the Presidency proposes a compromise which includes a reference to 'land take mitigation principles' in the heading of Article 11 and clarifies that this provision is effort-based and applies only to new cases of soil sealing and soil destruction, as part of land take, and not to already sealed or destroyed soils. It is also made clear that these principles would not override Member States' decisions on spatial planning, but rather aim to establish good practices to mitigate the impact of such decisions, to be considered by Member States in their land use planning. Moreover, the application of the mitigation principles is not covered by the reporting obligation. Further clarification is provided in recital 30d as regards the qualification of soils with renewable energy constructions.

c) *Management of contaminated sites (Articles 12-16 and related definitions, annexes and recitals)*

Also on this issue the Presidency introduced additional flexibilities. A risk-based and stepwise approach is proposed to identify and investigate potentially contaminated sites and to risk-assess and manage contaminated sites, to allow Member States to prioritise measures, taking into account the potential risks, socio-economic context and the current and planned land use. To help identify the potentially contaminated sites and prioritise measures, Member States are required to lay down a list of potentially contaminating activities. A definition of potentially contaminated site and a clarification that contamination my also occur at deeper level than soil, i.e. in the bedrock or parent material, have also been added. The public involvement is refined and limited to the first phases of the process, i.e. the establishment and application of the risk-based and stepwise approach, the identification and investigation of potentially contaminated sites.

The text also requires Member States to establish a hierarchy of responsibility defining the responsible parties for investigation of potentially contaminated sites and risk-assessment and management of contaminated sites for which it is difficult to identify the polluter. A decision on whether to apply different approaches to historically and newly contaminated sites is left to Member States. The Presidency text also clarifies that the EU funds can be used in case no accountable party can be identified or held accountable. It also specifies that the previous measures and existing management schemes related to contaminated sites (investigations, risk assessments, risk reduction measures and registers) should be recognised if they meet the requirements of the Soil Monitoring Law.

Furthermore, the Presidency proposes more flexible approach on the site-specific assessment and management of contaminated sites. In particular, the phases and principles for the methodology for the site-specific assessment are made voluntary and it is clarified that the site-specific assessment should be proportionate to the complexity of the site and might not be required if the conclusion on whether the soil contamination poses no unacceptable risk to human health or environment or remediation is needed can be reached on the basis of the initial investigation. The text maintains the Commission's approach on the risk reduction measures, i.e. Member States' obligation to define what constitutes an unacceptable risk for human health and environment from contaminated site and to ensure that appropriate measures, the examples of which are provided in Annex V, are implemented to bring the risks to an acceptable level within an appropriate timescale.

d) *Reporting and information to the public (Articles 6, 16, 18 and 19 and related annexes and recitals)*

In order to address delegations' concerns related to the confidentiality and protection of sensitive data, the Presidency text specifies that the information to the public on the results of the soil monitoring and assessments should be disclosed in the form of aggregated data. A reference to the Regulation on European statistics, as well as to protect data ownership (Articles 18(2), 19(4a) and recital 36) was also added to further clarify the issue of data confidentiality. It is also clarified that not a permanent access but an effective transmission and exchange of the reporting information and data between Member States and the Commission and the EEA should be ensured. In addition, the disclosure of certain data and information and reporting is subject to a derogation on the grounds of public security or national defence (Articles 6(7a), 16a, 18(2a), recital 25a).

e) Other issues:

- Definitions (Article 3): A number of definitions of terms not used in the revised text have been deleted (semi-natural land, artificial land, geographically explicit data), and definitions of new terms have been added (soil unit, potentially contaminated site, risk reduction measures, definitions related to soil sealing and soil destruction, settlement area, organic and mineral soils). Clarifications and adjustments in line with the changes made in other parts of the text were also introduced;
- Union financing (Article 17, recital 11): The Presidency proposes as a compromise a neutral reference to the Union financial programmes in accordance with their applicable rules and conditions;
- Access to justice (Article 22, recitals 49 and 49a): The text has been aligned with similar provisions in legislation already agreed between co-legislators;
- Penalties (Article 23): On request by many delegations the provision has been deleted;
- Support from the Commission (Article 23a, recitals 52a and 52b) and timelines: In order to facilitate the implementation of the directive, the Presidency text foresees the Commission's support and assistance in the form of non-binding documents and scientific tools as well as an exchange of information, experience and best practices on a number of issues covered by the Directive. The deadlines for the soil measurements and soil health assessments, for identification and registration of the existing potentially contaminated sites are also slightly extended.

III. CONCLUSION

9. The Presidency's compromise text sets a delicate balance that was supported by most delegations. The text can be found in the Annex to this Note. Changes to the Commission's proposal are marked in **bold** and deletions in […]. The most recent changes, following the meeting of the Committee of Permanent Representatives on 29 May, are marked in **bold underlined** and deletions in […].

10. The Council is invited to agree on a General Approach, as set out in the Annex to this note. The General approach will constitute the Council's mandate for future negotiations with the European Parliament in the context of the Ordinary Legislative Procedure.

ANNEX

Proposal for a

Directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law)

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee[1],

Having regard to the opinion of the Committee of the Regions[2],

Acting in accordance with the ordinary legislative procedure,

Whereas:

(1) Soil is a vital, limited **resource**, **and considered** non-renewable and irreplaceable **at human time scale** […] that is crucial for the economy, the environment and the society.

(2) Healthy soils are in good chemical, biological and physical condition so that they can provide ecosystem services that are vital to humans and the environment, such as safe, nutritious and sufficient food, biomass, clean water, nutrients cycling, carbon storage and a habitat for biodiversity. However, 60 to 70 % of the soils in the Union are […] **degraded** and continue to deteriorate.

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1 OJ C , , p. .
2 OJ C , , p. .

(2b) Soils also provide services such as acting as a physical platform for infrastructures and human activities, as a source of raw materials, or constituting an archive of geological, geomorphological and archaeological heritage. While these services are often considered soil ecosystem services, not all of them need a functional ecosystem to be provided and are often – especially in the case of platform for infrastructure and source of raw materials – incompatible with the other soil ecosystem services as these inherently entail a degradation of the soil. They are also often the most prevalent uses of a soil, causing a significant loss of the aforementioned vital ecosystem services, and contributing to the degradation of the soils. As such, it is important to find a balance between these two types of soil ecosystem services.

(2c) Soil degradation affects ecosystem services provided by soils, with negative impacts to human health and the environment, and can cover different aspects related to physical degradation such as soil sealing and soil artificialisation in general, soil erosion, soil compaction and reduction of soil water retention and infiltration, to chemical or biological degradation such as excess and depletion of nutrients, acidification, salinisation and soil contamination, loss of soil organic carbon, soil biodiversity and soil biological activity.

(3) Soil degradation is costing the Union several tens of billion euro every year. Soil health is impacting the provision of ecosystem services that have an important economic return. Sustainable management and regeneration of soils therefore makes sound economic sense and can significantly increase the price and value of the land in the Union.

(4) The European Green Deal[3] has set out an ambitious roadmap to transform the Union into a fair and prosperous society, with a modern, resource-efficient and competitive economy, aiming to protect, conserve and enhance the Union's natural capital, and to protect the health and well-being of citizens. As part of the European Green Deal, the Commission has adopted the EU Biodiversity Strategy for 2030[4], the Farm to Fork Strategy[5], the Zero Pollution Action Plan[6], the EU Climate Adaptation Strategy[7] and the EU Soil Strategy for 2030[8].

(5) The Union is committed to the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)[9]. Healthy soils contribute directly to the achievement of several SDGs, in particular SDG 2 (zero hunger), SDG 3 (good health and well-being), SDG 6 (clean water and sanitation), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production), SDG 13 (climate action) and SDG 15 (life on land). SDG 15.3 aims to combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world by 2030.

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3 Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, The European Green Deal COM(2019) 640 final.

4 Communication from the Commission to the European Parliament, the Council the European Economic and Social Committee and the Committee of the Regions, EU Biodiversity Strategy for 2030, Bringing nature back into our lives COM(2020) 380 final.

5 Communication from the Commission to the European Parliament, the Council the European Economic and Social Committee and the Committee of the Regions, A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system COM(2020) 381 final.

6 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil' COM(2021) 400 final.

7 Communication from the Commission to the European Parliament, the Council, the European, Economic and Social Committee and the Committee of the Regions, Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change COM(2021)82 final.

8 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate COM(2021) 699 final.

9 https://sdgs.un.org/goals

(6) The Union and its Member States, as parties to the Convention on Biological Diversity, approved by Council Decision 93/626/EEC[10], agreed at the 15th Conference of the Parties on the "Kunming-Montreal Global Biodiversity Framework" (GBF)[11] which comprises several action-oriented global targets for 2030 of relevance for soil health. Nature's contributions to people, including soil health, should be restored, maintained and enhanced.

(7) The Union and its Member States, as Parties to the UN Convention to Combat Desertification (UNCCD), approved by Council Decision 98/216/EC[12], have committed to combat desertification and mitigate the effects of drought in affected countries. Thirteen Member States[13] have declared themselves as parties affected by desertification under the UNCDD.

(8) In the context of United Nations Framework Convention on Climate Change (UNFCCC) land and soil is considered simultaneously as a source and a sink of carbon. The Union and Member States as parties have committed to promote sustainable management, conservation and enhancement of carbon sinks and reservoirs.

(9) The EU Biodiversity Strategy for 2030 states that it is essential to step up efforts to protect soil fertility, reduce soil erosion and increase soil organic matter by adopting sustainable soil management practices. It also states that significant progress is needed on identifying contaminated soil sites, restoring degraded soils, defining the conditions for good ecological status of soils, introducing restoration objectives, and improving the monitoring of soil health.

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10 Council Decision of 25 October 1993 concerning the conclusion of the Convention on Biological Diversity (93/626/EEC) (OJ L 309, 13.12.1993, p. 1).

11 Decision adopted by the Conference of the Parties to the Convention on Biological Diversity on 19 December 2022, 15/4. Kunming-Montreal Global Biodiversity Framework.

12 Council Decision of 9 March 1998 on the conclusion, on behalf of the European Community, of the United Nations Convention to combat desertification in countries seriously affected by drought and/or desertification, particularly in Africa (OJ L 83, 19.3.1998, p. 1).

13 Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Latvia, Malta, Portugal, Romania, Slovakia, Slovenia, Spain.

(10) The EU Soil Strategy for 2030 sets the long-term vision that by 2050, all EU soil ecosystems are in healthy condition and are thus more resilient. As a key solution, healthy soils contribute to address the EU's goals of achieving climate neutrality and becoming resilient to climate change, developing a clean and circular (bio)economy, reversing biodiversity loss, safeguarding human health, halting desertification and reversing land degradation.

(11) Funding is vital to enable a transition to healthy soils. The Multiannual Financial Framework presents several funding opportunities available for the protection, sustainable management and regeneration of soils. **'**A Soil Deal for Europe' is one of the five EU missions of the Horizon Europe programme and is specifically dedicated to promoting soil health. The **EU** Soil Mission is a key instrument for the implementation of this Directive. It aims to lead the transition to healthy soils through funding an ambitious research and innovation programme, establishing a network of 100 living labs and lighthouses in rural and urban areas, advancing the development of a harmoni**s**ed soil monitoring framework and increasing the awareness of the importance of soil. Other Union programmes that present objectives contributing to healthy soils are the Common Agricultural Policy, the Cohesion Policy funds, the Programme for Environment and Climate Action, the Horizon Europe work programme, the Technical Support Instrument, the Recovery and Resilience Facility and InvestEU.

(12) The Soil Strategy for 2030 announced that the Commission would table a legislative proposal on soil health to enable the objectives of the Soil Strategy and to achieve good soil health across the EU by 2050. In its resolution of 28 April 2021 on soil protection[14], the European Parliament emphasised the importance of protecting soil and promoting healthy soils in the Union, bearing in mind that the degradation continues, despite the limited and uneven action being taken in some Member States. The European Parliament called on the Commission to design a Union wide common legal framework, with full respect for the subsidiarity principle, for the protection and sustainable use of soil, addressing all major soil threats.

(13) In its conclusions of 23 October 2020[15], the Council supported the Commission in stepping up efforts to better protect soils and soil biodiversity, as a non-renewable resource of vital importance.

(14) Regulation (EU) 2021/1119 of the European Parliament and of the Council[16] sets out a binding objective of climate neutrality in the Union by 2050 and negative emissions thereafter, and of prioritising swift and predictable emission reductions and, at the same time, enhancing removals by natural sinks. Sustainable soil management results in increased carbon sequestration and in most cases in co-benefits for ecosystems and biodiversity. The Commission's Communication on Sustainable Carbon Cycles[17] underlined the need for clear and transparent identification of the activities that unambiguously remove carbon from the atmosphere such as the development of a EU framework for the certification of carbon removals from natural ecosystems including soils. Moreover, the revised Regulation on Land Use, Land Use Change and Forestry not only places soil carbon central to the achievement of targets on the pathway to a climate neutral Europe, but also calls for Member States to prepare a system for the monitoring of soil carbon stocks, using, inter alia, the land use/cover area frame statistical survey (LUCAS) dataset.

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14 European Parliament resolution of 28 April 2021 on soil protection (2021/2548(RSP)).

15 Council Conclusions on Biodiversity - the need for urgent action, 12210/20.

16 Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') (OJ L 243, 9.7.2021, p. 1).

17 Communication from the European Commission to the European Parliament and to the Council Sustainable Carbon Cycles COM (2021) 800.

(15) The Commission's Communication on adaptation to climate change[18] underlined that using nature-based solutions inland, including the restoration of the sponge-like function of soils, will boost the supply of clean and fresh water, reduce the impacts of flooding and alleviate the impacts of droughts. It is important to maximise the capacity of soils to retain and purify water and reduce pollution.

(16) The Zero Pollution Action Plan adopted by the Commission sets out the vision for 2050 that air, water and soil pollution is reduced to levels no longer considered harmful to health and natural ecosystems and that respect the boundaries our planet can cope with, thus creating a toxic-free environment.

(17) The Commission's Communication on safeguarding food security and reinforcing the resilience of food systems[19] stressed that food sustainability is fundamental for food security. Healthy soils make the Union food system more resilient by providing the basis for nutritious and sufficient food.

(18) It is necessary to set measures for monitoring and assessing soil health, managing soils sustainably and tackling contaminated sites to achieve healthy soils by 2050, to maintain them in healthy condition and meet the Union's objectives on climate and biodiversity, to prevent and respond to droughts and natural disasters, to protect human health and to ensure food security and safety.

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18 Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change COM (2021)82 final.

19 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Safeguarding food security and reinforcing the resilience of food systems, COM (2022) 133 final.

(19) Soils host more than 25% of all biodiversity and are the second largest carbon pool of the planet. Due to their ability to capture and store carbon, healthy soils contribute to the achievement of the Union's objectives on climate change. Healthy soils also provide a favourable habitat for organisms to thrive and are crucial for enhancing biodiversity and the stability of ecosystems. Biodiversity below and above ground are intimately connected and interact through mutualistic relationships (e.g. mycorrhizal fungi that connect plant roots).

(19a) Soil organic matter is crucial for the provision of soil ecosystem services and functions, by reducing soil degradation such as erosion and compaction, while increasing the buffering, water holding and infiltration as well as cation exchange capacity of the soil. Soil organic matter, generally measured through soil organic carbon, can not only improve the structural stability of soils, reflected by their soil organic carbon to clay ratio, but also the development of biomass, including an increase in crop yields. Additionally, soil organic matter positively affects soil biodiversity and can increase the amount of carbon sequestered in soils and therefore the soil organic carbon stocks, thereby contributing to climate change mitigation and adaptation.

(20) Floods, wildfires and extreme weather events are natural disaster risks of the highest concern across Europe. The concern for droughts and water scarcity is rapidly increasing across the Union. In 2020, 24 Member States considered droughts and water scarcity to be key emerging or climate related disaster risks, compared to only 11 Member States in 2015. Healthy soils are instrumental for the resilience to droughts and natural disasters. Practices that enhance water retention and nutrient availability in soils, soil structure, soil biodiversity and carbon sequestration, increase the resilience of ecosystems, plants and crops to withstand and recover from drought, natural disasters, heatwaves and extreme weather events which will become more frequent in the future due to climate change. In turn, without proper soil management, drought and natural disasters cause soil degradation and make soils unhealthy. Improvement of soil health helps to mitigate the economic losses and fatalities associated with climate-related extremes, which amounted to approximately 560 billion EUR and more than 182.000 casualties in the Union between 1980 and 2021.

(21) Soil health contributes directly to human health and well-being. Healthy soils provide safe and nutritious food, and have the ability to filter contaminants, hence preserving drinking water quality. Soil contamination can harm human health through ingestion, inhalation or dermal contact. Human exposure to the healthy soil microbial community is beneficial to develop the immune system and resistance against certain diseases and allergies. Healthy soils support the growth of trees, flowers, and grasses, and create green infrastructure that offers aesthetic value, well-being, and quality of life.

(22) Soil degradation impacts fertility, yields, pest resistance and nutritional food quality. Since 95 % of our food is directly or indirectly produced on soils and the global population continues to increase, it is key that this finite natural resource remains healthy to ensure food security in the long-term and secure the productivity and profitability of Union agriculture. Sustainable soil management practices maintain or enhance soil health and contribute to the sustainability and resilience of the food system.

(23) The **aspirational** long-term objective of the Directive is to achieve healthy soils by 2050. As an intermediate step, in light of the limited knowledge about the condition of soils and about the effectiveness and costs of the measures to regenerate their health, the **D**irective takes a staged approach. In the first stage**,** the focus will be on setting up the soil monitoring framework and assessing the situation of soils throughout the EU. It also includes requirements to lay down measures to manage soils sustainably**,** […] regenerate unhealthy soils**,** once their condition is established**, as well as assess and manage the risks of contaminated sites. However, it does not impose** […] an obligation to achieve healthy soils by 2050 **nor** […] intermediate targets. This proportionate approach will allow sustainable soil management and regeneration of unhealthy soils to be well prepared, incentivised and set in motion. In a second stage, as soon as the results of the first assessment of soils and trends analysis are available, the Commission will take stock of the progress towards the 2050 objective and the experience thereof, and will propose a review of the **D**irective if necessary to accelerate progress towards 2050.

(24) Addressing the pressures on soils and identifying the appropriate measures to maintain or regenerate soil health requires that the variety of soil types, the specific local and climatic conditions and the land use or the land cover is taken into account. It is therefore appropriate that Member States establish soil […] **units reflecting a certain degree of homogeneity of those characteristics, for the monitoring and assessment of soil health across all their territory**. **Soil units should however be under the management of** […] **appropriate** […] governance **structures** […] **enabling Member States** to **ensure that the monitoring and assessment are properly undertaken, and that sustainable** manag**ement of** soils and […] measures **are** ca**r**ried out to comply with the requirements laid down in this Directive**. Soil districts reflect the administrative territories under the responsibility of these governance structures and cover one or several entire soil units** […][20].

[20] […]

(24a) To design the sample survey for the soil monitoring, the Member States will need to take into account their soil districts and soil units. In order to ensure sufficient level of harmonisation between Member States, the minimum criteria to define soil units should be defined at European level. In that regard, soil type and land use are two minimum criteria that should serve as harmonised basic data. As for the soil type, the map of soil regions of the European Union and Adjacent Countries[21] allows to represent the frame condition for soil development at the landscape level. This map builds on soil types as defined in the World Reference Base for Soil Resources[22], as well as on fully comparable and harmonized basic data at the continental level, i.e climate, topography, relief, geology and vegetation. As for the land use, the categories as defined in Regulation (EU) 2018/841[23] and the IPPC Guidelines serve as a harmonised basis for land use reporting. Therefore, in order to delineate the soil units, Member States should take into account at least the soil districts, as well as the above mentioned soil regions and the land use categories. Due to spatial variability in soil properties and land use, a soil unit may consist of non-adjacent areas. In addition, climatic and environmental conditions can be taken into account. More detailed or updated information at the European, national or subnational level could be used, when available.

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21 **'Soil Regions of the European Union and Adjacent Countries 1:5,000,000', 2005, accessed 2024-03-07, http://data.europa.eu/88u/dataset/ae71ffee-1ae9-4624-ae3f-f49513fe9dcb**

22 **https://www.fao.org/soils-portal/data-hub/soil-classification/world-reference-base/en/**

23 **Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (OJ L 156, 19.6.2018, p. 1).**

(25) In order to ensure an appropriate governance on soils, Member States should be required to appoint […] **one or more** competent authorit**ies** for each soil district. Member States should be allowed to appoint any additional competent authority at **the** appropriate level**,** including at national or […] **subnational** level.

(25a) Member States should be allowed to designate the suitable competent authority for carrying out in military sites the duties laid down in this Directive. In addition, any data and information pertaining to the military sites should not be disclosed, given their disclosure can adversely affect public security or national defence. Therefore, Member States should be allowed not to make such data and information accessible to the public, including through the digital soil health data portal or the register of potentially contaminated sites and contaminated sites, nor to report them to the Commission and the EEA.

(26) In order to have a common definition of healthy soil condition, there is a need to define a minimum common set of measurable criteria, which, if not respected leads to a critical loss in the soil's capacity to function as a vital living system and to provide ecosystem services. Such criteria should reflect and be based on the existing level of soil science.

(27) In order to describe soil degradation it is necessary to establish **common** soil descriptors that can be measured or estimated. Even if there is significant variability between soil types, climatic conditions and land uses, the current scientific knowledge allows to set criteria at Union level for some of those soil descriptors. However, Member States should be able to adapt the criteria for some of these soil descriptors based on specific national or local conditions and define the criteria for other soil descriptors for which common criteria at EU level cannot be established at this stage. For those descriptors for which clear criteria that would distinguish between healthy and unhealthy condition cannot be identified now, only monitoring and assessment are required. This will facilitate the development of such criteria in future.

(27a) In order to make a clear distinction between the aspirational long-term objective of this Directive and the operational aspects of implementing sustainable soil management practices, the criteria for healthy soil condition of the soil descriptors are split into non-binding sustainable target values and operational trigger values. The non-binding sustainable target values reflect the long-term aspirational objective of this Directive and do not create an obligation to act. These target values reflect, based on the current scientific knowledge, the ideal situation where the capacity of soils to provide ecosystem services will not decrease and no significant harm will occur to human health or the environment. However, bearing in mind the need for efficiency and the limited resources available, measures to achieve good soil health need to be prioritized and implemented gradually. Therefore, operational trigger values are needed. These values set in motion appropriate measures to maintain or regenerate soil health. For each aspect of soil degradation, one or several proportional and feasible trigger values are set. This enables a stepwise implementation of measures ranging from vigilance and awareness raising to sustainable management up to regeneration practices. Setting the trigger values at Member State level ensures that local conditions and practices, soil use, and current policies can be fully taken into account. Member States could decide to set the trigger value for one or more soil degradations at the same level as the target value for these soil degradations. The Commission should support Member States in establishing the sustainable target and operational trigger values.

[…]

(29) Some soils have special characteristics either because they are atypical by nature and constitute rare habitats for biodiversity or unique landscapes or because they have been heavily modified by humans **and may contain tangible traces of our past**. Those characteristics should be taken into account in the context of the definition of healthy soils and the requirements to achieve healthy soil condition.

(29a) Similarly to the aspirational long-term objective to achieve healthy soils by 2050, and in view of contributing to the objectives of the EU Soil Strategy for 2030 and in particular, to the so-called "No Net Land Take" objective, this Directive also aims to adopt a staged approach on the issue of land take. To contribute to this long-term goal, it is important to assess the various processes of land take, and aim to reduce and mitigate their impact on soil health and ecosystem services.

This Directive thus aims to set up a monitoring framework for the more visible aspects of land take: soil sealing and soil destruction, using already available tools at EU level through the Copernicus products, optionally complemented with national remote sensing data and inventories. The aim is to be as cost-effective and pragmatic as possible at this stage, with the goal of having a harmonised understanding, and to initiate first considerations at the national level, based on sound data.

(30) Soil is a limited resource subject to an ever-growing competition for different uses. Land take **is a process which causes a modification of land use and of the characteristics of the soil. It can be seen as an overarching concept that can be subdivided into multiple aspects. First, an aspect of land use change from natural and semi-natural land uses towards settlement areas. Second, an aspect of the artificialisation of soils caused by the durable alteration of the soil components and characteristics, resulting in a loss of the capacity of soils to provide ecosystem services.**

This last aspect of land take, soil artificialisation, can be further divided into three main processes: soil sealing, soil destruction, and other types of soil artificialisation.

Soil sealing can be equated to a covering of the soils with artificial materials, impermeable or (semi-)permeable, often combined with a destruction of soils. Buildings and roads are an example of impermeable soil sealing. Train tracks with associated permeable materials are a type of semi-permeable soil sealing.

Soil destruction is the destruction of the surface layer of the soil and sometimes the subsoil. It can be seen most predominantly during construction works, open-pit mining, quarrying, which completely remove – sometimes temporarily - layers of soil, or more insidiously in examples such as waste disposal and dumping grounds where the soil is damaged to the point of destruction.

Finally, there are other, less visible types of soil artificialisation, which could be for example the intentional stabilisation and compaction of soil, the modification of layers of soil or subsoil with the inclusion of artificial materials or the partial covering of soil with composite materials.

Soil artificialisation is as such a type of soil degradation which can be one of the most impactful on soil health, as it can lead up to a complete loss of soil through soil destruction and the total loss of soil functions, often reducing the services provided by soil to a platform for infrastructure and a source of raw materials, with infiltration sometimes still possible into the (sub-)soil, most notably when (semi-)permeable materials are used. The most visible and impactful sub-types of soil artificialisation – soil sealing and soil destruction – are also the easiest to monitor, and are as such the main focus of the monitoring in this Directive.

(30a) Among the land take aspects, the growth of settlement areas is a process often driven by economic development needs, […] **which entails a land use change from** natural and semi-natural areas (including **protected forests, natural grasslands, peatlands,** agricultural and forestry land, gardens and parks) […] **to settlement area, for example as part of urban** development**.**

Settlement areas, as described in the revised Regulation (EU) 2018/841, includes all developed land -- i.e. residential, transportation, commercial, and production (commercial, manufacturing) infrastructure of any size, unless they are already included under other land-use categories. It also includes soils, herbaceous perennial vegetation such as turf grass and garden plants, trees in rural settlements, homestead gardens and urban areas.

In particular, this aspect of land take often affects the most fertile agricultural soils, potentially putting food security in jeopardy, by "taking" them for settlement use instead. This change of land use is often, but not always, a precursor to some other aspects of land take, in particular to soil sealing, and as such is important to monitor in order to anticipate at least part of the process of soil sealing. It is also important to note that settlements are not always fully sealed. On the contrary, a significant amount of urban area still retains important amounts of unsealed soils, sometimes even higher than 50% of their surface. This indicator of land take alone thus is not sufficient to fully monitor the issue, as it does not differentiate between sealed and unsealed soils, and invisibilises the green areas within settlement areas, making their monitoring and sustainable management more difficult.

(30b) Unsealed soils in settlement areas, and in densely populated urban areas in particular, are as important to monitor and manage sustainably as any other soils, as they still provide ecosystem services that are vital in maintaining a good quality of life within urban areas. These densely populated areas combine and concentrate a wide array of environmental issues in a comparatively smaller surface area. These issues can go from a higher rate of contaminated sites due to past industries, to higher risk of flooding because of soil sealing, to a higher prevalence of heat islands and a more limited access to green areas essential for mental and physical wellbeing. Soil ecosystem services provided by healthy soils in urban area can as such have a very strong positive impact on a great quantity of people by tackling those specific issues and their importance should not be minimised. Those green spaces, both public and private, also contribute to the blue-green network and biodiversity, and are a key element for other environmental policies. This is also in line with Article 8 of Regulation …/…[24]+ on the restauration of urban ecosystems, which reflects the need for Member States to maintain and increase the surface of urban green spaces.

[24] **+ OP : please insert in the text the number of Regulation on nature restoration contained in document COM(2022) 304**

(30c) On the other hand, soil sealing and soil destruction, as part of the soil artificialisation aspect of land take, are different from settlement growth, as they do not focus on a land use change, but rather on a concrete and measurable change in the soil cover and soil characteristics. In soil sealing, the […] soil **is for example modified and reduced to serving** as a platform for constructions and infrastructure, **including buildings, roads, parking, and other mineral surfaces. Soil destruction might be caused by soil removal, even temporarily, when the soil is reduced to being used** as a direct source of raw material **such as minerals and lignite, during mining or quarrying activities, during construction works or as part of soil sealing.** […] **It can also be found in dumping grounds, where the soil is covered by waste materials, damaging it to the point of destruction.** The**se** […] transformation**s** may cause the loss, often irreversibly, of the capacity of soils to provide other ecosystem services (provision of food and biomass, water and nutrients cycling, basis for biodiversity and carbon storage). In particular, […] **soil sealing is** often […] **done on** […] fertile agricultural soils, […] **contributing further to the disruption of** food security […]. Sealed soil also exposes human settlements to higher flood peaks and more intense heat island effects. **In addition, sealed and destroyed soils are the easiest of the soil artificialisation aspects to monitor through remote sensing and machine learning, making their monitoring easier.** Therefore, **sealed and destroyed soils were selected** […] to **be** monitor**ed** […] **together with** their effects on soil's capacity to provide ecosystem services.

(30d) Concerning renewable energies, Member States can qualify the soil as sealed, destroyed or neither sealed nor destroyed, depending on the type of construction. For example, solar parks could either be considered as soil sealing or not, depending on what is done with the soil at their base. If the soil can still sustain an ecosystem sufficiently, then it is not considered soil sealing. The assessment should be made based on the impact on the soil, regardless of purpose or appearance of the construction. Inventories of this type of areas, where information on what is done with the soil at their base is available, can be intersected with the remote sensing maps of soil sealing to qualify these areas as unsealed soils.

(30e) The principle of the reduction of the impact is essential when it comes to soil sealing and soil destruction in general. Indeed, it is vital to find a balance between the needed economical and demographic growth, and the provision of ecosystem services. As such, it is […] appropriate to lay down certain principles to mitigate the impacts of […] **soil sealing and soil destruction** as part of sustainable soil management**, by adopting an effort-based approach taking into account a large set of good practices aimed at minimizing and offsetting the loss of soil's capacity to provide ecosystem services. They should be based on the land take hierarchy of the EU Soil Strategy for 2030, taking into account different conditions and geographical and administrative circumstances in Member States.**

These can cover a wide array of practices such as minimising soil sealing, de-sealing and renaturating previously sealed soils, rational densification of urbanised areas while safe guarding green spaces – including urban green spaces – and natural terrains, revitalisation of brownfields, privileging time-limited land take and performing land rehabilitation upon the termination of the land take.

It should be noted that, to be as sustainable as possible in the application of these principles, the offsetting measures, depending on the ecosystem service to be offset, might need to be geographically as close as possible to the source of the loss of ecosystem service. Indeed, a collateral issue to this kind of principles if applied wrongly, can be the displacement – sometimes very far away – of green and high value ecosystem areas and services away from the sealed places, with a complete concentration of soil sealing and soil destruction in the affected areas.

(31) The assessment of soil health based on the monitoring network should be accurate while at the same time keeping the costs of such monitoring at reasonable level. It is therefore appropriate to lay down criteria for sampling points that are representative of the soil **units reflecting a certain degree of homogeneity of soil** condition under different soil types, climatic conditions and land use.

It is also appropriate to consider the specific situation of the Union's outermost regions, as listed in Article 349 of the Treaty on the Functioning of the European Union (TFEU), which provides for specific measures to support those regions. Therefore, Member States should be able to adapt, when necessary, the monitoring and assessment of soil health obligations to their outermost region's specific characteristics.

The grid of sampling points should be determined by using geostatistical methods**, be based on the soil units** and be sufficiently dense to provide an estimation of the area of […] **degradated** soils **throughout the territory of Member States** […] within an uncertainty of not more than 5% **at the soil unit level**. This value is commonly considered to provide a statistically sound estimation and reasonable assurance that the objective has been achieved. **The design of the sample survey should be based on the best available information on soil properties distribution, including, but not limited to information resulting from previous national or subnational surveys, relevant measurements from soil managers and measurements conducted under Union and international legislations or specific programmes such as the LUCAS soil campaign as part of the Land Use/Cover Area frame statistical Survey (LUCAS) or the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests). Data obtained from sampling points taken during soil investigations at contaminated sites may be used for the assessement of soil health criteria, but should not prevent from complying with obligations set out under this Directive for the management of contaminated sites.**

(32) The Commission should assist and support Member States**, at their request, to** monitor **their** soil health by continuing to carry out and enhancing regular in-situ soil sampling and related soil measurements (LUCAS soil) as part of the Land Use/Cover Area frame statistical Survey (LUCAS) Programme **that applies Regulation (EC) No 223/2009 of the European Parliament and of the Council**[25]. For that purpose**, and subject to the agreement of Member States**, the LUCAS Programme sh**ould** be enhanced and upgraded to fully align it with the specific quality requirements to be met for the purpose of this Directive. In order to alleviate the burden, Member States should be allowed to take into account the soil health data surveyed under the enhanced LUCAS soil. The Member States thus supported should take the necessary legal arrangements to ensure that the Commission can carry out such in-situ soil sampling, including on privately owned fields, and in compliance with applicable national or Union legislation.

(33) The Commission is developing remote sensing services in the context of Copernicus as a user-driven programme **established by Regulation (EU) 2021/696**[26] , hereby also supporting Member States. In order to increase the timeliness and effectiveness of soil health monitoring, and where relevant, Member States should use remote sensing data including outputs from the Copernicus services for monitoring relevant soil descriptors **and soil indicators of soil sealing and soil destruction,** and for assessing soil health. The Commission and the European Environment Agency should support exploring and developing soil remote sensing products, to assist the Member States in monitoring the relevant soil descriptors **and indicators**.

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25 **Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and repealing Regulation (EC, Euratom) No 1101/2008 of the European Parliament and of the Council on the transmission of data subject to statistical confidentiality to the Statistical Office of the European Communities, Council Regulation (EC) No 322/97 on Community Statistics, and Council Decision 89/382/EEC, Euratom establishing a Committee on the Statistical Programmes of the European Communities (OJ L 87, 31.3.2009, p. 164–173)**.

26 **Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU (OJ L 170, 12.5.2021, p.69-148).**

(34) Building on and upgrading the existing EU soil observatory, the Commission should establish a digital soil health data portal that should be compatible with the EU Data Strategy[27] and the EU data spaces and which should be a hub providing access to soil data coming from various sources**, in the aggregated form at the soil unit level or a more detailed level if relevant, as long as it is not possible to identify the individual values or the location of the underlying georeferenced samples**. That portal should primarily include all the data collected by the Member States and the Commission as required by this Directive**. The treatment of these data as well as their access should comply with relevant Union legislation such as Directive 2003/04/EC on public access to environmental information, Directive 2007/2/EC on establishing an Infrastructure for Spatial Information in the European Community, Directive 1024/2019/EC on open data and re-use of public sector information, Regulation 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data, and Regulation 223/2009 on European statistics. Furthermore, Member States should be able to express their opinion on the data made available to the public for their territory through the portal or related reports, and request to correct errors if any.**

I**n addition, i**t should […] be possible to integrate in the portal, on a voluntary basis, other relevant soil data collected by Member States or any other party (and in particular data resulting from projects under Horizon Europe and the Mission 'A Soil Deal for Europe'), provided that those data meet certain requirements as regards format and specifications. Those requirements should be specified by the Commission by way of implementing acts.

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27 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a European strategy for data, COM(2020)66 final.

(35) It is also necessary to improve the harmonisation of soil monitoring systems used in the Member States and exploit the synergies between Union and national monitoring systems in order to have more comparable data across the Union. **In this respect it is very important to ensure the quality and comparability of soil measurements through the application of quality management system practices by the laboratories involved. To minimize the administrative burden for the laboratories, a Member State could decide to limit the number of needed accreditations of the laboratories to only one for one of the methodologies for determining the values of soil descriptors. Equivalent standards at Union or international level, for instance the quality management system of ICP Forests, could be used.**

(35a) In order to ensure the protection of soils from pollution by emerging substances that have the potential to cause significant risks to human and animal health and to contaminate surrounding air, surface waters, groundwater, and subsequently oceans, policy mechanisms to detect and assess such substances of emerging concern should be established. In that regard, an approach that allows monitoring and analysis of those substances or groups of substances via watch lists, as is already the case for surface water and groundwater, should be developed for soil contamination. The substances or groups of substances to be placed on the watch list should be selected from amongst those substances for which the information available indicates that they could pose a significant risk at Union level to, or via, the soil environment, and for which the monitoring data are insufficient. The number of such substances or groups of substances to be monitored and analysed under the watch lists should not be limited.

(36) In order to make the widest possible use of soil health data generated by the monitoring carried out under this Directive, Member States should be required to facilitate the access to such data **to the public, in the aggregated form at the soil unit level or a more detailed level if relevant, as long as it is not possible to identify the individual values or the location of the underlying georeferenced samples. The confidential information collected by the Commission or by Member States to produce European statistics should be protected in accordance with the rules and measures of Regulation (EC) No 223/2009 of the European Parliament and of the Council, in order to gain and maintain the confidence of the parties responsible for providing that information. In case the Commission or Member States produce soil health statistics, they should ensure that confidential data respect the principles of Regulation (EC) No 223/2009 of the European Parliament and of the Council.**

Moreover, in order to protect data ownership, it is important that the Commission, the EEA or the Member States only disclose information with the consent of the data owner.

In addition, Member States should communicate soil health data and assessments […] **to** relevant stakeholders such as farmers, foresters, land owners and local authorities**, upon their request**.

Besides, soil health data made available pursuant to this Directive can be used for monitoring of soil-related aspects in other Union legislation, where relevant.

(37) To maintain or enhance soil health, soils need to be managed sustainably. Sustainable soil management will enable the long-term provision of soil services, including improved air and water quality and food security. It is therefore appropriate to lay down **guiding** sustainable soil management principles to […] **define** soil management practices.

(38) Economic instruments, including those under the Common Agricultural Policy (CAP) that provide support to farmers, have a crucial role in the transition to the sustainable management of agricultural soils and, to a lesser extent, forest soils. The CAP aims to support soil health through the implementation of conditionality, eco-schemes and rural development measures. Financial support for farmers and foresters who apply sustainable soil management practices can also be generated by the private sector. Voluntary sustainability labels in the food, wood, bio-based, and energy industry, for example, established by private stakeholders, can take into account the sustainable soil management principles set out in this Directive. This can enable food, wood, and other biomass producers that follow those principles in their production to reflect these in the value of their products. Additional funding for a network of real-life sites for testing, demonstrating and upscaling of solutions, including on carbon farming, will be provided through the Soil Mission's living labs and lighthouses. Without prejudice to the polluter pays principle, support and advice should be provided by Member States to help landowners and land users affected by action taken under this Directive taking into account, in particular, the needs and limited capacities of small and medium sized enterprises.

(39) Pursuant to Regulation (EU) 2021/2115 of the European Parliament and of the Council[28], Member States have to describe in their CAP Strategic Plans how the environmental and climate architecture of those Plans is meant to contribute to the achievement of, and be consistent with, the long-term national targets set out in, or deriving from, the legislative acts listed in Annex XIII to that Regulation.

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28 Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013 (OJ L 435, 6.12.2021, p. 1).

(40) In order to ensure that the best sustainable soil management practices are implemented, Member States should be required to closely monitor the impact of soil management practices and adjust practices and recommendations as necessary, taking into account new knowledge from research and innovation. Valuable contributions are expected in this respect from the Horizon Europe Mission 'A Soil Deal for Europe' and in particular its living labs and activities to support soil monitoring, soil education and citizen engagement.

(41) **Soil r**egeneration **and soil renaturation** bring degraded soils back to healthy condition. When defining soil regeneration measures, Member States should be required to take into account the outcome of the soil health assessment and to adapt those regeneration measures to the specific characteristics of the situation, the type, the use and the condition of the soil and the local, climatic and environmental conditions.

In the case of soil renaturation, and in the context of this Directive, it differs from soil regeneration in that it covers the reconstruction of soils following soil sealing or soil destruction, and is also a way of countering soil artificialisation in the broad sense through soil restoration, by recovering more natural components and processes for a soil that was artificialised. The end goal is to get as close as possible to the natural functioning of the soil and its optimal ecosystem services provision. Nature-based solutions or engineering of new soils are possible ways of achieving this goal.

(42) To ensure synergies between the different measures adopted under other Union legislation that may have an impact on soil health, and the measures that are to be put in place to sustainably manage and regenerate soils in the Union, Member States should ensure that the sustainable soil management and regeneration practices are coherent with the national restoration plans adopted in accordance with Regulation (UE) …/… of the European Parliament and of the Council[29]; the strategic plans to be drawn up by Member States under the Common Agricultural Policy in accordance with Regulation (EU) 2021/2115, the codes of good agricultural practices and the action programmes for designated vulnerable zones adopted in accordance with Council Directive 91/676/EEC[30], the conservation measures and prioritised action framework established for Natura 2000 sites in accordance with Council Directive 92/43/EEC[31], the measures for achieving good ecological and chemical status of water bodies included in river basin management plans prepared in accordance with Directive 2000/60/EC of the European Parliament and of the Council[32], the flood risk management measures established in accordance with Directive 2007/60/EC of the European Parliament and of the Council[33], the drought management plans promoted in the Union Strategy on Adaptation to Climate Change[34], the national action programmes established in accordance with Article 10 of the United Nations Convention to Combat Desertification, targets set out under Regulation (EU) 2018/841 of the European Parliament and of the Council[35] and

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29 OP : please insert in the text the number of Regulation on nature restoration contained in document COM(2022) 304 and insert the number, date, title and OJ reference of that Regulation in the footnote […]

30 Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991, p. 1).

31 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

32 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, pp. 1-73).

33 Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (OJ L 288, 6.11.2007, p. 27).

34 Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change COM(2021)82 final.

35 Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (OJ L 156, 19.6.2018, p. 1).

Regulation (EU) 2018/842 of the European Parliament and of the Council[36], the integrated national energy and climate plans established in accordance with Regulation (EU) 2018/1999 of the European Parliament and of the Council[37], the national air pollution control programmes prepared under Directive (EU) 2016/2284 of the European Parliament and of the Council[38], risk assessments and disaster risk management planning established in accordance with Decision No 1313/2013/EU of the European Parliament and of the Council[39], **the** […] national action plans established in accordance with Regulation (UE) …/… of the European Parliament and of the Council[40]**, and the national actions plans adopted in accordance with Article 4 of Directive 2009/128/EC of the European Parliament and of the Council**[41]**, and the environmental impact assessments performed according to Directive 2011/92/EU of the European Parliament and of the Council**[42]. Sustainable soil management and regeneration practices should be, as far as possible, integrated within these programmes, plans and measures to the extent that they contribute to the achievement of their objectives. Consequently, relevant indicators and data, such as soil-related result indicators under the CAP Regulation and statistical data on agricultural input and output reported under

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36 Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (OJ L 156, 19.6.2018, p. 26).

37 Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1).

38 Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (OJ L 344, 17.12.2016, p. 1).

39 Decision No 1313/2013/EU of the European Parliament and of the Council of 17 December 2013 on a Union Civil Protection Mechanism (OJ L 347, 20.12.2013, p. 924).

40 + OP: please insert in the text the number of the Regulation on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115 contained in document COM(2022)305 and insert the number, date, title and OJ reference of that Directive in the footnote

41 **Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides (OJ L 309 24.11.2009, p. 71).**

42 **Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) (OJ L 26, 28.1.2012, p. 1).**

Regulation (EU) 2022/2379 of the European Parliament and of the Council[43], should be accessible to the competent authorities responsible for sustainable soil management and regeneration practices and soil health assessment in order to cross-link these data and indicators and thus enable the most accurate possible assessment of the effectiveness of the measures chosen.

(43) Contaminated sites are **often** the legacy of decades **of activities such as** industrial **or military** activity **in the EU** and may lead to risks for human health and the environment now and in the future. It is therefore necessary first to identify and investigate potentially contaminated sites and then, in case of confirmed contamination, to assess the risks **of the contaminated site** and take measures to address unacceptable risks. **In this context, it is essential to also consider the impact of contaminated sites on environmental media or matrices other than soil, such as groundwater or surface water. Some of those activities, as for instance underground storage facilities for dangerous substances, may have taken place in the parent material or bedrock. When such underground storage facility has leaked, contaminants may have moved into the bedrock or parent materials, but most likely will not be found in the soil. Yet they may spread and thus have an impact on human health or the environment. Therefore, in case such activities are present at potentially contaminated sites, also the parent material or bedrock in the vicinity of the activity will have to be investigated to verify whether the activity has caused contamination that has an impact on human health or the environment.**

[43] Regulation (EU) 2022/2379 on statistics on agricultural input and output.

(43a) Soil investigation **has to determine whether a potentially contaminated site is contaminated or not, and whether the contamination poses a risk to human health or the environment; it is not mandatory to analyse other soil descriptors than soil contamination in this investigation. As land use may change over time, it is relevant to keep information on contamination accessible to the public. For instance, at the moment a decision has to be taken on the change of land use, it is important to carry out an evaluation whether a contamination that was found in a past soil investigation, may pose a risk to the new land use that is envisaged. So, to conclude whether a potentially contaminated site is contaminated or not, also the risks to human health or the environment linked to sensitive site uses have to be taken into account. A soil investigation** may **also** prove that a potentially contaminated site is in fact not contaminated. In that case, the site should no longer be labelled by the Member State as potentially contaminated, unless contamination is suspected based on new evidence.

(43b) As the number of potentially contaminated sites and contaminated sites may be very large and the level of risk a contaminated site poses may vary from very low to very high, it is logical to follow a risk-based and stepwise approach to identify and investigate potentially contaminated sites and to manage contaminated sites. Such approach can allow prioritisation by Member States. In this prioritisation, Member States can take into account the potential risk a suspected or confirmed contamination poses, as well as economical or social context. The evaluation of potential risk used in such prioritisation is much more generic than the site-specific risk assessment that is carried out when investigating a contaminated site.

(44) To identify potentially contaminated sites, Member States should collect evidence among others through historical research **exploring information on** […]industrial **activities,** incidents and accidents **using old maps, archives, press articles**, environmental permits and notifications by the public or authorities. **Member States should decide on a list of potentially contaminating activities and have the possibility to prioritise certain potentially contaminated sites that are most likely to pose a potential risk to human health or the environment, based on the type of activity, size of the potential contamination, indication of immediate risk or other relevant information. As the number of potentially contaminated sites may evolve through time, a first identification should be completed within a defined timeframe, based on the existing evidence, whilst the rest should be identified through a systematic approach.**

(45) In order to ensure that soil investigations on potentially contaminated sites are carried out timely and effectively, Member States should, in addition to the obligation to lay down the […] **timeframe** by which those investigations should be carried out, be required to lay down specific events that also trigger such investigation. Such triggering events may include the request or review of an environmental or building permit or an authorisation required pursuant to Union legislation or national legislation, soil excavation activities, land use changes or land or real estate transactions. Soil investigations may follow different stages, such as a **preliminary** desk study, **site-specific historic study to collect information about past industrial activities, incidents or accidents,** site visit, preliminary or exploratory investigation, more detailed or descriptive investigation, […] field or laboratory testing**, and may include a site-specific assessment of the risks the contamination poses to human health and the environment**. **In case contamination is found, the soil investigation should underpin the characterisation of the contamination and its environmental context and provide basic information for the site-specific risk assessment and the eventual design of the risk reduction measures.** Baseline reports and monitoring measures implemented in accordance with Directive 2010/75/EU of the European Parliament and of the Council[44] could also qualify as soil investigation where appropriate.

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44 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (OJ L 334, 17.12.2010, p. 17.

(46) Flexibility for the management of potentially contaminated sites and contaminated sites is needed to take account of costs, benefits and local specificities. Member States should therefore at least adopt a risk-based **and stepwise** approach for managing potentially contaminated sites and contaminated sites, taking into account the difference between these two categories, and which allows to allocate resources taking account of the specific environmental, economic and social context. Decisions**, including on the risk-based and stepwise approach,** should be taken based on the nature and extent of potential risks for human health and the environment resulting from exposure to soil contaminants **or to contaminants that migrated to the groundwater** (e.g. exposure of vulnerable populations such as pregnant women, persons with disabilities, elderly people and children).

(46a) Natural and anthropogenic background levels should be taken into account in the risk assessment and could also help to set remediation or management objectives.

(46b) The cost-benefit analysis of undertaking **investigation, site-specific risk assessment or** remediation should be positive. **For instance, for small-scale contaminated sites, detailed site-specific risk assessment may be more expensive than immediate soil remediation, or the site could be clearly and seriously contaminated that detailed site-specific risk assessment is not necessary to decide to remediate. In such cases, the number of steps in the risk-based approach can be reduced and detailed site-specific risk assessment brings little added value.** Member States should lay down the specific methodology for determining the site-specific risks of contaminated sites. Member States should also define what constitutes an unacceptable risk from a contaminated site based on scientific knowledge, the precautionary principle, local specificities, and current and […] **planned** land use.

(46c) In order to reduce the risks of contaminated sites to an acceptable level for human health and the environment, Member States should […] **ensure that** adequate risk reduction measures including remediation **are taken**. The optimum […] **risk reduction measures** should be sustainable and selected through a balanced decision-making process that takes account of the environmental, economic and social impacts. **The choice of the technique or measure depends on a combination of criteria such as the nature of the contaminants, the characteristics of the soil, the volume of the contamination, the time and space available, budgetary constraints, remediation objectives, current and planned land use, potential to improve soil health, road traffic, nuisance for the neighbourhood, current operation of activities, etc. As soil remediation focuses on taking away the risk that soil contamination poses to human health or environment, it may be that it does not improve other soil health descriptors. Certain remediation techniques can also negatively impact soil health. Therefore, all the advantages and disadvantages of the remediation techniques should be taken into account.** It should be possible to qualify measures taken under other Union legislation as risk reduction measures under this Directive when those measures effectively reduce risks posed by contaminated sites.

(46d) The management of potentially contaminated sites and contaminated sites should respect the polluter-pays, precautionary and proportionality principles. **Member States should aim to identify the polluter and sh**ould **establish a hierarchy or decision chain of responsibility, to decide who should bear the cost of the soil investigation, risk assessment and the risk reduction measures. Member States may decide to further distinguish between historically and newly contaminated sites and to apply a more stringent approach for contamination caused after a certain pivot date. In case of contaminated sites for which no accountable party can be identified or held accountable, Member States should be able to use financial instruments and EU financial programmes in order to fulfil the obligations regarding soil investigation and remediation.**

(46e) Soil contamination is already dealt under existing relevant European legislation, such as in Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions or Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage. The rules of this Directive are without prejudice to requirements under existing relevant European legislation.

(46f) Soil investigations, risk assessments or risk reduction measures that have been carried out on potentially contaminated sites or contaminated sites prior to the entry into force of this Directive that meet the requirements set out in this Directive, should be deemed appropriate to fulfill the requirements set out by this Directive on such sites.

(47) Measures taken pursuant to this Directive should also take account of other EU policy objectives, such as the objectives pursued by [Regulation (EU) xxxx/xxxx[45]] that aim at ensuring secure and sustainable supply of critical raw materials for Europe's industry.

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45 + OP: please insert in the text the number of the Regulation establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) 168/2013, (EU) 2018/858, 2018/1724 and (EU) 2019/1020 contained in document COM(2023)160 and insert the number, date, title and OJ reference of that Directive in the footnote.

(48) Transparency is an essential component of soil policy and ensures public accountability and awareness, fair market conditions and the monitoring of progress. Therefore, Member States should set up and maintain a national register of contaminated sites and potentially contaminated sites which contains site-specific information that should be made publicly accessible in an online georeferenced spatial database. **In case registers are established at subnational level, Member States should foresee a coordinated national entry point to the different subnational registers, with for example a centralised national website with weblinks.** The register should contain the information that is necessary for the public to be informed on the existence and on the management of potentially contaminated sites and contaminated sites. Because the presence of soil contamination is not yet confirmed but only suspected on potentially contaminated sites, the difference between contaminated sites and potentially contaminated sites has to be communicated and explained well to the public to avoid raising unnecessary concern. **Registers that exist already at the time this Directive enters into force and that meet the requirements set out in this Directive, should be deemed appropriate to fulfill the requirements set out in this Directive.**

(49) Article 19(1) of the Treaty on European Union (TEU) requires Member States to provide remedies sufficient to ensure effective judicial protection in the fields covered by Union law. In addition, in accordance with the Convention on access to information, public participation in decision- making and access to justice in environmental matters[46] (Aarhus Convention), members of the public concerned should have access to justice in order to contribute to the protection of the right to live in an environment which is adequate for personal health and well-being.

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46 Convention on access to information, public participation in decision- making and access to justice in environmental matters – Declaration, (OJ L 124, 17.5.2005).

(49a) As clarified by the case-law of the Court of Justice[47], Member States may not restrict legal standing to challenge a decision of a public authority to those members of the public concerned who participated in the preceding administrative procedure to adopt that decision. In addition, any review procedure should be fair, equitable, timely and not prohibitively expensive, and provide for adequate redress mechanisms, including injunctive relief as appropriate. Furthermore, in line with the case law of the Court of Justice[48] access to justice is as a minimum to be granted to the public concerned.

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47 **Case C–826/18, Judgment of the Court (First Chamber) of 14 January 2021; LB and Others v College van burgemeester en wethouders van de gemeente Echt-Susteren; paragraphs 58 and 59.**

48 **Case C-237/07, Judgment of the Court (Second Chambre) of 25 July 2008; Dieter Janecek v Freistaat Bayern,; paragraph 42; Case C-404/13, Judgment of the Court (Second Chamber) of 19 November 2014; Client Earth v the Secretary of State for the Environment, Food and Rural Affairs; paragraph 56; Case C-723/17, Judgment of the Court (First Chamber) of 26 June 2019; Craeynest and Others; paragraph 56; Case C-752/18, Judgment of the Court (Grand Chamber) of 19 December 2019, Deutsche Umwelthilfe eV v Freistaat Bayern, paragraph 56.**

(50) Directive (EU) 2019/1024 of the European Parliament and of the Council[49] mandates the release of public sector data in free and open formats. The overall objective is to continue the strengthening of the EU's data economy by increasing the amount of public sector data available for re-use, ensuring fair competition and easy access to public sector information, and enhancing cross-border innovation based on data. The main principle is that government data should be open by default and design. Directive 2003/4/EC of the European Parliament and of the Council[50] is aimed at guaranteeing the right of access to environmental information in the Member States in line with the Aarhus Convention. The Aarhus Convention and Directive 2003/4/EC encompass broad obligations related both to making environmental information available upon request and actively disseminating such information. **Directive 2003/04/EC provides a restricted list of exemptions from dissemination or disclosure of environmental information, taking into account the public interest served by the dissemination, in case the dissemination or disclosure of the information would adversely affect certain interests such as public security or national defence; the confidentiality of commercial or industrial information where such confidentiality is provided for by national or Union law to protect a legitimate economic interest, including the public interest in maintaining statistical confidentiality and tax secrecy; the confidentiality of personal data and/or files relating to a natural person where that person has not consented to the disclosure of the information to the public, where such confidentiality is provided for by national or Union law.** Directive 2007/2/EC of the European Parliament and of the Council[51] is also of broad scope, covering the sharing of spatial information, including data sets on different environmental topics. It is important that provisions of this Directive related to access to information and data-sharing arrangements complement those Directives and do not create a separate legal regime. Therefore, the provisions of this Directive regarding information to the public and information on monitoring of implementation should be without prejudice to Directives (EU) 2019/1024, 2003/4/EC and 2007/2/EC.

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49 Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information (OJ L 172, 26.6.2019, p. 56).

50 Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p. 26).

51 Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) (OJ L 108, 25.4.2007, p. 1).

(50a) It is also important that provisions of this Directive related to data-sharing arrangements enable Member States to reuse already existing data infrastructures established pursuant to Directives (EU) 2019/1024 and 2007/2/EC to ensure an effective and timely exchange of information. For this reason the Member States and the Commission could make use of tools such as REPORTNET managed by the EEA. This approach follows the once-only principle and avoids additional burden on the Member States to setup a dedicated data infrastructure under this Directive.

(51) In order to ensure the necessary adaptation of the rules on soil health monitoring, sustainable soil management and management of contaminated sites, the power to adopt acts in accordance with Article 290 of the Treaty on the Functioning of the European Union should be delegated to the Commission in respect of amending this Directive to adapt to technical and scientific progress the methodologies for monitoring soil health, […] the indicative list of risk reduction measures **and** the phases and requirements for the site-specific risk assessment**.** […] It is of particular importance that the Commission carries out appropriate consultations during its preparatory work, including at expert level, and that those consultations be conducted in accordance with the principles laid down in the Interinstitutional Agreement on Better Law-Making of 13 April 2016[52]. In particular, to ensure equal participation in the preparation of delegated acts, the European Parliament and the Council receive all documents at the same time as Member States' experts, and their experts systematically have access to meetings of Commission expert groups dealing with the preparation of delegated acts.

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52 Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making of 13 April 2016 (OJ L 123, 12.5.2016, p. 1).

(52) In order to ensure uniform conditions for the implementation of this Directive, implementing powers should be conferred on the Commission in order to set out the format, structure and detailed arrangements for reporting data and information electronically to the Commission. Those powers should be exercised in accordance with Regulation (EU) No 182/2011 of the European Parliament and the Council[53].

(52a) In order to provide support to Member States to carry out their obligations under this Directive, the Commission should provide for documents and scientific tools analysing, synthesizing and documenting, in an efficient and coordinated way, possible methodologies and procedures that could be applied. These non-binding documents and scientific tools would provide in due time essential information for Member States, while ensuring the flexibility to continue using methodologies and procedures already in place. The documents and scientific tools should be established in cooperation with the Member States. These documents and scientific tools should be complemented with the necessary assistance and capacity building.

[53] Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by the Member States of the Commission's exercise of implementing powers (OJ L 55, 28.2.2011, p. 13).

(52b) In addition to the documents and scientific tools, the Commission should organize regular exchange of information, experience and best practices on the application of this Directive. This forum could, in addition to the practical implementation of this Directive, be used to discuss for exemple the use of traffic light systems for the communication to the public of the results of the assessments of soil health; the sustainable management of soil contamination other than anthropogenic point source contamination; the application of the hierarchy of responsability defining the responsible party or parties for the management of contaminated sites; orphan site management; remediation techniques for contaminated sites; the identification and evaluation of natural and anthropogenic background levels; different approaches for the identification of areas where individual criteria for healthy soil condition are not satisfied; the quality management system practices for laboratories; the soil sealing and soil destruction mitigation principles.

(53) The Commission should carry out an evidence-based evaluation and, where relevant, a revision of this Directive, **7 and a half** […] years after its entry into force on the basis of the results of the soil health assessment. The evaluation should assess in particular the need to set more specific requirements to make sure […] **degraded** soils are regenerated and the objective to achieve healthy soils by 2050 is achieved. The evaluation should also assess the need to adapt the definition of healthy soils to scientific and technical progress by adding provisions on certain descriptors or criteria based on new scientific evidence relating to the protection of soils or on the grounds of a problem specific to a Member State arising from new environmental or climatic circumstances. Pursuant to paragraph 22 of the Interinstitutional Agreement on Better Law-Making, that evaluation should be based on the criteria of efficiency, effectiveness, relevance, coherence and EU value added and should provide the basis for impact assessments of possible further measures.

(54) Coordinated measures by all Member States are necessary to achieve the vision to have all soils healthy by 2050 and to secure the provision of ecosystem services by soils across the Union in the long-term. Individual actions of Member States have proven to be insufficient since the soil degradation is continuing and even **increasing** […]. Since the objectives of this Directive cannot be sufficiently achieved by the Member States but can rather, by reason of the scale and effects of the action, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 TEU. In accordance with the principle of proportionality as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.

(55) In accordance with the Joint Political Declaration of 28 September 2011 of Member States and the Commission on explanatory documents[54], Member States have undertaken to accompany, in justified cases, the notification of their transposition measures with one or more documents explaining the relationship between the components of a directive and the corresponding parts of national transposition instruments. With regard to this Directive, the legislator considers the transmission of such documents to be justified.

54 OJ C 369, 17.12.2011, p. 14.

HAVE ADOPTED THIS DIRECTIVE:

Chapter I

General provisions

Article 1

Objective and Subject matter

1. The objective of the Directive is to put in place a solid and coherent soil monitoring framework for all soils across the **Union** […]**,** to continuously improve soil health in the Union, **maintain soils in healthy condition and tackle all aspects of soil degradation,** with the view to achieve healthy soils by 2050**,** […] so that they can supply multiple ecosystem services at a scale sufficient to meet environmental, societal and economic needs, prevent and mitigate the impacts of climate change and biodiversity loss, increase the resilience against natural disasters and for food security and that soil contamination is reduced to levels no longer considered harmful to human health and the environment.

2. This Directive lays down **a framework and** measures on:

   (a) monitoring and assessment of soil health;

   (b) sustainable soil management;

   (c) **management of** contaminated sites.

Article 2

Scope

This Directive applies to all soils in the territory of Member States.

Article 3

Definitions

For the purposes of this Directive, the following definitions shall apply:

(1) ‘soil’ means the top layer of the Earth’s crust situated between the bedrock **or parent material** and the land surface, which is composed of mineral particles, organic matter, water, air and living organisms;

(2) ‘ecosystem’ means a dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit;

(3) ‘ecosystem services’ means **direct or** indirect contributions of ecosystems to the economic, social, cultural and other benefits that people derive from those ecosystems;

(4) ‘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;

(5) ‘sustainable soil management’ means soil management practices that maintain or enhance the ecosystem services provided by the soil without impairing the **soil** functions enabling those services or being **significantly** detrimental to other properties of the environment;

(6) ‘soil management practices’ mean practices that impact the physical, chemical or biological **properties** […] of a soil;

(7) ‘managed soils’ means soils where soil management practices are carried out;

(8) ‘soil district’ means the part of the territory of a Member State, as delimited by that Member State in accordance with this Directive;

(8a) ‘soil unit’ means a spatially discrete area within a soil district resulting from the intersection of spatial data used as criteria for statistical homogeneity within that soil district;

(9) ‘soil health assessment’ means the evaluation of the health of the soil based on the measurement or estimation of soil descriptors;

(9a) ‘soil descriptor’ means a parameter describing a physical, chemical, or biological characteristic of soil health;

(9b) ‘potentially contaminated site’ means a delineated area where soil contamination or contamination of bedrock or parent material caused by point-source anthropogenic activities is suspected with high probability based on relevant evidence;

(10) ‘contaminated site’ means a delineated area […] with confirmed **soil contamination or contamination of bedrock or parent material caused by point-source anthropogenic activities** […];

[…]

(12) ‘land’ means the surface of the Earth that is not **regularly** covered by water **bodies**;

(13) ‘land cover’ means the physical and biological cover of the earth’s surface;

(14) **‘unsealed soil’ means an area of soil that does not fall under the definition of sealed soil** […];

(15) **‘soil sealing’ means the covering of soils by buildings, construction and layers of completely or partly impermeable** material […];

(16) **‘sealed soil’ means an area of soil that underwent soil sealing** […];

(17) **‘soil destruction’ means the temporary or long-term removal of soils** […];

(17a) ‘destroyed soil’ means an area of soil that underwent soil destruction;

(17b) ‘de-sealing’ means the conversion of sealed soil into unsealed soil;

(18) ‘transfer function’ means a mathematical rule that allows to convert the value of a measurement, performed using a methodology different from a reference methodology, into the value that would be obtained by performing the soil measurement using the reference methodology;

(19) ‘public concerned’ means the public affected or likely to be affected by soil degradation, or having an interest in the decision-making procedures related to the implementation of the obligations under this Directive, including land owners and land users, as well as non-governmental organisations promoting the protection of human health or the environment and meeting any requirements under national law.

(20) ‘soil contamination’ means the presence of a […] substance in the soil […] **at a level** that may be harmful to human health or the environment;

(21) ‘contaminant’ means a substance liable to cause soil contamination **or contamination of bedrock or parent material**;

(22) ‘**soil** regeneration’ means an intentional activity aimed at reversing soil from degraded to healthy condition;

(22a) ‘soil renaturation’ means the restoration or reconstruction of destroyed soils with the aim to recover the capacity of soils to provide ecosystem services;

(23) ‘risk’ means the […] **likelihood** of harmful effects to human health or the environment resulting from exposure to soil contamination **or to contamination of bedrock or parent material**;

(24) ‘soil investigation’ means a process **which can be performed in multiple and iterative phases** to assess the presence and […] **level** of contaminants in the soil**, in the bedrock or parent material and, if relevant to characterise and delineate the extent of a contaminated site and, if relevant, to assess the site-specific risks the contaminated site poses to human health or the environment** […];

[…]

(26) ‘soil remediation’ means a […] **set of actions** that reduce, isolate or immobili**s**e contaminant**s** […] in the soil**, the bedrock or the parent material;**

(27) ‘risk reduction measures’ mean measures that aim to reduce the risks of contaminated sites to human health and the environment by modifying the source pathway-receptor linkage without changing the characteristics of the contamination itself or via soil remediation.

Article 4

Soil districts and soil units

1. Member States shall establish**, for administrative purposes,** […] throughout their territory**, one or more soil districts under the responsibility of one or more competent authorities as designated pursuant to Article 5**.

   […]

2. **Member States shall also establish soil units covering their entire territory for the purposes of monitoring design and reporting of soil health with a given level of uncertainty within that soil unit,** […] tak**ing** into account […]:

   (a) **the geographical extent of soil districts as established pursuant to the first paragraph of this Article** […] [55]**;**

   (b) **the soil type as defined in the map of the soil regions of the European Union and Adjacent Countries**[56]**;**

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55 […]

56 **'Soil Regions of the European Union and Adjacent Countries 1:5,000,000', 2005, accessed 2024-03-07, http://data.europa.eu/88u/dataset/ae71ffee-1ae9-4624-ae3f-f49513fe9dcb**

(c) the land use categories, excluding water bodies, as referred to in Regulation (EU) 2018/841 of the Parliament and the Council[57] […];

[…] **[58]** […] **[59]**

[…]

Member States may use more detailed or updated equivalent data when available at the European, national or subnational level to establish their soil units.

Members States may take into account additional spatial data to establish their soil units, such as climate, environmental zone as described in Alterra Report 2281[60]**, or river basins.**

Article 5

Competent authorities

Member States shall designate the competent authorities responsible at an appropriate level for carrying out the duties laid down in this Directive.

[…]

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57 Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU

58 […]

59 […]

60 **M.J. Metzger, A.D. Shkaruba, R.H.G. Jongman and R.G.H. Bunce, Descriptions of the European Environmental Zones and Strata, Alterra Report 2281 ISSN 1566-7197.**

Chapter II

Monitoring and assessment of soil health

Article 6

Soil health and […] **soil sealing and soil destruction monitoring framework**

1. Member States shall establish a monitoring framework **at a level appropriate for the soil descriptors and soil sealing and soil destruction indicators** […] to ensure that regular**, coherent** and accurate monitoring of soil health **and soil sealing and soil destruction** is carried out in accordance with this Article and Annexes I and II.

   If necessary, Member States may adapt their monitoring framework for their outermost regions in order to take into account their specific characteristics.

2. Member States shall monitor soil health **in each soil unit within a soil district** and […] **soil sealing and soil destruction** in each soil district.

3. The monitoring framework shall be based on the following:

   (a) the soil descriptors and […] criteria **for healthy soil condition** referred to in Article 7;

   (b) the soil sampling points to be determined in accordance with Article 8(**1**[…]);

   (c) the soil measurement**s to be** carried out by **Member States and, if any, by the Commission in accordance with Article 8(2) and 8(2a)** […]**;**

   (d) the remote sensing data and products referred to in paragraph 5 of this Article, if any;

   (e) the […] soil sealing **and soil destruction** indicators referred to in Article 7(1).

[…]

5. The Commission and the European Environment Agency (EEA) shall leverage existing space-based data and products delivered under the Copernicus component of the EU Space Programme established by Regulation (EU) 2021/696 to explore and develop**, together with**

Member States, soil remote sensing products, to **provide the Member States with the necessary data on soil sealing and soil destruction indicators and to** support the Member States in monitoring the relevant soil descriptors.

6. The Commission and the EEA shall, on the basis of existing data and within two years of the entry into force of this Directive, establish a digital soil health data portal that shall provide access in georeferenced spatial format to at least the available soil health data **aggregated at the soil unit level or a more detailed level,** resulting from:

(a) the soil measurements referred to in Article 8(2) **and (2a)**;

[…]

(c) the relevant soil remote sensing data and products referred to in paragraph 5 of this Article.

The treatment of these data as well as their access shall be done in accordance with relevant Union legislation.

6a. The Commission and the EEA shall ensure that the Member States are given, in an early, timely and effective manner, the opportunity to express their opinion and to request error correction, if any, before soil health data are made public through the digital soil health data portal referred to in paragraph 6. This shall also apply to any other report based on the monitoring framework established under this Directive.

7. The digital soil health data portal referred to in paragraph 6 may also provide access to other soil health related data than the data referred to in that paragraph if those data were shared or collected in accordance with the formats or methods established by the Commission pursuant to paragraph 8.

7a. The digital soil health data portal referred to in paragraph 6 shall not provide access to the data and information the disclosure of which would adversely affect public security or national defence.

8. The Commission shall adopt implementing acts to establish formats or methods for sharing or collecting the data referred to in […] **this Article** or for integrating those data in the digital soil health data portal. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 21.

Article 7

Soil descriptors, criteria for healthy soil condition, and […] **soil sealing and soil destruction indicators**

1. When monitoring and assessing soil health, Member States shall apply the soil descriptors […] listed in Annex I**, Parts A, B and C**.

   When monitoring […] **soil sealing and soil destruction,** Member States shall apply the […] soil sealing **and soil destruction** indicators[…] **listed** in Annex I**, Part D**.

2. **When assessing soil health, Member States shall use criteria for healthy soil condition. The criteria for healthy soil condition shall consist of:**

   (a) non-binding sustainable target values listed in Annex I, Parts A and B; and

   (b) operational trigger values.

[…]

3. Member States shall […] **set** the organic contaminants for the soil descriptor related to soil contamination referred to in **P**art B of Annex I**. For that purpose, Member States may take into account the indicative watch list referred to in paragraph 5a.**

4. Member States shall set […] **the non-binding sustainable target values** for the soil descriptors listed in **P**art B of Annex I in accordance with the provisions set out in the third column in **P**art B of Annex I.

4a. Member States shall set one or more operational trigger values for each soil descriptor listed in Annex I, Parts A and B, reflecting soil degradation levels for which measures are required to improve the soil health in accordance with Article 9(4) of this Directive.

Member States may set the operational trigger value for one or more soil degradations at the same level as the non-binding sustainable target value for these soil degradations.

5. Member States may set additional soil descriptors and […] **soil sealing and soil destruction** indicators[…] **that are not** listed in […] Annex I […].

5a. Within *(OP: please insert date = 18 months after date of entry into force of the Directive),* the Commission shall establish, in cooperation with Member States, an indicative watch list of soil contaminants, having a high potential to affect soil health, human health or the environment, and shall update the list according to the latest scientific knowledge. Member States may adapt their soil contamination descriptor accordingly.

6. Member States shall inform the Commission when soil descriptors, […] **soil sealing and soil destruction** indicators and […] criteria **for healthy soil condition** are set or adapted in accordance with paragraphs 2 to 5 of this Article**.**

Article 8

Measurements and methodologies

1. Member States shall determine sampling points by applying the methodology set out in **P**art A**.1** of Annex II.

The Commission shall provide Member States with relevant maps of soil descriptors, the initial starting sample and the relevant data linked to sampling points collected under previous European soil surveys for the application of the methodology set out in Part A.1 of Annex II.

1a. After determination of the sampling points and prior to the sampling survey, Member States shall notify the Commission of any potential need for support in terms of field sampling and soil analyses as well as any other need related to the sampling survey.

The Commission shall assess the needs and set the appropriate level of support in coordination with the Member States concerned.

In case of support by the Commission, the Member State concerned shall adapt the sampling survey accordingly and the practical organisation between the Commission and the competent authority of the Member State is covered by a written agreement. In the event of support for the field survey, the Member State concerned shall ensure that the Commission can carry out in-situ soil sampling.

2. Member States **and, in case of support by the Commission and in accordance with the written agreement referred to in the paragraph 1(a) subparagraph 3, the Commission** shall carry out soil measurements by taking soil samples at the sampling points referred to in paragraph 1 and collect, process and analyse data **as relevant** in order to determine the following:

(a) the values of the soil descriptors **listed** […] in Annex I;

(b) where relevant, the values of the additional soil descriptors;

[…]

Member States are exempted from taking soil samples from sealed and destroyed soils.

In relation to the aspect of soil degradation salinisation listed in Part A of Annex I, Member States may exclude the areas not at risk of salinisation from the measurement of electrical conductivity and shall inform the Commission thereof.

The in-situ soil sampling shall be carried out in accordance with the minimum criteria for the methodology of field sample survey defined in Part A.2 of Annex II.

2a. Under the condition that the data were collected in the same period as the sampling survey and according to the methodologies referred to in Annex II Part A.2 and Part B, the soil measurements to be carried out by Member States as referred to in paragraph 2 may consist of, where relevant, the measurements made by:

(i) Member States in accordance with existing national or sub-national soil monitoring networks and surveys;

(ii) Member States under Union legislation and international law;

(iii) private actors, research organisations and other parties, where available.

For the first cycle of soil measurements to be performed in accordance with paragraph 4, the period referred in the first subparagraph of this paragraph starts on ... (OP: please insert date = one year before date of entry into force of the Directive).

2b. Member States shall collect, process and analyse data in order to determine the values of the soil sealing and soil destruction indicators listed in Part D of Annex I.

3. Member States shall apply the following:

(a) the methodologies for determining or estimating the values of the soil descriptors set out in **P**art B of Annex II;

(b) the minimum methodological criteria for determining the values of the […]soil sealing **and soil destruction** indicators set out in **P**art C of Annex II;

(c) any requirements laid down by the Commission in accordance with paragraph 6.

Member States may apply other methodologies than the ones listed in the first subparagraph, points (a) and (b), provided that validated transfer functions are **made** available, as required in Annex II, **P**art B, fourth column.

3a. Member States shall ensure that laboratories, or parties contracted by laboratories, performing the soil measurements apply quality management system practices in accordance with EN ISO/IEC-17025 or with other equivalent standards accepted at Union or international level, and have access to suitably qualified staff with adequate training and to the infrastructure, equipment and products necessary to carry out such soil measurements.

When assessing compliance with quality management system practices, Member States may deem sufficient one accreditation for one of the methodologies for determining the values of soil descriptors set out in Part B of Annex II.

Member States shall ensure that laboratories, or parties contracted by laboratories, performing the soil measurements demonstrate their competences in analysing relevant measurands by:

(a) participation in proficiency testing programmes covering the methods of analysis at levels of concentrations that are representative of soil monitoring programmes, if available;

(b) analysis of reference materials that are representative of collected samples which contain appropriate levels of concentrations, if available.

Where the Commission carries out soil measurements in accordance with this Article, this paragraph shall apply to Commission.

4. Member States **and, in case of support by the Commission, the Commission** shall ensure that the first soil measurements are performed at the latest by… (*OP: please insert the date* = […] ***5*** *years after date of entry into force of the Directive*).

5. Member States shall ensure that new soil measurements are performed […] every […] **6** years **within one sampling campaign or as part of a continuous sampling scheme during the indicated period of time.**

By way of derogation from the first subparagraph, Member States may decide, before a new sampling campaign, not to carry out new soil measurements for a soil descriptor in part or in all of their territory if it is reasonable and justified to expect, based on data previously collected pursuant to Articles 6, 7 and 8, and the use of scientific evidence, including predictive soil models, that the value of such soil descriptor has not evolved significantly since the last cycle. Member States shall without undue delay notify the Commission of any such decision.

5a. Member States shall ensure that the value of the […] soil sealing **and soil destruction** indicators are updated at least every **3** year**s, based on available information**.

6. The Commission is empowered to adopt delegated acts in accordance with Article 20 to amend Annex II**, Part B** in order to adapt the reference methodologies mentioned in it to scientific and technical progress, in particular where values of soil descriptors can be determined by remote sensing **products** referred to in Article 6(5).

Article 9

Assessments of the soil health

1. Member States shall assess the soil health in all their soil districts **and associated soil units** based on the data collected in the context of the monitoring referred to in Articles 6, 7 and 8 for each of the soil descriptors […] **listed** in Parts A and B of Annex I.

[…]

Member States shall ensure that **assessments of** soil health […] are performed […] every […] **6** years and that the first soil health assessment is performed by … *(OP: please insert the date =* […] ***6*** *years after date of entry into force of the Directive)*.

[…]

2. Soil health is assessed with respect to each aspect of soil degradation using the non-binding sustainable target value and the operational trigger values for the related criterion for healthy soil condition set in accordance with Article 7(2), 7(4) and 7(4a).

3. Member States shall analyse the values for the soil descriptors listed in **P**art C of Annex I […] **with a view to identify** whether there is a critical loss of ecosystem services, taking into account the relevant data and available scientific knowledge.

Member States shall analyse the values of […] soil sealing **and soil destruction** indicators listed in **P**art D of Annex I […] **with a view to** assess their impact on the loss of ecosystem services and on the objectives and targets established under Regulation (EU) 2018/841.

3a. Member States may identify improvements for each soil descriptor listed in parts A, B and C of Annex I.

4. Based on the assessment**s** of soil health carried out in accordance with this Article, the competent authorit**ies as referred to in Article 5** shall, where relevant in coordination with local, regional, national authorities, identify, in each soil district, the areas **where individual criteria for healthy soil condition are not satisfied and where measures are required to improve the soil health** […] and inform the public**, on an aggregated level,** in accordance with Article 19.

In addition, in order to contribute to improving the soil health, the competent authorities as referred to in Article 5 shall, where relevant in coordination with local, regional, national authorities, identify, in each soil district, the areas of sealed and destroyed soil with high potential to improve soil health through de-sealing and renaturation. The potential of areas of sealed and destroyed soil shall be assessed based on technical feasibility, cost-efficiency and achievable level of soil health improvement.

[…]

6. **In addition to the obligations under Article 19,** Member States shall communicate soil health data and assessment**s** referred to in Articles 6 to 9 to the relevant land owners and land managers upon their request, in particular to support the development of the advice referred to in Article 10(**2**[…]).

Chapter III

Sustainable soil management

Article 10

Sustainable soil management

1. From *(OP: please insert the date =* […] ***5*** *years after date of entry into force of the Directive)*, Member States shall take at least the following measures, taking into account the type, use and condition of soil**, and the geographical and climatic conditions**:

   (a) defining sustainable soil management practices […] **taking into account** the **guiding** sustainable soil management principles listed in Annex III to be gradually implemented on all managed soils and, on the basis of the outcome of the soil assessments carried out in accordance with Article 9, regeneration practices to be gradually implemented […] in the Member States;

   (b) defining soil management practices and other practices affecting negatively the soil health to be avoided by soil managers.

   When defining the practices […] referred to in this paragraph, Member States shall take into account the programmes, plans, targets and measures listed in Annex IV as well as the latest existing scientific knowledge including results coming out of the Horizon Europe **m**ission **'A** Soil Deal for Europe**'**.

   Member States shall identify synergies with the programmes, plans and measures set out in Annex IV. The soil health monitoring data, the results of the soil health assessments, the analysis referred to in Article 9 and the sustainable soil management […] **practices** shall inform the development of the programmes, plans and measures set out in Annex IV.

Member States shall ensure that the process of elaboration of the practices referred to in the first subparagraph is open, inclusive and effective and that the public concerned, in particular landowners and managers, are involved and are given early and effective opportunities to participate in their elaboration.

2. Member States shall ensure easy access to impartial and independent advice on sustainable soil management, training activities and capacity building for soil managers, landowners and relevant authorities.

Member States shall also take the following measures:

(a) promoting awareness on the medium- and long-term multiple benefits of sustainable soil management and the need to manage soils in a sustainable manner;

(b) promoting research and implementation of holistic soil management concepts;

(c) making available a regularly updated mapping of available funding instruments and activities to support the implementation of sustainable soil management.

3. Member States shall regularly assess the effectiveness of the measures taken in accordance with this Article and, where relevant, review and revise those measures, taking into account the soil health monitoring and assessment**s** referred to in Articles 6 to 9.

[…]

Article 11

Land take mitigation principles

Without impinging on the autonomy of the Member States with regards to spatial planning, Member States shall ensure that the following principles are […] **taken into consideration** in case of […] **new soil sealing and soil destruction as part of land take, at the appropriate spatial level within their territory**:

(a) avoid or reduce as much as […] possible the loss of the capacity of the soil to provide multiple ecosystem services, including food production, by:

(i) reducing**, as much as possible,** the area **of soil** affected by […] **soil sealing and soil destruction** […]**, in particular by encouraging the reuse and repurposing of sealed soils, such as existing buildings,** and

(ii) selecting areas where the loss of ecosystem services would be […] **minimal, in particular on severely degraded soils, such as brownfields,** and

(iii) performing the […] **soil sealing and soil destruction** in a way that minimises the negative impact on soil**, in particular by protecting the surrounding soils or by keeping the soil sealing as reversible as possible**;

(b) […]**aim to offset** […] **to a reasonable extent** the loss of soil capacity to provide multiple ecosystem services**, including with the return of services from renaturation, by encouraging the de-sealing of sealed soils and the reconstruction of destroyed soils**.

Chapter IV

Management of contaminated sites

Article 12

Risk-based and stepwise approach

1. Member States shall **ensure that** […] the risks for human health and the environment of potentially contaminated sites and contaminated sites **are identified, managed**, and kep**t** […] to acceptable levels, taking account of the environmental, social and economic impacts of the soil contamination and of the risk reduction measures taken pursuant to Article 15 […] **(**4**)**. **The risks may be evaluated taking account of the land use during each step referred to in paragraph 2.**

   Member States shall establish a hierarchy of responsibility to determine the responsible party or parties for the site-specific implementation of points (b) and (c) of paragraph 2.

2. By … (OP: please insert the date =4 years after the date of entry into force of the Directive) Member States shall establish a risk-based **and stepwise** approach for the following:

   (a) the identification of potentially contaminated sites in accordance with Article 13;

   (b) the investigation of potentially contaminated sites in accordance with Article 14;

   (c) the **site-specific risk assessment and** management of contaminated sites in accordance with Article 15.

3. The requirement laid down in paragraph 2 is without prejudice to more stringent requirements arising from Union or national legislation.

4. The public concerned shall be given early and effective opportunities:

(a) to […] **comment on** the establishment and concrete application of the risk-based **and stepwise** approach as defined in this Article;

(b) to provide information relevant for the identification of potentially contaminated sites in accordance with Article 13 **and**, the investigation of potentially contaminated sites in accordance with Article 14 […];

(c) to […] **provide information in view of the** correction of information contained in the register […] **of** contaminated sites and potentially contaminated sites in accordance with Article 16.

Article 13

Identification of potentially contaminated sites

1. Member States shall systematically […] identify **the** […] potentially contaminated sites.

2. **For the purpose of the identification of potentially contaminated sites, Member States shall lay down a list of potentially contaminating activities. Those activities may be further classified or prioritised according to their relevance to cause soil contamination based on scientific evidence.** When identifying the potentially contaminated sites**,** Member States shall take into account the following criteria **where relevant**:

(a) operation of an active or inactive potentially contaminating […] activity;

(b) operation of an activity referred to in Annex I to Directive 2010/75/EU;

(c) operation of an establishment referred to in Directive 2012/18/EU of the European Parliament and of the Council[61];

(d) operation of an activity referred to in Annex III to Directive 2004/35/CE of the European Parliament and of the Council[62];

(e) occurrence of a potentially contaminating accident, calamity, disaster, incident or spill;

[…]

(**f**) […] **relevant** information resulting from the soil health monitoring carried out in accordance with Articles 6, 7 and 8.

[…]

3. Member States shall ensure that **the** […] potentially contaminated sites **existent before or at the date of entry into force of this Directive** are **identified and duly recorded in the register referred to in Article 16** […] by *(OP: please insert date =* […] ***10*** *years after date of entry into force of the Directive* […].

61 Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (OJ L 197, 24.7.2012, p. 1).

62 Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (OJ L 143, 30.4.2004, p. 56)

Article 14

Investigation of potentially contaminated sites

1. Member States shall ensure that **the** […] potentially contaminated sites identified […] **pursuant to** Article 13 are subject to soil investigation**, in accordance with paragraph 2 of this Article and the risk-based and stepwise approach referred to in Article 12**.

2. Member States shall lay down the rules concerning the […] **time frame**, content, form and the prioritisation of the soil investigations. […]

   Member States may consider baseline reports and monitoring measures implemented in accordance with the Directive 2010/75/EU **as well as other investigations** as soil investigation**, when they fulfill the requirements of this Directive** […].

3. Member States shall also establish specific events that trigger an investigation […] with**in the time frame referred to in** paragraph 2.

Article 15

Site-specific risk assessment and management of contaminated sites

1. Member States shall lay down the specific methodology for […] **assessing** the site-specific risks of contaminated sites. Such methodology **may** be based on the **indicative** phases and **principles** […] for site-specific risk assessment listed in Annex VI.

2. Member States shall define what constitutes an unacceptable risk for human health and the environment resulting from contaminated sites by taking into account existing scientific knowledge, the precautionary principle, local specificities, and current and […] **planned** land use.

3. For each contaminated site […] **established** pursuant to Article 14 or by any other means, […] **Member States** shall **ensure that** […] a site-specific assessment **is carried out** for the current and planned land use to determine whether the contaminated site poses unacceptable risks for human health or the environment. **If the information gathered pursuant to Article 14 is sufficient to conclude that the soil contamination poses no unacceptable risk to human health or the environment or to conclude that soil remediation is needed, site specific risk assessment does not have to be carried out.**

4. On the basis of the outcome of the assessment referred to in paragraph 3, […] **Member States** […] shall **ensure that** […] the appropriate measures **are taken and implemented** to bring the risks to an acceptable level for human health and the environment ('risk reduction measures') **within an appropriate timescale**.

5. The risk reduction measures may consist of the measures referred to in Annex V. When deciding on the appropriate risk reduction measures, […] the costs, benefits, effectiveness, durability, **sustainability, improvement of soil health** and technical feasibility of available risk reduction measures **shall be taken into account**.

6. The Commission is empowered to adopt delegated acts in accordance with Article 20 to amend Annexes V and VI to adapt the list of risk reduction measures and the **principles** for site-specific risk assessment to scientific and technical progress.

Article 16

Register

1. By ... *(OP : please insert date = 4 years after entry into force of the Directive*), Member States shall, in accordance with paragraph 2, draw up a register of contaminated sites and potentially contaminated sites **as established according to this Chapter**.

2. The register shall contain the information set out in Annex VII**, except the information the disclosure of which would adversely affect public security or national defence**.

3. **Member States shall manage or supervise t**he register **and ensure that it is** […] regularly […] review**ed** and up […] date**d**.

4. Member States shall make public the register and information referred to in paragraphs 1 and 2**, in accordance with Article 19**. Disclosure of any information may be refused or restricted by the competent authority where the conditions laid down in Article 4 of Directive 2003/4/EC of the European Parliament and of the Council[63] are fulfilled.

   The register shall be made available in **the form of** an online georeferenced spatial database.

[…]

63 Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p. 26).

Chapter V

Financing, information to the public and reporting by Member States

Article 17

Union financing

Given the priority inherently attached to the establishment of soil monitoring**,** […] sustainable management and regeneration of soils**, and management of contaminated sites**, the implementation of this Directive shall be supported by […] Union financial programmes in accordance with their applicable rules and conditions.

Article 18

Reporting by Member States

1. Member States shall electronically report the following data and information to the Commission and to the EEA every […] **6** years:

   (a) the data and results of the soil health monitoring and assessment**s** carried out in accordance with Articles 6 to 9;

   (b) a trend analysis of the soil health for the descriptors listed in **P**arts A, B, and C of Annex I and for the[…] soil sealing **and soil destruction** indicators listed in **P**art D of Annex I in accordance with Article 9;

   (c) a summary of the progress on:

      (i) implementing sustainable soil management principles in accordance with Article 10;

(ii) the […] identification […] **and the** investigation **of potentially contaminated sites**, **the** […] management of contaminated sites**, and the registration of potentially contaminated sites and contaminated sites,** in accordance with Articles 12 to 16;

[…]

The first reports shall be submitted by … (*OP: please insert date* = […] ***6*** *years and 6 months after entry into force of the Directive*).

2. […] **Member States and the Commission, with the support of the EEA shall ensure effective exchange of the information and data referred to in paragraph 1, respecting the statistical confidentiality. Member States shall also ensure that the Commission and the EEA have timely and effective access to the data and information contained in the register referred to in Article 16.**

2a. By way of derogation from the first and the second paragraphs, if disclosure of certain data and information would adversely affect public security or national defence, Member States may decide not to report, exchange nor ensure access to such data and information.

3. Member States shall provide the Commission with online access to the following:

(a) an up-to-date list and spatial […] **extent** of their soil districts **and soil units** referred to in Article 4 by … (OP: please insert the date = […] **3** years and 3 months after date of entry into force of the Directive);

(b) an up-to-date list of the competent authorities referred to in Article 5 by … (OP: please insert the date = […] **3** years and 3 months after date of entry into force of the Directive);

(c) the measures and sustainable soil management practices referred to in Article 10 by… (OP: please insert the date = […] **5** years and 3 months after date of entry into force of the Directive).

4. The Commission is empowered to adopt implementing acts establishing the format and the modalities for submitting the information referred to paragraph 1 of this Article. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 21.

Article 19

Information to the public

1. Member States shall make **accessible to the** public the […] **results** generated by the monitoring carried out under Article 8 […] **and** the assessment**s** carried out under Article 9 **in the form of aggregated data, and the register under Article 16** of this Directive**.** […] [64]

[64] […]

2. The Commission shall ensure that **the public has access to** […] the digital soil health data portal referred to in Article 6**.** […] [65] [66]

[…][67]

4. Disclosure of any information required under this Directive may be refused or restricted where the conditions laid down in Article 4 of Directive 2003/4/EC are fulfilled.

4a. When the Commission or Member States use confidential data to produce European statistics, it shall protect such data in accordance with the rules and measures of Regulation (EC) No 223/2009 of the European Parliament and of the Council. The Commission or the EEA shall require the explicit authorisation of the authority that collected the data before disclosure of confidential data.

[65] […]
[66] […]
[67] […]

Chapter VI

Delegation and Committee procedure

Article 20

Exercise of the delegation

1. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in this Article.

2. The power to adopt delegated acts referred to in Articles 8**(6)** […] **and** 15**(6)** […] shall be conferred on the Commission for an indeterminate period of time from the date of entry into force of this Directive.

3. The delegation of power referred to in Articles 8**(6)** […] **and** 15**(6)** […] may be revoked at any time by the European Parliament or by the Council. A decision to revoke shall put an end to the delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the Official Journal of the European Union or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.

4. Before adopting a delegated act, the Commission shall consult experts designated by each Member State in accordance with the principles laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making.

5. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

6. A delegated act adopted pursuant to Articles 8**(6) and** […] 15**(6)** […] shall enter into force only if no objection has been expressed either by the European Parliament or the Council within a period of two months of notification of that act to the European Parliament and the Council or if, before the expiry of that period, the European Parliament and the Council have both informed the Commission that they will not object. That period shall be extended by two months at the initiative of the European Parliament or of the Council.

Article 21

Committee

1. The Commission shall be assisted by a committee. That committee shall be a committee within the meaning of Regulation (EU) No 182/2011.

2. Where reference is made to this paragraph, Article 5 of Regulation (EU) No 182/2011 shall apply.

Chapter VII

Final provisions

Article 22

Access to justice

1. Member States shall ensure that**, in accordance with the national legal system,** members of the public **concerned** […], have access to a review procedure before a court of law, or an**other** independent and impartial body established by law, to challenge the substantive or procedural legality of the assessment of soil health, the measures taken pursuant to this Directive and any failures to act of the competent authorities **when one of the following conditions is met:**

(a) **they have a sufficient interest;**

(b) **they maintain the impairment of a right, where administrative procedural law of a Member State requires this as a precondition.**

[…]

2. **Standing in the review procedure shall not be conditional on the role that the concerned member of the public played during a participatory phase of the decision-making procedures under this Directive.**

3. Review procedure […] shall be fair, equitable, timely and […] not prohibitively expensive, and shall provide adequate and effective **redress mechanisms** […], including injunctive relief […] **as appropriate.**

[…]

[…]

Article 23a

Support by the Commission

1. The Commission shall provide Member States with the necessary support, assistance and capacity building in order to enable them to carry out their obligations under this Directive. In particular, the Commission shall issue, in cooperation with the Member States, documents and scientific tools that may be used by Member States to facilitate them to:

(a) establish a monitoring framework pursuant to Article 6 and determine their sampling points pursuant to Article 8(1) and (1a) and Part A.1 of Annex II ;

(b) set sustainable target values and operational trigger values for the soil descriptors pursuant to Article 7(2) and Parts A, B and C as relevant of Annex I;

(c) determine their list of organic contaminants to be monitored pursuant to Article 7(3) and Part B of Annex I with the possibility to take into account the indicative watch list of soil contaminants to be established by the Commission pursuant to Article 7(5a);

(d) assess the areas not at risk of salinization that can be excluded from the measurements of electrical conductivity pursuant to Article 8(2) and Part A of Annex I;

(e) carry out in-situ sampling of soil descriptors pursuant to Article 8(2) and Part A.2 of Annex II;

(f) determine the values of the soil sealing and soil destruction indicators pursuant to Article 8(2b) and Part C of Annex II;

(g) determine or estimate the values of the soil descriptors pursuant to Article 8(3) and Part B of Annex II;

(h) identify and assess the critical loss of ecosystem services pursuant to Article 9(3) subparagraph 1 and the impact of soil sealing and soil destruction on the loss of ecosystem services pursuant to Article 9(3) subparagraph 2;

(i) identify the potentially contaminated sites and to lay down a list of potentially contaminating activities pursuant to Article 13; and

(j) lay down the specific methodology for assessing the site specific risks of contaminated sites, taking into account common practices, methodologies and toxicological data pursuant to Article 15.

The documents and scientific tools referred to in the first subparagraph shall be provided for, as regards:

i. point a), within 1 year after the entry into force of this Directive;
ii. points b), c), e) and j), within 18 months after the entry into force of this Directive;
iii. point i), within 2 years after the entry into force of this Directive;
iv. points d), f) and g), within 3 years after the entry into force of this Directive;
v. point h), within 4 years after the entry into force of this Directive.

Those documents and scientific tools may take the form of guidelines.

2. The Commission shall organize regular exchange of information, experience and best practices between Member States and, where relevant, other parties on the application of this Directive and the communication to the public of the results generated by the monitoring and the soil health assessments. The first exchange shall take place within three months after entry into force of the Directive.

The Commission shall publish the results of the exchange of information, experience and best practices on these and other relevant topics, and where relevant, provide recommendations or guidelines to Member States.

Article 24

Evaluation and review

1. By (*OP :please insert the date* = […] ***7** years **and 6 months** after the date of entry into force of the Directive*), the Commission shall carry out an evaluation of this Directive to assess the progress towards its objectives and the need to amend its provisions in order to set more specific requirements to **achieve the objectives of this Directive** […]. This evaluation shall take into account, inter alia, the following elements:

   (a) the experience gained through the implementation of this Directive;

   (b) the data and information referred to in Article 18;

   (c) relevant scientific and analytical data, including results from research projects funded by the Union;

   (d) an analysis of the gap towards achieving healthy soils by 2050;

   (e) an analysis of the possible need to adapt to scientific and technical progress the provisions of this Directive in particular regarding the following items:

      (i) the definition of healthy soils;

      (ii) the establishment of criteria for soil descriptors listed in **P**art C **of Annex I and soil sealing and soil destruction indicators listed in Part D** of **A**nnex I;

      (iii) the addition of new soil descriptors for monitoring purposes.

2. The Commission shall present a report on the main findings of the evaluation referred to in paragraph 1 to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions.

Article 25

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by … [OP please insert date = […] **3** years after date of entry into force of the Directive]. They shall forthwith communicate to the Commission the text of those provisions.

   When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 26

Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 27

Addressees

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament	*For the Council*
The President	*The President*

ANNEX I

SOIL DESCRIPTORS,CRITERIA FOR HEALTHY SOIL CONDITION, AND […] SOIL SEALING AND SOIL DESTRUCTION INDICATORS

For the purposes of this Annex, the following definitions shall apply

(1) **'natural land' means an area of land in which the natural process is dominant and human intervention is minimal or non-existent, with the primary ecological functions and species composition not substantially modified** […]**;**

(2) 'net […] **sealing**' means the result of […]**soil sealing** minus[…] **de-sealing;**

(3) 'Settlement area' as defined in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories;

(3a) 'Organic soils' and 'mineral soils' as defined in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Aspect of soil degradation	**Soil descriptor[68]**	**Criteria for healthy soil condition – non-binding sustainable target values[69]**	**Land areas that shall be excluded from meeting the related criterion**
Part A: soil descriptors with criteria for healthy soil condition established at Union level			
Salini**s**ation[70]	Electrical Conductivity (deci-Siemens per meter)	< 4 dS m^{-1} when using saturated soil paste extract (eEC) measurement method, or equivalent criterion if using another measurement method	Naturally saline land areas**, areas with regular flooding from marine submersion and areas subject to sea spray** […]
[…]	[…]	[…]	[…]
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

[68] The minimum criteria for the methodology for in-situ sampling of soil descriptors are provided in Part A.2 of Annex II and further detailed in application of Article 23a

[69] The methodology on setting sustainable target values and operational trigger values for soil descriptors of Part A, B and, when possible, Part C of Annex I are further detailed in application of Article 23a.

[70] **The measurement of electrical conductivity can be excluded in areas not at risk of salinisation. The methodology for assessing areas not at risk of salinisation are further detailed in application of Article 23a.**

[+] OP : please insert in the text the number of Regulation on nature restoration contained in document COM(2022) 304

		- For mineral soils: SOC/Clay ratio > 1/13 **(that is SOC content to the content of the clay fraction (fraction with a diameter of less than 0.002 mm))**; Member States […] **are expected to** apply corrective factor**s to the ratio** where specific soil types or climatic conditions justify it, taking into account the **link to structural stability.** […]	Non- managed soils in natural land areas
Subsoil compaction			Non-managed soils in natural land areas **and areas with naturally compacted soils**

<table>
<tr>
<td>[…]</td>
<td>Bulk density in subsoil […] (g per cm^3)</td>
<td>
<table>
<tr><td>Soil texture[71]</td><td>range</td></tr>
<tr><td>sand, loamy sand, sandy loam, loam</td><td><1.80</td></tr>
<tr><td>Sandy clay loam, loam, clay loam, silt, silt loam</td><td><1.75</td></tr>
<tr><td>silt loam, silty clay loam</td><td><1.65</td></tr>
<tr><td>Sandy clay, silty clay, clay loam with 35-45% clay</td><td><1.58</td></tr>
<tr><td>Clay</td><td><1.47</td></tr>
</table>
Member States may apply different texture classes or values corresponding to the levels seen as a problem for plant rooting system development.

[…]
</td>
<td></td>
</tr>
</table>

[71] As defined in […] **IUSS Working Group WRB. 2022. World Reference Base for Soil Resources. International soil classification system for naming soils and creating legends for soil maps. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria**

	Optional: **Saturated hydraulic conductivity – Ksat (cm/day)** **Air capacity (%)**	 **≥ 10 cm/day[72]** **Member States may adapt this value according to their local soil conditions.** **≥ 5%[74]** **Member States may adapt this value according to their local soil conditions.**	

[72] Lebert, M., Böken, H., Glante, F. 2007. Soil compaction—indicators for the assessment of harmful changes to the soil in the context of the German Federal Soil Protection Act. Journal of Environmental Management 82(3): 388-397.

Part B: soil descriptors with criteria for healthy soil condition established at Member States level			
Excess nutrient content in soil	Extractable phosphorus (mg per kg)	< "maximum value"; […] **Member States shall define their own "maximum value", to a level that would not entail damage to the environment and human health.**	[…] **Non-managed soils in natural land areas**
Soil erosion	**Soil erosion rate** **(tonnes per hectare per year)**	**< "maximum value";** **Member States shall define their own "maximum value", to a level that would not entail damage to the environment and human health.**	**Badlands and natural land areas, except if they represent a significant disaster risk**

Soil contamination	- concentration of heavy metals in soil: As, Sb, Cd, Co, Cr (total), […], Cu, Hg, Pb, Ni, Tl, V, Zn (**m**g per kg) - concentration of a selection of organic contaminants established by Member States and taking into account existing concentration limits e.g. for water quality and air emissions in Union legislation	Reasonable assurance, obtained from soil point sampling, identification and investigation of contaminated sites and any other relevant information, that no unacceptable risk for human health and the environment from soil contamination exists. **Natural and anthropogenic background levels should be taken into account in the risk assessment.** **If natural background is the only reason leading to unacceptable risks, then such soil should be deemed as compliant with healthy soil criteria provided it is managed in such a way that there is no unacceptable risk for human health.** Habitats with naturally high concentration of heavy metals that are included in Annex I of Council Directive 92/43/EEC[73] shall remain protected.	No exclusion

[73] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

Reduction of soil **water retention** […] **and infiltration** […]	**Water retention:** - Soil water holding capacity of the soil sample (**% of water / total soil (volume or mass)** […]) **Water infiltration:** - **Saturated hydraulic conductivity – Ksat (cm/day)** - **Air capacity (%)**	The estimated value for the total water holding capacity**, the saturated hydraulic conductivity and the air capacity** of a soil […] **unit is above the minimal threshold and may also be assessed** by river basin or subbasin**, taking into account water processes occurring at that scale.** […]. The minimal threshold shall be set (in tonnes) by the Member State at **the relevant scale** […] at such a value that the impacts of floodings following intense rain events or of periods of low soil moisture due to drought events are mitigated.	No exclusion
Loss of soil organic carbon	**Soil organic carbon stocks (tC ha^{-1})** **Optional:** **Soil organic carbon content (g per kg)**	**Contribute to national targets for net greenhouse gas removals in the LULUCF sector as referred to in Article 4(3) of Regulation (EU) 841/2018** **> "minimum value";** **The "minimum value" shall be laid down by the Member State by soil texture**	**No exclusion**

Part C: soil descriptors without criteria	
Aspect of soil degradation	**Soil descriptor**
Excess nutrient content in soil	**Total n**itrogen in soil (mg g^{-1}) **Soil organic carbon to nitrogen ratio**
Acidification	Soil acidity (pH) **Member States may also select the optional descriptor:** **- base saturation (i.e. (Ca + Mg + K)/effective CEC)**
Topsoil compaction	Bulk density in topsoil (A-horizon[74]) (g cm^{-3}) **Optional** **Saturated hydraulic conductivity (cm/day)** **Air capacity (%)**
Loss of soil biodiversity	[…] Member States […] **shall** […] select **at least one** […] soil descriptor for biodiversity such as **but not limited to**: - metabarcoding of bacteria, fungi, protists and animals; **- Phospholipid fatty acid analysis (PFLA)** - abundance and diversity of nematodes; […] - abundance and diversity of earthworms (in cropland); **- abundance and diversity of springtails;** **- abundance and diversity of native ants;** **- bacterial diversity based on DNA;** **- soil biological quality based on arthropods (QBS-ar)** **- presence of** invasive alien species and plant pests

[74] As defined in the FAO Guidelines for Soil Description, Chapter 5 (https://www.fao.org/3/a0541e/a0541e.pdf)

Optional: **Loss of soil biological activity**	**Member States may select soil descriptors for biological activity such as but not limited to:** - **soil basal respiration ($(mm^3\ O_2\ g^{-1}\ hr^{-1})$ in dry soil** - **microbial biomass;** - **Soil respiration;** - **Enzyme activity.**

Part D: […] *soil sealing and soil destruction indicators*	
Aspect of soil degradation	**Soil sealing and soil destruction indicators**
[…] **S**oil sealing **and soil destruction**	Total […] **sealed soils and destroyed soils** (km² and % of Member State surface) **Soil sealing and soil destruction, de-sealing, net-sealing (average per year–- in km² and % of Member State surface)** […] **Total settlement area (km² and % of Member State surface)** **Land use change towards and from settlement area** (average per year–- in km² and % of Member State surface) […] Member States may also measure other related optional indicators such as: **- soil artificialisation** - land fragmentation - land recycling rate - land taken for commercial activities, logistic hubs, renewable energies, surfaces such as airports, roads, mines - consequences of […] **soil sealing and soil destruction** such as quantification of loss of ecosystem services, change in floods intensity

ANNEX II

METHODOLOGIES

Part A: Methodology for determining sampling points **and for the sample survey**

Activity	**Minimum criteria for methodology**
1. Determination of soil sampling points (sample survey) **for soil health assessment**	The sample survey shall be designed from a complete sample frame containing the best available information on the soil properties distribution, including but not limited to information resulting from […] **relevant** […] measurements **pursuant to Article 8 paragraphs 2 and 2a** […]. The sampling scheme shall be a stratified random sampling optimised on the **best available information on the variability of** soil health descriptors **and the stratification shall be based on the soil units established in accordance with Article 4(2)**. **Sampling points related to measurements referred to in Article 8 paragraph 2a may be taken into account partly or completely in the sampling scheme, regardless of their associated design.** The **number and location** of the […] **sampling points** shall […] **represent the variability of the chosen soil descriptors within the soil units with** a maximum percent error (or Coefficient of Variation) of 5% […]. […] The allocation and size of the sample shall be determined by applying **appropriate procedures (e.g.** the Bethel algorithm **-** Bethel, 1989[75]**) able to** account for the required maximum estimation error. **The sample survey designed by the Member States for each monitoring cycle may change or remain the same.** **The determination of soil sampling points is further detailed in application of Article 23a.**
2. Field sample survey	**Exact sampling locations should be sampled unless duly justified circumstances prevent sampling the**

[75] Bethel, J. 1989. "Sample Allocation in Multivariate Surveys." Survey Methodology 15: 47–57.

	locations, such as soil saturated with water or a high level of rock content. **When soil composite samples are taken, they shall be a mixture of at least 5 subsamples.** **When sampling soil in non-forested areas, residues and organic debris should be removed from the surface.** **When sampling soil in forested areas, the forest floor, if relevant subdivided in litter and organic layer, should be sampled separately and their thickness and weight should be recorded.** **When taking samples or subsamples for the composite sample, they should be taken to a depth of at least 30 cm of soil. Information such as soil type and if possible genetic soil horizons should be recorded. Subsamples should be mixed together in order to get a homogeneous composite sample. Sampling can be done by fixed depth or by horizon, but data shall be reported by fixed depth.** **Bulk density samples should be undisturbed samples taken at the relevant depth, including below 30 cm for subsoil. Samples related to soil compaction (saturated hydraulic conductivity and air capacity) may be the same undisturbed samples than the ones taken for bulk density. Where high content of coarse fragments in soil prevents sample taking, sampling may be excluded in that location for measuring bulk density.** **The field sample survey is further detailed in application of Article 23a, including on how to handle specific situations such as shallow soils and different sampling depths.**

Part B: Methodology for determining or estimating the values of soil descriptors

When a reference methodology is set, either the reference methodology **or an equivalent methodology** is used or another methodology, provided that it is available in the scientific literature or publicly available and a validated transfer function is available.

If a CEN methodology is available, it is preferred over the reference methodology. In this case the initial reference methodology is considered as an equivalent methodology.

Soil descriptor	**Reference methodology**	**Minimum methodological criteria**	**Validated transfer function required (if using a methodology different from the reference methodology)?**
Soil texture (clay, silt and sand content – needed for the determination of other descriptors and related ranges)	[…] ISO 11277 […] Determination of particle size distribution in mineral soil material – Method by sieving and sedimentation […]		YES
Electrical Conductivity	**Option 1: ISO 11265 Determination of The Specific Electrical Conductivity;** Option […] **2**: saturated soil paste extract (eEC) measurement method (FAO SOP: GLOSOLAN-SOP-08[76]) […]		YES
Soil erosion rate		Soil erosion rate estimation shall take into account all actions taken to mitigate or compensate the erosion risk, including post-fire mitigation measures. Soil erosion rate estimation shall include all relevant erosion processes such as erosion by water, wind, harvest and tillage.	N**ot applicable** […]

[76] https://www.fao.org/3/cb3355en/cb3355en.pdf

		Soil erosion by water shall be assessed by considering the following factors: - soil characteristics (e.g. erodibility, soil crusting, soil roughness**,** **stoniness**), - climate (e.g. rainfall erosivity – intensity and duration […]), - topography (e.g. slope steepness and length), - vegetation cover, crop type, land use and management practices to control or reduce erosion, - management practices (e.g. cover crops, reduced tillage, mulching, etc.), - burned areas. Soil erosion by wind shall be assessed by considering the following factors: - soil characteristics (e.g. erodibility), - climate (e.g. soil moisture, wind speed, evaporation), - vegetation (e.g. crop type), - management practices to control or reduce erosion (e.g. wind breaks).	

		Soil erosion by management practices such as tillage or export of biomass shall be quantitatively assessed based on a methodology either available in the scientific literature or publicly available.	
Soil Organic Carbon (SOC)	ISO 10694 […] Determination of organic and total carbon after dry combustion**, ensuring all carbon is incinerated.** **Carbon in carbonates should be determined using ISO 10693 and organic carbon should be expressed as difference.**		YES
Soil Organic Carbon Stocks (SOC stocks)	**Methodology as set out in Annex V of Regulation 2018/1999 in accordance to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories**		**YES**
Bulk density in subsoil […]	ISO 11272 […] for determination of dry bulk density In case an equivalent parameter is chosen, the methodology shall be either a European or International standard when available; if such standard is not available, the methodology chosen shall either be available in the scientific literature or publicly available.	**Methodology can be refined depending on the proportion of coarse fragments**	YES
Extractable	**Preferred:** ISO 11263 […] for spectrometric		YES

phosphorus	determination of phosphorus soluble in sodium hydrogen carbonate solution (P-Olsen) **Other methods can be used as an alternative.**		
- Concentration of heavy metals in soil: As, Sb, Cd, Co, Cr (total), […] Cu, Hg, Pb, Ni, Tl, V, Zn - Concentration of a selection of organic contaminants defined by Member States and taking into account existing **Union** […] legislation (e.g. on water quality or pesticides)	[…] **ISO 54321: Aqua Regia** **Optional: bioavailable fractions of contaminants, such as ISO 17586 using dilute nitric acid.**	Use European or International standards when available; if such standard is not available, the methodology chosen shall either be available in the scientific literature or publicly available	YES N**ot applicable if European or International standards are not available** […]
Soil water holding capacity**, air capacity and saturated hydraulic conductivity**	Methodology to determine the value for one sample point: **1) Soil water holding capacity and air capacity:** Option 1: LABORATORY: ISO 11274 […] for determination of the water-retention characteristic. Option 2: ESTIMATION: apply […] particle size distribution**, bulk density,** […] soil organic carbon **concentration**. **2) Saturated hydraulic conductivity:**	Minimum criteria for estimating the total soil water holding capacity**, the air capacity and the saturated hydraulic conductivity** of a soil **unit** […] **or** on a river basin or sub-basin scale: - for the area of **soils not sealed or destroyed,** […] estimate the total value of soil water holding capacity**, air capacity and saturated hydraulic conductivity** - for the area of […] **sealed and destroyed soils**, consider setting the water holding capacity**, air capacity**	YES (for point value)

	Option 1: LABORATORY: ISO 17313: Determination of hydraulic conductivity of saturated porous materials **Option 2: ESTIMATION: apply pedotransfer functions requiring soil-specific input data such as particle size distribution, bulk density, soil organic carbon concentration.**	**and saturated hydraulic conductivity** of impervious areas to zero, attributing proportionately intermediate values to semi-impervious and other artificial areas.	
Nitrogen in soil	**Option 1** ISO 11261 […] for determination of total soil nitrogen using a modified Kjeldahl method **Option 2** **ISO 13878: Determination of total nitrogen by dry combustion**		YES
Soil acidity	ISO 10390 […] for determination of pH in H2O**, KCl** and CaCl2 extract […]		YES
Base saturation and exchangeable concentrations of sodium, potassium, calcium, and magnesium	**ISO 11260: Determination of effective cation exchange capacity and base saturation level using BaCl2**		**YES**

Bulk density in "topsoil" (A-horizon[77])	ISO 11272 […] for determination of dry bulk density	**Methodology can be refined depending on the proportion of coarse fragments**	YES
[…] **Descriptors linked to soil biodiversity and biological activity** […]	[…]	Use European or international standards when available; if such standard is not available, the methodology chosen shall either be available in the scientific literature or publicly available.	[…] For other soil biodiversity descriptors: N**ot applicable** […]

[77] As defined in the FAO Guidelines for Soil Description, Chapter 5 (https://www.fao.org/3/a0541e/a0541e.pdf)

Part C: minimum methodological criteria for determining the values […] **of the soil sealing and soil destruction indicators**

[…]

- For the soil sealing and soil destruction indicators, the methodologies used shall comply with the definitions set out in Article 3 and Annex I. Such methodologies shall make use at least of the Copernicus products or, preferably, best available data including remote sensing images, which shall be supplemented with relevant national inventories.

- For the settlement area indicator, Member states may use data collected under Regulation (EU) 2018/841, provided that such data are reported at district level.

[…]

- The methodologies chosen shall either be available in the scientific literature or publicly available.

ANNEX III

GUIDING SUSTAINABLE SOIL MANAGEMENT PRINCIPLES

The following principles shall apply:

(a) avoid leaving soil bare by establishing and maintaining vegetative soil cover, especially during environmentally sensitive periods;

(b) minimise physical soil disturbance;

(c) avoid inputs or release of substances into soil that may harm human health or the environment, or degrade soil health;

(d) ensure that machinery use is adapted to the strength of the soil, and that the number and frequency of operations on soils are limited so that they do not compromise soil health;

(e) when fertili**s**ation is applied, ensure adaptation to the needs of the plant and trees at the given location and in the given period, and to the condition of soil and prioriti**s**e circular solutions that enrich the organic content;

(f) in case of irrigation, maximise efficiency of irrigation systems and irrigation management and ensure that when recycled wastewater is used, the water quality meets the requirements set out in Annex I of Regulation (EU) 2020/741 of the European Parliament and of the Council[78] and when water from other sources is used, it does not degrade soil health;

(g) ensure soil protection by the creation and maintenance of adequate landscape features at the landscape level;[79]

(h) use site-adapted species in the cultivation of crops, plants or trees where this can prevent soil degradation or contribute to improving soil health, also taking into consideration the adaptation to climate change;

(i) ensure optimised water levels in organic soils […] **to avoid negative impact on** the structure and composition of such soils […];[80]

(j) in the case of crop cultivation, ensure crop rotation and crop diversity, taking into consideration different crop families, root systems, water and nutrient needs, and integrated pest management;

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78 Regulation (EU) 2020/741 of the European Parliament and of the Council of 25 May 2020 on minimum requirements for water reuse (OJ L 177, 5.6.2020, p. 32).

79 This principle does not apply to forest soils

80 This principle does not apply to urban soils

(k) adapt livestock movement and grazing time, taking into consideration animal types and stocking density, so that soil health is not compromised and the soil's capacity to provide forage is not reduced;

(l) in case of known […] loss of one or several functions that substantially reduce the soils capacity to provide ecosystem services, apply targeted measures to […] **restore** those soil functions.

ANNEX IV

PROGRAMMES, PLANS, TARGETS AND MEASURES REFERRED TO IN ARTICLE 10

(1) The national restoration plans prepared in accordance with Regulation …/…[81]+.

(2) The strategic plans to be drawn up by Member States under the Common Agricultural Policy in accordance with Regulation (EU) 2021/2115.

(3) The Code of Good Agricultural Practice and the action programmes for designated vulnerable zones adopted in accordance with Directive 91/676/EEC.

(4) The conservation measures and prioritised action framework established for Natura 2000 sites in accordance with Directive 92/43/EEC.

(5) The measures for achieving good ecological and chemical status of surface water bodies and good chemical and quantitative status of groundwater bodies included in river basin management plans prepared in accordance with Directive 2000/60/EC.

(6) The flood risk management measures included in the flood risk management plans prepared in accordance with Directive 2007/60/EC.

(7) The drought management plans referred to in the Union Strategy on Adaptation to Climate Change.

(8) The national action programmes established in accordance with the United Nations Convention to Combat Desertification.

(9) The targets set out under Regulation (EU) 2018/841.

(10) The targets set out under Regulation (EU) 2018/842.

(11) The national air pollution control programmes prepared under Directive (EU) 2016/2284 and the monitoring data about air pollution impacts on ecosystems reported under that Directive.

(12) The integrated national energy and climate plans established in accordance with Regulation (EU) 2018/1999.

(13) The risk assessments and disaster risk management planning in accordance with Decision No 1313/2013/EU.

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81 + OP : please insert in the text the number of Regulation on nature restoration contained in document COM(2022) 304

(14) The national actions plans adopted in accordance with Article 8 of Regulation …/…[82]+.

(15) The national actions plans adopted in accordance with Article 4 of Directive 2009/128/EC.

(16) The mitigation and risk reduction measures stated in the environmental impact assessments performed according to Directive 2011/92/EU for the plans and projects that might have a negative impact on the soil.

[82] + OP : please insert in the text the number of Regulation of the European Parliament and of the Council the sustainable use of plant protection products and amending Regulation (EU) 2021/2115 contained in document COM(2022)305

ANNEX V

INDICATIVE LIST OF RISK REDUCTION MEASURES

(1) Remediation techniques for in- or ex-situ remediation:

a) Physical remediation techniques:
   a. Vapor extraction, air sparging;
   b. Heat treatment, steam injection, thermal desorption, vitrification;
   c. Soil washing and flushing;
   d. […]
   e. Liquid layer removal;
   f. […]

b) Biological remediation techniques:
   a. Stimulation of aerobic or anaerobic degradation: bioremediation, biostimulation, bioaugmentation, bioventing, biosparging;
   b. Phytoextraction, phytovolatili**s**ation, phytodegradation;
   c. Composting, soil amendments, landfarming, and bioreactor systems;
   d. Biofiltration, biotreatment wetlands, and biobeds;
   e. **Monitored n**atural attenuation.

c) Chemical remediation techniques:
   a. Chemical oxidation;
   b. Chemical reduction and reduction-oxidation (redox) reactions;
   c. Pump and treat of groundwater.

d) Remediation techniques **to reduce the transfer of contaminants** […] **(through** isolation, containment and monitoring**)**:

a. Surface capping, reactive barriers, encapsulation;

b. Chemical stabili**s**ation, solidification and immobili**s**ation;

c. Geo-hydrological isolation and containment;

d. Phyto-stabilisation;

e. Control and aftercare through monitoring wells.

(2) Risk reduction measures other than remediation **to reduce exposure**:

a) Restriction on the cultivation and consumption of crops and vegetables;

b) Restriction on the consumption of eggs;

c) Restriction on the access of pets or husbandry;

d) Restriction on the extraction or use of groundwater for drinking, personal hygiene or industrial purposes;

e) Restriction on the demolition, de-sealing, or construction on the site **(e.g. constructive measures for ventilation, tanking, etc.)**;

f) Restriction on the access on or in the neighbourhood of the site (e.g. through fencing);

g) Restriction on land use or land use changes;

h) Restriction on digging, drilling or excavation;

i) Restriction to avoid contact with soil, dust or indoor air and apply precautions to protect human health (e.g. respirators, gloves, wet cleaning, etc.).

(3) Best available techniques referred to in Directive 2010/75/EU.

(4) Measures taken by competent authorities and industrial operators following a major accident, in accordance with Directive 2012/18/EU.

ANNEX VI

INDICATIVE PHASES AND […] PRINCIPLES FOR SITE-SPECIFIC RISK ASSESSMENT

1. Characteri**s**ation of the contamination requires identifying the **nature of the** contaminants **(e.g. heavy metals, organic contaminants, etc.)** present at the site and determining their source, concentration, chemical form, and distribution in the soil**, parent material** and groundwater. The presence and concentration of contaminants **in the different media** is determined through […] sampling and investigation **on-site and off-site, if a transfer of contaminants is suspected**. **Contaminants associated with the potentially contaminating activities are sampled in the relevant media on the basis of the environmental context and the physico-chemical properties of the contaminants that influence their behaviour in the environment. Natural and anthropogenic background concentrations should be considered.**

2. Exposure assessment **requires to** identif**y** the path by which soil contaminants may reach receptors. Exposure pathways may include inhalation, ingestion, dermal contact, plant uptake, migration to groundwater or others. The […] **concentrations of the contaminants in the exposure media are** combined with **exposure parameters (e.g.** frequency and duration of exposure**, soil ingestion rate, etc.)** and receptor characteristics such as age, gender, and health status to estimate the […] **daily exposure dose**. The source-pathway-receptor linkages are summari**s**ed in a graphic, schematic and simplified representation: the conceptual site model. **Exposure can be assessed through direct analysis at the point of exposure or by modelling the transfer of a contaminant to the medium of exposure.**

3. Toxicity or hazard assessment involves the evaluation of the potential **human** health and environmental **adverse** effects of the contaminants, based on the dose and duration of exposure. The toxicology or hazard assessment takes into account the inherent toxicity of the contaminants and the susceptibility of different **exposed receptors (humans and ecosystems** […]**)**. The toxicological information is used to estimate reference doses or concentrations, which are used for the risk characteri**s**ation.

4. Risk characteri**s**ation requires integrating the information from the previous steps to estimate the magnitude and probability of adverse effects of the contaminated site for human health and the environment, including from migration of the contamination to other environmental media. The risk characteri**s**ation helps to **assess and** prioriti**s**e the need for risk reduction and remediation measures**, and to ensure that the condition of the soil is compatible with the current and planned land use**. It can also help to define remediation or management objectives for a site, e.g. to achieve maximum acceptable limits or site-specific risk-based screening values. **Risk assessment involves a large number of hypotheses and uncertainties. It is therefore essential to evaluate these uncertainties to fully understand the significance of the results obtained and to make well-informed decisions.**

   The assessment of risk for human health or environment should be proportionate to the complexity of the contaminated site.

ANNEX VII

CONTENT OF REGISTER OF POTENTIALLY CONTAMINATED SITES AND CONTAMINATED SITES

The design and presentation of the data in the register shall enable the public to track progress in the management of potentially contaminated sites and contaminated sites. The register shall contain and present the following information at site level for the known potentially contaminated sites, contaminated sites, contaminated sites requiring further action, and contaminated sites where action was taken or is being taken:

(a) coordinates, address or cadastral parcel(s) of the site in accordance with Directives (EU) 2019/1024 and 2007/2/EC;

(b) year of inclusion in the register;

(c) contaminating or potentially contaminating […] activities that have taken or are taking place on the site;

(d) management status of the site;

(e) conclusion on the presence or absence, […] type and risk of the contamination (or residual contamination after remediation) where information on those elements is already available from the soil investigations and risk assessment referred to in Articles 14 and 15;

(f) **Required** next actions and management steps […] referred to in Articles 14 and 15 […].

The register may also contain the following information at site level for the known potentially contaminated sites, contaminated sites, contaminated sites requiring further action, and contaminated sites where action was taken or is being taken, where available:

(a) information on environmental permits issued for the site, including the start and end year of the activity;

(b) current and planned land use;

(c) results of soil investigation and remediation reports such as concentrations and contours of the contamination, conceptual site model, risk assessment methodology, techniques used or planned, effectiveness and cost estimates of risk reduction measures**;**

(d) timeline of next actions and management steps.